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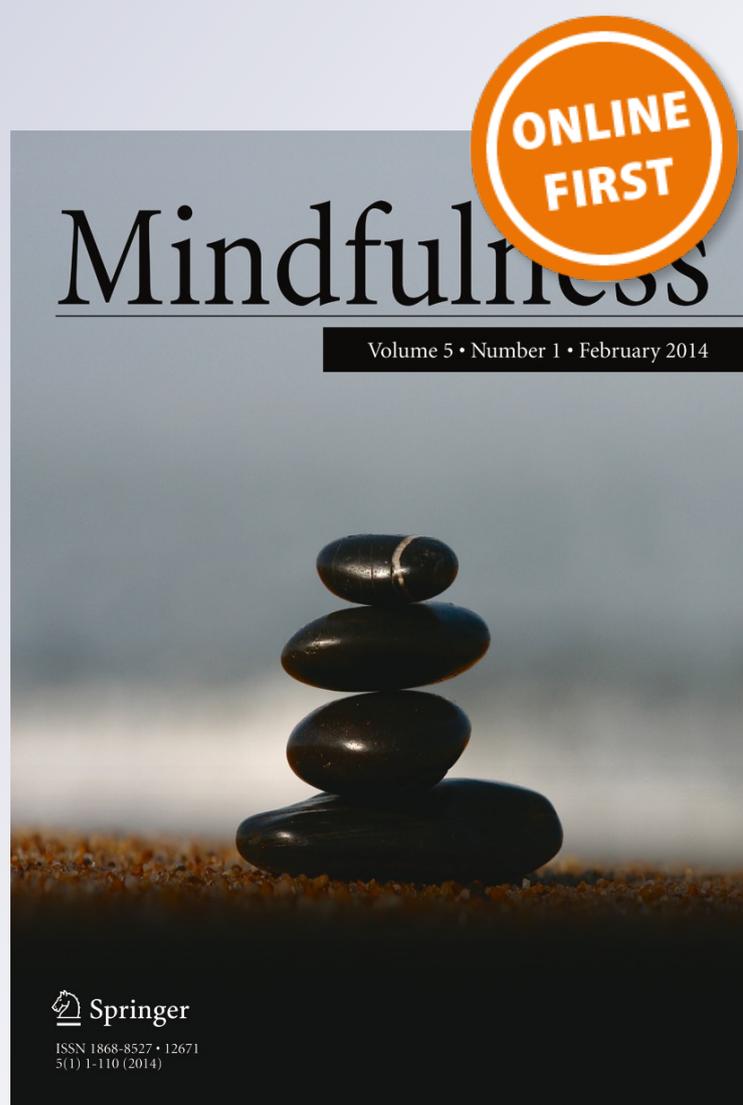
Richard Chambers, Eleonora Gullone, Craig Hassed, Wendy Knight, Tracy Garvin & Nicholas Allen

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Mindful Emotion Regulation Predicts Recovery in Depressed Youth

**Richard Chambers · Eleonora Gullone · Craig Hassed ·
Wendy Knight · Tracy Garvin · Nicholas Allen**

Abstract The incidence of major depression increases markedly during adolescence and early adulthood. There is therefore an increased need for effective emotion regulation (ER) capacities during this period. The present study explored the relative benefits of dispositional mindfulness compared to other commonly researched ER strategies, cognitive reappraisal, and expressive suppression, in a sample of youth with major depression presenting to a clinical service. Results demonstrated that mindfulness is distinct from these other ER strategies and is associated with lower cross-sectional levels of depression, anxiety, rumination and dysfunctional attitudes, and improved quality of life. Greater dispositional mindfulness also predicted greater recovery from these symptoms. It was concluded that a greater tendency to use mindfulness as an ER strategy is associated with positive mental health outcomes and better quality of life.

Keywords Mindfulness · Emotion regulation · Youth · Depression

N. Allen (✉)
Melbourne School of Psychological Sciences, University of Melbourne, Melbourne, Australia
e-mail: nba@unimelb.edu.au

R. Chambers · E. Gullone
School of Psychology, Psychiatry, and Psychological Medicine, Monash University, Melbourne, Australia

C. Hassed
Department of General Practice, Monash University, Melbourne, Australia

W. Knight · T. Garvin
Orygen Youth Health, Parkville, Australia

Introduction

Adolescence is a developmental period characterized by a number of key cognitive developments, including the capacities to think abstractly (Keating 2004) and empathize (Larson and Asmussen 1991), which appear to involve increased executive function (Nelson et al. 2005a) and emotion regulation (ER; Allen and Sheeber 2008a). These developments result in increased individuation and significance of interpersonal relationships and allow adolescents to navigate an increasingly complex social world (Larson and Sheeber 2008). However, this increased capacity for abstract thinking and empathy also may engender increased potential for negative affect, rumination (Treynor et al. 2003), and dysfunctional attitudes (Lewinsohn et al. 2001; Segal et al. 1999). When this occurs prior to full maturation of the cognitive capacities required for regulating such increases in cognitive and affective capacities (Kesek et al. 2008; Larson and Sheeber 2008), vulnerable individuals are placed at risk for psychological problems, particularly depression (Allen and Sheeber 2008b; Davey et al. 2008; Silk et al. 2003). Indeed, research suggests that the prevalence of depression begins to increase rapidly between age 15 years and early adulthood (Kessler et al. 1995; Seeley and Lewinsohn 2008).

Depression is increasingly being conceptualized as resulting from maladaptive emotion regulation (ER; Ochsner and Gross 2007; Silk et al. 2003; Strauman 2002). ER refers to the process of modulating one or more aspects of an emotional experience or response (Campos and Sternberg 1981; Gross 1998a, b). It can occur at different points during the emotion-generative process to influence the frequency and duration of different emotions, as well as how they are expressed (Gross 2007). Maladaptive ER has also been associated with anxiety (Coan and Allen 2004; Mennin et al. 2002; Rottenberg and Gross 2007), dysfunctional attitudes (Segal et al. 1999), and decreased quality of life (QOL; Phillips and Power 2007). It

has also been associated with rumination, which can be considered both an emotion regulation strategy and a cognitive risk factor for depression (Treynor et al. 2003). Adaptive ER is intrinsic to mental health and adaptive functioning more generally (Gross and Munoz 1995).

However, the aspects of ER wherein most are most strongly associated depression and associated clinical features remain unclear. This in part reflects limitations to the field of ER research, such as lack of operational consensus and disagreement as to whether emotions can be meaningfully separated from emotional processes (see Chambers, Gullone, and Allen (2009) for a review). Hence, it is possible that the ER models most commonly explored may fail to capture the features most relevant to these mental health problems.

Most widely researched is the process model of ER developed by Gross (1998a). This model distinguishes between ER strategies depending on whether they emerge early or late in the emotion-generative continuum. Antecedent-focused strategies involve behavioral, attentional, and cognitive manipulation of input to the system. A cardinal example is cognitive reappraisal (CR), which refers to attempts to think about emotive stimuli in ways that alter their emotional salience prior to, or early in, the emotion-generative process. Response-focused strategies refer to manipulation of responses to emotions that have already been generated. A cardinal example is expressive suppression (ES), which refers to conscious inhibition of behavioral responses to emotions (Gross and John 2003).

It is well established that ES has a number of adverse psychological and physical effects, such as decreased experience of positive emotions (Gross and Levenson 1997), impaired recall of information (Richards and Gross 2000), increased rumination (Gross and John 2003), and immunological and cardiovascular problems (Gross 1998a, b; Gross and Levenson 1997; Harris 2001). CR, by contrast, has been demonstrated to be more adaptive for down-regulating intense negative emotions (Gross 2001; Ochsner and Gross 2004) without the physiological costs associated with suppression (Butler et al. 2003; Mauss et al. 2007).

However, evidence increasingly links attempts to change or avoid emotional experiences—referred to as experiential avoidance (Hayes and Wilson 1994)—with psychopathologies including depression (Hayes 2003; Whelton 2004). In contrast, nonjudgmental awareness and acceptance of emotional states engendered by direct contact with the present moment lead to better psychological outcomes (Hayes et al. 2004; Hayes and Wilson 1994). This suggests that mindfulness may be a more adaptive ER strategy than CR or ES—both of which are about changing or avoiding particular emotional experiences.

Mindfulness refers to direct, experiential contact with the present moment (Chambers et al. 2009; Keng et al. 2011). While it is a mode of awareness that we all experience at

times, individual people vary in their dispositional levels of mindfulness. It is also a capacity that can be trained through systematic training.

We would like to note that the term "mindfulness" is variably used in the literature to describe a mode or state of awareness, a psychological process, and a set of practices that specifically aim to develop these capacities (Germer, Siegel, and Fulton; Germer et al. 2005). It is important to distinguish between these when discussing "mindfulness" to avoid confusion (Chambers et al. 2009). In this study, we have explored dispositional mindfulness, referring to the innate tendency to be mindful in daily life.

Mindfulness is increasingly proving effective for treating psychopathology and improving mental health (Allen et al. 2006; Hofmann et al. 2009; Keng et al. 2011). This includes reducing depressive symptoms (Kingston et al. 2007) and preventing depressive relapse (Kuyken et al. 2012; Ma and Teasdale 2004; Segal et al. 2002). Furthermore, dispositional mindfulness (individual differences in the tendency to use mindfulness in everyday life, irrespective of particular training) has been found to be associated with less emotional difficulties (Hill and Updegraff 2012), attenuated neural responses to emotional stimuli (Brown et al. 2012), and reduced incidence of depression (Barnhofer et al. 2011).

Research is even increasingly demonstrating that mindfulness may be more adaptive for regulating emotions than cognitive approaches such as CR and ES (Chambers et al. 2009; Teasdale et al. 2000). CR and ES emphasize changing or avoiding certain emotions, inherently encouraging experiential avoidance. Mindfulness, in contrast, encourages changing one's relationship with—rather than avoiding or changing—unpleasant thoughts and feelings. This perhaps explains the increasing literature supporting mindfulness as an adaptive ER strategy in both clinical and nonclinical populations (Bond and Bunce 2000; Hayes et al. 2006; Lappalainen et al. 2007; Zettle and Hayes 1986; Zettle and Rains 1989).

Nevertheless, further research is required to elucidate the more precise nature of the relationship between dispositional mindfulness and cognitive ER strategies, and to explore the differential relationships between these ER approaches and mental health. The nature of these relationships is particularly important to examine in adolescents and youth, given the importance of this population learning to adaptively regulate emotions to counter their increased vulnerability to psychological disorders outlined above (Allen and Sheeber 2008a).

Aims of the Current Study

Use of less adaptive ER strategies by adolescents has been associated with both increased incidence of depression (Betts et al. 2009; Birmaher et al. 1996) and

decreased QOL (Phillips and Power 2007). Furthermore, a growing body of research has linked mindfulness with reduced psychopathology and improved mental health in adolescents (Biegel et al. 2009; Black et al. 2009; Brown et al. 2011; Burke 2010). As such, it is timely to contrast mindfulness and cognitive ER strategies with depression, associated features such as rumination and dysfunctional attitudes, anxiety, and QOL in young people, and to explore the benefits of each for mental health. We hypothesized that:

1. Dispositional mindfulness would be a distinct dimension of ER amongst depressed youth than CR and ES.
2. Dispositional mindfulness would have a stronger negative relationship with depression, anxiety, rumination, and dysfunctional attitudes than CR or ES and a stronger positive relationship with QOL.
3. Dispositional mindfulness would predict greater recovery from depression, measured longitudinally.

Method

Participants

One hundred and seven adolescent outpatients experiencing a current major depressive episode (MDE) were recruited from successive presentations of eligible clients who had been referred to the depression clinic in a tertiary referral service (Orygen Youth Health; OYH) for older adolescents and young adults (aged 15–25 years). These participants were recruited to take part in a trial of a Mindfulness-Based Cognitive Therapy (MBCT; Segal et al. 2002) intervention for prevention of depressive relapse. Thirty-two male and 75 female participants between the ages of 15 and 25 (M = 18.8, SD = 3.2) took part and were assessed cross sectionally at Time 1 (T1). Longitudinal assessment (pre/post) took place 8 weeks after T1, and a total of 50 participants were assessed (the remainder were lost to follow-up for reasons including not engaging with treatment, discharge from the clinic, or non-attendance to assessment appointments). Participants were excluded if they did not speak English as a first language (due to the use of self-report measures), had previously practiced yoga or meditation (given the mindfulness component in the MBCT treatment intervention), or had psychotic disorders (such clients were referred to different clinics within OYH). Sociodemographic data (i.e., parental occupation) measured via the Australian National University occupational status scale for Australia, version 3.2 (ANU3; McMillan and Jones 2000) were collected for each participant (see below), with an overall mean score of 32.8 (SD = 25).

Measures

Australian National University occupational status scale for Australia (v.3.2) (ANU3_2 scale; McMillan and Jones 2000) is a measure of occupational prestige whereby each of the 161 Australian Standard Classification of Occupations (ASCO) groups is ordinally ranked from 1 to 100. Higher scores reflect greater occupational prestige. This provides an accurate indication of socioeconomic status.

Hamilton Psychiatric Rating Scale for Depression

The Hamilton Depression Rating Scale (HAM-D; Hamilton 1960) is a 21-item, clinician-administered screening instrument designed to measure the severity of illness over the previous 2-week period in adults already diagnosed as having depression. It offers high validity and reliability in measuring response to treatment and is used in a variety of mental health areas including primary care, psychiatry, drug trials, and related clinical, institutional, and research settings (Faries et al. 2000).

Dysfunctional Attitude Scale, Form A

The Dysfunctional Attitude Scale, Form A (DAS-A; Weissman and Beck 1978) is a 9-item self-report scale designed to assess endorsement of dysfunctional beliefs that are purported to guide self-evaluation (Segal et al. 1999) and to identify the underlying risk factors for depression (Beck 1972). The DAS-A has demonstrated high validity and reliability for assessing dysfunctional cognitions in depressed populations (Nelson et al. 2005b).

Emotion Regulation Questionnaire

The Emotion Regulation Questionnaire (Gross and John 2003) is a 10-item self-report scale designed to assess individual differences in the habitual use of two emotion regulation strategies: cognitive reappraisal and expressive suppression. High internal consistency, test-retest reliability, and validity have been reported for the ERQ (Gross and John 2003; John and Gross 2004).

Centre for Epidemiological Studies Depression Rating Scale—Revised (CESD-R)

The Center for Epidemiologic Studies Depression Scale-Revised (CESD-R; Radloff 1977) is a 20-item self-report scale designed to assess mood, somatic complaints, interpersonal interactions, and motor functioning over the preceding week. The scale is reported to have excellent internal consistency with estimates ranging from 0.8 to 0.9. Test-retest reliability (ranging from 25 to 52 weeks) is reported to be between 0.4 and 0.7

(Devins et al. 1988; Radloff 1977). Face and construct validity are reported to be excellent (Eaton et al. 2004).

Mood and Anxiety Symptoms Questionnaire—Short Form

The Mood and Anxiety Symptom Questionnaire—Short Form (MASQ; Watson and Clark 1991) is a 62-item self-report measure assessing symptoms that commonly occur in mood and anxiety disorders. The MASQ is comprised of four subscales: General Distress: Anxious Symptoms (GDA), General Distress: Depressive Symptoms (GDD), Anxious Arousal (AA), and Anhedonic Depression (AD). Factor analytic examinations of the MASQ with student, community, and patient samples support these conceptually derived subscales (Watson et al. 1995).

Mindful Awareness Attention Scale

The Mindfulness Awareness Attention Scale (MAAS; Brown and Ryan 2003) is a 15-item self-report scale with a single factor, designed to assess dispositional awareness of and attention to present-moment events and experiences. The scale has been evaluated in college, working adult, and cancer patient populations and has demonstrated good validity and reliability (Brown and Ryan 2003). It has also been shown to incrementally predict depressive and anxious symptomatology (Zvolensky et al. 2006).

Ruminative Responses Scale

The Ruminative Responses Scale (RRS), a subscale of the Response-Styles Questionnaire (RSQ; Nolen-Hoeksema and Morrow 1991), is a 22-item self-report scale designed to assess how frequently participants engage in rumination in response to feeling sad or depressed. The RRS has been shown to distinguish between two dimensions of rumination, brooding and reflection. Treynor et al. (2003) found that while both brooding and reflection were associated with concurrent depression, only brooding predicted depressive symptoms longitudinally. The RRS has demonstrated good internal consistency, moderate to high test-retest reliability, and validity for predicting depression (Nolen-Hoeksema 2000; Spasojevic and Alloy 2001).

World Health Organization Quality of Life Scale, Brief Form

The World Health Organization Quality of Life Scale, Brief Form (WHOQOL-BREF; The WHOQOL Group 1998) is a 26-item self-report scale designed to examine domain level profiles QOL. The scale assesses four QOL domains (physical health, psychological, social relationships, and environment). WHOQOL-BREF domain scores demonstrate good

discriminant validity, content validity, internal consistency, and test-retest reliability (The WHOQOL Group 1998).

Procedure

When suitable clients first presented for treatment, the clinicians explained the research project, and informed consent was obtained. The researcher then made contact with the participant to further explain the study, answer any questions, and arrange a suitable time for the initial assessment.

The majority of assessments were performed at Orygen, with a small number conducted in the participants' homes (4 out of 100), in cases where participants were unable to travel to the clinic. Assessments were performed in a single session.

This research forms part of a larger study designed to assess the efficacy of adding an 8-week Mindfulness-Based Cognitive Therapy component to treatment-as-usual (TAU—in this case, Cognitive Behavioral Therapy as standard, and antidepressant medication where indicated) for preventing depressive relapse. While the results of the larger study are not reported here, the pre/post nature of the larger study design made it possible to explore the relationship between dispositional mindfulness, on one hand, and recovery from depression and anxiety, as well as reductions in levels of rumination and dysfunctional attitudes and improvements in QOL, on the other. As such, all measures were administered at two time points (T1 and T2, which were 8 weeks apart).

Results

Cross-sectional Analyses

Factor analyses were first conducted in order to determine, on the basis of item content, whether mindfulness, ES, and CR were distinct or overlapping constructs. A factor analysis of items from the Emotion Regulation Questionnaire and the Mindfulness Attention Awareness Scale was performed with varimax rotation. A scree plot indicated three or four factors, with a three-factor model providing the most interpretable fit to the data. Items were neatly grouped into factors reflecting mindfulness, ES, and CR, with minimal cross-loadings (see Table 1). Based on criteria described by Arrindell et al. (1983), the lower bound value for meaningful factor loading of an item was set at 0.4. Distinctiveness of factor loading was also established by examining the second highest factor loading for an item. If this loading was greater than 0.2, the item was discarded, unless the algebraic difference between this loading and the highest loading was >.2. According to these criteria, three items were discarded, one each from the MAAS, ERQ suppression, and ERQ reappraisal subscales. Subsequent analyses were run twice, with both the original and modified ER scales, and results were compared. No significant change in

Table 1 Summary of factor loadings of items from the MAAS and ERQ (N=107), demonstrating three independent factors

	Component		
	1	2	3
MAAS Act without paying attention	**0.77**	−0.17	0.12
MAAS Rush through activities	**0.71**	−0.07	−0.12
MAAS Difficult to stay focused	**0.68**	−0.18	−0.04
MAAS Drive on "automatic pilot"	**0.62**	−0.18	−0.002
MAAS Running on automatic	**0.61**	−0.03	−0.39
MAAS Do jobs/tasks automatically	**0.60**	−0.30	−0.24
MAAS Snack without awareness	**0.59**	−0.17	0.06
MAAS Focus on goal, miss present	**0.59**	−0.06	0.28
MAAS Careless	**0.54**	−0.10	−0.01
MAAS Not conscious of emotion	**0.53**	0.02	0.05
MAAS Walk without paying attention	**0.51**	0.08	0.12
MAAS Preoccupied with past/future	**0.42**	0.09	−0.03
MAAS Forget people's names	**0.40**	0.02	−0.13
MAAS Not listening	**0.38**	−0.29	0.24
MAAS Don't notice physical tension	**0.37**	−0.03	−0.20
ERQr Change thinking to increase +ve emotions	−0.03	**0.90**	0.06
ERQr Change thinking to decrease −ve emotions	0.06	**0.82**	0.14
ERQr Change thinking to control emotions	−0.24	**0.78**	0.16
ERQr Change thinking to decrease −ve emotions	−0.13	**0.65**	−0.15
ERQr Change thinking to increase +ve emotions	−0.11	**0.53**	−0.34
ERQr Change thinking when stressed to stay calm	0.26	**0.35**	0.37
ERQs Don't express +ve emotions	0.03	−0.09	**0.79**
ERQs Keep emotions to self	−0.23	−0.03	**0.78**
ERQs Control emotions by not expressing them	−0.06	0.12	**0.73**
ERQs Don't express +ve emotions	−0.35	−0.07	**0.20**

Note: *MAAS 1–15* Mindful Awareness Attention Scale items 1–15, *ERQr* ERQ Reappraisal items, *ERQs* ERQ Suppression items. Extraction method was principal component analysis with varimax rotation. Rotation converged in five iterations. Highest factor loadings for each component are in bold

any results was observed, and so the decision was made to retain the items in order to maintain consistency of the scales with previous research.

Correlational analyses were then performed to examine the bivariate relationships between these three ER strategies (mindfulness, ES, and CR), measures of depression and anxiety, associated cognitive features (rumination and dysfunctional attitudes), and QOL measures. Demographic variables (age, gender, and SES) were less strongly associated with symptoms, cognitive risk markers, and QOL dimensions than the ER measures. Of the three ER strategies, mindfulness was most strongly associated with lower psychological symptoms and cognitive risk markers, and higher QOL (Table 2).

Next, a series of hierarchical multiple regression analyses were conducted to examine the unique contributions of

demographic (age, gender, and socioeconomic status) and ER strategies (mindfulness, reappraisal, and suppression to levels of depression and anxiety.

These seven predictor variables were entered hierarchically in two blocks. Step 1 incorporated the demographic variables and step 2 the ER variables. Table 3 displays a summary of the results for the regression analyses, with the CES-D, HAM-D, MASQ, RRS, DAS, and QOL as the dependent variables, respectively.

As can be seen from the table, mindfulness remained the strongest of the three ER strategies for predicting psychological symptoms in the regression analyses. This was despite SES increasing in strength as a predictor of measures of psychological symptoms, associated clinical markers, and QOL. In addition, none of the predictor variables was found to predict rumination. In further analyses, we examined whether the treatment condition (i.e., TAU-plus-MBCT versus TAU) was a significant moderator of these associations. Treatment condition was not a significant moderator of the association between MAAS and outcome for any of the outcome variables.

Longitudinal (Pre/Post) Analyses

A series of independent sample *t* tests were calculated to detect any baseline (T1) differences between the TAU-plus-MBCT and TAU groups on the scales used. No significant baseline group differences were observed.

Next, a series of repeated measures ANOVAs were performed, with pre/post treatment (T1, T2) as a repeated measures factor to examine group differences on outcome measures (e.g., MAAS, ERQ, and HAMD) following the 8-week intervention period. Note that in these analyses, both groups (TAU-plus-MBCT and TAU) were analyzed together (i.e., there was no between-subjects factor). The ANOVAs revealed significant pre/post treatment effects for mindfulness, CR, depression (HAMD, CESD-R, MASQ GDD, and MASQ AD), anxiety (MASQ AA), rumination (RRS total), dysfunctional attitudes, and psychological, social, and environmental QOL. This indicated improvement for all participants on these variables at T2 compared to T1 (see Table 4).

Next, in order to investigate whether changes in levels of mindfulness were correlated with changes in mood, change score analyses were performed to assess whether changes in MAAS scores correlated with changes in CESD-R and HAMD scores. There are a number of ways to calculate change scores from pre- and post-intervention scores. The most basic method is to subtract pre-scores from post-scores, to provide difference scores. However, where such change scores are correlated, this is akin to part/whole correlations, which tend to produce misleading results, typically an over-correction of the post-score (Cohen et al. 2003). Consequently, a linear regression analysis was used here, with the pre-

Table 2 Summary of correlations amongst demographic, emotion regulation, symptom and quality of life variables (*N*=107)

	Age	Gender	ANU3	ADO	MAAS	ERQ SUPP	ERQ REAPP
CESD-R	−0.22*			−0.33**	−0.40**		
HAM-D			−0.25*		−0.27**	0.25*	−0.20*
MASQ GDD				−0.25*	−0.35**		−0.28*
MASQ AD				−0.31**	−0.22*		−0.30**
MASQ AA				−0.28*	−0.44**		
MASQ GDA				−0.22*	−0.35**		
RRS TOTAL					−0.31**		
RRS REFLECT					−0.26**		
DAS			−0.25*			0.31**	
QOL PSYCH					0.32**		
QOL PHYS			−0.20*	0.32**	0.30**	−0.24*	0.29**
QOL SOCIAL	−0.25*						0.23*
QOL ENVIRO					0.23*		0.20*

Note: Values provided are Pearson correlations. Statistics significant at: *$p < .05$, **$p < .01$, two-tailed. Nonsignificant correlations have been omitted from table. *ANU3* Australian National University occupational status scale for Australia, *ADO* Age of depressive onset (years), *MAAS* Mindful Awareness Attention Scale, *ERQ* Emotion Regulation Questionnaire (*SUPP* Suppression subscale, *REAPP* Reappraisal subscale), *CESD-R* Centre for Epidemiological Studies Depression Scale—Revised, *MASQ* Mood and Anxiety Symptoms Questionnaire (*AA* Anxious Arousal subscale, *GDA* General Distress Anxiety subscale, *AD* Anhedonic Depression subscale, *GDD* General Distress Depression subscale), *RRS* Rumination Response Scale (*TOTAL* total score, *REFLECT* reflection subscale), *DAS* Dysfunctional Attitudes Scale, *QOL* World Health Organization Quality of Life scale (*PSYCH* psychological domain, *PHYS* physical domain, *SOCIAL* social domain, *ENVIRO* environmental domain)

score (T1) used to predict the post-score (T2). This analysis was used to derive an unstandardized residual score for MAAS scores to represent the change in that variable over the intervention period. These unstandardized scores were then analyzed for correlation with change residuals from HAMD and CESD-R scores in order to evaluate which changes covaried over the intervention period.

MAAS change scores were strongly correlated with HAMD change scores, $r(41) = −0.47$, $p=0.001$. There was a nonsignificant trend toward correlation between MAAS change scores and CESD-R change scores, $r(41)=−0.28$, $p= 0.07$. By comparison, neither CR nor ES change scores were significantly correlated with depression change scores.

A series of hierarchical regression analyses were then performed to assess whether greater baseline (T1) levels of self-reported mindfulness, CR, and/or ES predicted change on measures of depression and anxiety, cognitive risk markers, ER strategy use, or QOL at T2 (i.e., by controlling for the relevant T1 measures in each of the dependent variables). Socioeconomic status (SES) was also controlled for in these analyses, given the significant relationships found between SES and the outcome variables noted above. These analyses revealed that higher baseline levels of mindfulness significantly predicted increased use of CR, reduced depression and rumination (especially brooding), and greater QOL at T2. By comparison, higher baseline levels of reappraisal and lower baseline levels of suppression did not significantly predict improvements in any outcome measures, as shown in Table 5.

Discussion

Overall, this study supports the hypothesis that dispositional mindfulness is a distinct dimension of ER that has important implications for mental health. Factor analysis demonstrated that mindfulness, ES, and CR represent distinct ER strategies. Correlational and regression analyses demonstrated that mindfulness was negatively correlated with all symptoms of depression and anxiety as well as associated cognitive markers of depression, with the exception of dysfunctional attitudes. Mindfulness was also positively correlated with psychological, physical, and environmental QOL dimensions. Furthermore, mindfulness appears to be more strongly associated with these features than is CR (which was associated with some but not all measures of depression and was not associated with anxiety or rumination). As expected, ES demonstrated a positive relationship with depression and dysfunctional attitudes, and a negative relationship with physical QOL. Overall, the current results indicate that dispositional mindfulness is a distinct ER dimension that is highly relevant to mental health and thus warrants further examination.

The finding that mindfulness is a distinct dimension of ER from CR and ES was expected theoretically, given key ontological differences between mindfulness and cognitive ER strategies highlighted elsewhere (Chambers et al. 2009). Furthermore, the fact that mindfulness was more strongly related to depression and anxiety—as well as their associated features such as rumination and QOL—than CR and ES concurs with previous research linking higher levels of mindfulness with

Table 3 Summary of significant adjusted beta weights for two-step hierarchical regression analyses (N=107), with demographic variables (age, gender, and socioeconomic status) entered as step 1 and emotion regulation strategy (mindfulness, suppression, and reappraisal) entered as step 2

Dependent variable	Block 1			Block 2			F for entire equation
	Age	Gender	ANU3	MAAS	ERQ SUPP	ERQ REAPP	
CESD-R			−0.38***	−0.28*			5.33*** (df=69)
HAM-D		0.22*	−0.33**	−0.25*	0.27*		5.02*** (df=65)
MASQ GDD			−0.31*	−0.38**			4.50*** (df=62)
MASQ AD			−0.34**	−0.24*			4.07** (df=60)
MASQ AA			−0.29*	−0.41***			5.30*** (df=63)
MASQ GDA			−0.28*	−0.45***			4.68*** (df=65)
DAS			−0.31*		0.39**		2.76* (df=65)
QOL psychological				0.35**			3.09** (df=66)
QOL physical		−0.24*		0.26*	−0.28*	0.26*	5.27*** (df=66)
QOL social	−0.38*			0.25*			2.20* (df=69)
QOL environmental			0.25*				3.02** (df=69)

Note: Values provided are adjusted beta weights. Regression statistics significant at: *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$, two-tailed. Nonsignificant beta weights have been omitted from table. *MAAS* Mindful Awareness Attention Scale. *ERQ* Emotion Regulation Questionnaire (*SUPP* Suppression subscale, *REAPP* Reappraisal subscale), *CES-D* Centre for Epidemiological Studies Depression Scale, *MASQ* Mood and Anxiety Symptoms Questionnaire (*AA* Anxious Arousal subscale, *GDA* General Distress Anxiety subscale, *AD* Anhedonic Depression subscale, *GDD* General Distress Depression subscale), *DAS* Dysfunctional Attitudes Scale, *QOL* World Health Organization Quality of Life Scale (*PSYCH* psychological domain, *PHYS* physical domain, *SOCIAL* social domain, *ENVIRO* environmental domain)

less use of maladaptive ER strategies such as experiential avoidance (Cowdrey and Park 2012; Skinner et al. 2010). It also reflects recent research demonstrating that dispositional mindfulness is protective against depression (Barnhofer et al. 2011).

The negative relationship detected between mindfulness and rumination concurs with previous research (e.g., Burg and Michalak 2012; Lykins and Baer 2009). Remaining in direct contact with whatever is experienced protects against getting caught up in harmful patterns of thinking about one's experiences. It is likely that this is protective against depression (Burg and Michalak 2012). In the present study, mindfulness was found to be significantly negatively correlated with both rumination generally and the reflection component of rumination (Treynor et al. 2003). However, no relationship was found between mindfulness and brooding, which has been previously identified to be relatively more dysfunctional (Burg and Michalak 2012), especially in adolescents (Burwell and Shirk 2007). It remains unclear why this was the case in the present study, and more research is warranted to determine which aspects of rumination are targeted most by mindfulness.

Previous research (e.g., Ramel et al. 2004) has demonstrated a relationship between mindfulness and dysfunctional attitudes. However, the present study failed to detect a relationship between dysfunctional attitudes and either mindfulness or reappraisal (there was a significant positive correlation with suppression). This does not appear to be due to a confounding effect of rumination such as that detected by Ramel and colleagues. While both the reflection and brooding dimensions of the RRS were correlated with mindfulness in our study, this relationship was not observed in the hierarchical regression analyses when demographic variables (age, gender, and SES) were controlled. Indeed, no relationship was detected between rumination and any other variables of interest in these analyses. It should be noted that a number of studies have suggested that assessing dysfunctional attitudes in a euthymic mood may not fully tap the most relevant aspects of risk for depression and that it might be necessary to examine dysfunctional attitudes during a mood challenge in order to fully assess these factors (Segal et al. 2002).

The positive correlation observed between reappraisal and the physical, social, and environmental dimensions of the

Table 4 *F* statistics for significant changes in outcome variables from T1 to T2 in each treatment condition (*N*=50)

Measure	TAU-plus-MBCT			TAU			Time
	T1	T2	n	T1	T2	n	
MAAS	3.33 (0.70)	3.66 (0.78)	20	3.45 (0.70)	4.00 (0.92)	21	26.45***
ERQ reappraisal	22.19 (6.16)	26.73 (5.63)	20	24.26 (6.35)	27.00 (7.55)	21	11.99***
ERQ suppression	16.85 (5.28)	15.00 (6.40)	20	17.26 (4.29)	16.08 (5.32)	21	1.87
CESD-R	40.58 (15.58)	31.24 (12.79)	20	38.56 (14.88)	24.72 (15.26)	21	34.33***
HAMD	10.44 (5.67)	8.00 (5.71)	20	12.07 (8.22)	7.04 (6.08)	21	11.52***
MASQ GDD	35.99 (13.83)	28.75 (13.60)	20	32.10 (14.75)	24.55 (10.47)	21	7.26**
MASQ AD	−4.47 (12.00)	−17.19 (22.05)	20	−13.63 (18.37)	−22.28 (18.20)	21	6.89*
MASQ GDA	20.07 (7.74)	22.18 (8.48)	20	23.36 (8.46)	20.44 (8.47)	21	2.51
MASQ AA	29.20 (11.56)	25.21 (7.58)	20	30.02 (10.86)	25.63 (8.06)	21	4.31*
RRS total	60.87 (11.44)	55.31 (15.57)	20	54.48 (10.65)	46.33 (12.29)	21	7.13*
RRS reflection	12.95 (2.98)	12.05 (4.01)	20	11.78 (3.53)	10.78 (2.80)	21	2.22
RRS brooding	14.05 (3.50)	13.17 (3.77)	20	12.57 (3.06)	11.08 (3.37)	21	2.68
DAS-A	26.75 (8.93)	23.43 (9.17)	20	26.17 (4.92)	22.83 (7.88)	21	8.62**
QOL physical	3.21 (0.49)	3.14 (0.50)	20	3.38 (0.57)	3.33 (0.56)	21	0.50
QOL psychological	2.34 (0.67)	2.97 (0.71)	20	2.55 (0.88)	3.15 (0.76)	21	43.98***
QOL social	2.90 (1.04)	3.45 (0.94)	20	3.03 (0.82)	3.52 (0.79)	21	8.54**
QOL environmental	3.33 (0.61)	3.48 (0.74)	20	3.12 (0.72)	3.38 (0.71)	21	8.90**

Note: Standard deviations are in parentheses. *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$. *(T)* nonsignificant trend, *MAAS* Mindful Attention Awareness Scale, *ERQ* Emotion Regulation Questionnaire, *CESD-R* Centre for Epidemiological Studies Depression Scale—Revised, *HAMD* Hamilton Depression Scale, *MASQ* Mood and Anxiety Symptoms Questionnaire (*GDD* General Distress Depression subscale, *AD* Anhedonic Depression subscale, *GDA* General Distress Anxiety subscale, *AA* Anxious Arousal subscale), *RRS* Ruminative Response Scale, *DAS-A* Previous Scale, *QOL* World Health Organisation Quality of Life Scale

QOL is consistent with previous research (Gross and John 2003). Interestingly, this relationship was not significant in the hierarchical regression analyses, although the relationship between mindfulness and psychological, physical, and social QOL remained significant in these analyses. This suggests that mindfulness is a stronger predictor of QOL in these domains than reappraisal. The positive relationship between mindfulness and QOL has been well established (Carlson et al. 2001, 2007; Speca et al. 2000), although the finding that mindfulness may be more important for better QOL than reappraisal is novel and should be researched further, especially given the observed negative relationship between mindfulness and depression. Suppression was found to negatively predict physical QOL, consistent with previous literature demonstrating deleterious physical health consequences of suppression (Gross 1998a, 2002) (Gross and John 2003; Gross and Levenson 1993).

The hypothesis that greater levels of mindfulness at T1 would be a better predictor than CR and ES of reduction depression, anxiety, rumination and dysfunctional attitudes, and improved QOL, was supported. Higher levels of baseline mindfulness significantly predicted increased use of CR and reduced symptoms of depression and rumination (especially brooding, which as noted above has been strongly associated with psychopathology), while reappraisal and suppression did not significantly predict improvements on any outcome measure.

As also noted above, greater dispositional mindfulness was cross sectionally associated with lower levels of depressive and anxious symptoms, reduced levels of associated cognitive features, and improved QOL, when compared to CR and ES. Furthermore, higher dispositional mindfulness also predicts greater improvement in these outcome measures, providing further evidence of the greater efficacy of mindfulness (as it is naturalistically utilized by individuals in the study) in improving psychological well-being, compared to CR and ES.

This concurs with the theoretical model proposed by Chambers et al. (2009), which posited mindfulness to be qualitatively distinct from these cognitive ER strategies. Chambers et al. proposed that mindfulness may avoid limitations inherent in the use of cognitive ER strategies, such as over- and under-engagement with emotions. In contrast, the nonjudgmental awareness inherent in mindfulness may facilitate a healthy engagement with emotions (Hayes et al. 2004), allowing individuals to fully experience their emotions without problematic patterns of under-engagement (such as thought suppression; Wegner (1994), and experiential avoidance; Hayes et al. 1996) and over-engagement (e.g.,

Table 5 Summary of multiple regression analyses with each ER strategy at T1 as the predictor variable and change in each of the outcome variables at T2 as the dependent variables (N=50)

Measure	MAAS			ERQ reappraisal			ERQ suppression		
	B	SE B	β	B	SE B	β	B	SE B	β
MAAS				−0.001	0.01	−0.004	−0.03	0.02	−0.15
ERQ reappraisal	3.92	1.37	0.39*				−0.02	0.22	−0.01
ERQ suppression	−1.63	1.23	−0.19	−0.17	0.14	−0.19			
CESD-R	−8.67	3.06	−0.38*	−0.29	0.33	−0.12	0.53	0.44	0.16
HAMD	−4.11	1.10	−0.48**	−0.08	0.14	−0.09	0.15	0.18	0.13
MASQ GDD	−4.63	3.08	−0.25	−0.28	0.32	−0.14	−0.47	0.42	−0.18
MASQ AD	−6.60	5.00	−0.22	−0.38	0.53	−0.12	−0.35	0.71	−0.08
MASQ GDA	−3.74	2.42	−0.30	−0.18	0.22	−0.13	0.45	0.28	0.25
MASQ AA	−3.30	2.10	−0.29	−0.23	0.20	−0.19	0.14	0.27	0.09
RRS total	−10.23	2.84	−0.48**	−0.01	0.35	−0.005	0.61	0.46	0.20
RRS reflection	−1.55	0.73	−0.31	−0.07	0.09	−0.13	0.04	0.11	0.06
RRS brooding	−2.12	.77	−0.39*	−0.05	0.09	−0.09	0.15	0.12	0.20
DAS-A	−4.17	1.66	−0.34	−0.22	0.18	−0.17	0.25	0.25	0.15
QOL physical	0.27	0.14	0.35	0.00	0.01	−0.003	−0.02	0.02	−0.14
QOL psychological	0.18	0.13	0.16	0.006	0.01	0.05	0.003	0.02	0.02
QOL social	0.22	0.21	0.17	0.01	0.02	0.10	−0.004	0.03	−0.02
QOL environmental	0.22	0.12	0.21	−0.004	0.01	−0.04	−0.002	0.02	−0.01

Note. Given the large number of analyses run, in order to guard against family wise (Type 1) error, only beta weights with a $p \leq .01$ have been interpreted, *$p \leq .01$, **$p \leq .001$. All equations were significant ($p \leq .01$) since scores on each measure at T1 were used to predict scores of the same measure at T2; therefore, F, R^2, and adjusted R^2 were not reported. *MAAS* Mindful Attention Awareness Scale, *ERQ* Emotion Regulation Questionnaire, *CESD-R* Centre for Epidemiological Studies Depression Scale—Revised, *HAMD* Hamilton Depression Scale, *MASQ* Mood and Anxiety Symptoms Questionnaire (*GDD* General Distress Depression subscale, *AD* Anhedonic Depression subscale, *GDA* General Distress Anxiety subscale, *AA* Anxious Arousal subscale), *RRS* Ruminative Response Scale, *DAS-A* Previous Scale, *QOL* World Health Organisation Quality of Life Scale

rumination; Nolen-Hoeksema 1998, and worry; Borkovec 1994). Given that CR expressly aims to circumvent full activation of certain emotions, it may represent a mode of cognitive avoidance analogous to experiential avoidance, despite its apparently adaptive qualities.

While Hofmann and Asmundson (2009) have posited that mindfulness is simply another cognitive ER strategy (specifically, a response-focused strategy that modifies use of suppression, the results of the present study instead suggested that mindfulness is distinct—and more adaptive. Whereas cognitive ER strategies attempt to alter affective experience, mindfulness attempts to alter one's relationship to such experience. It may represent a method of accessing a metacognitive mode whereby thoughts and emotions are experienced as mental phenomena rather than realities, allowing much greater flexibility in responding.

Limitations

There were a number of limitations of the present study. The mindfulness and cognitive ER scales were drawn from different instruments, and so method variance (for example, related to response formats) may have contributed to the distinctiveness of the mindfulness factor. Integrating the measurement of

these three constructs into one instrument with a common question and response format would help reduce this potential confound.

Future research may also benefit from the use of more sensitive measures to gain a clearer picture of the relationship between anxiety and other variables of interest. The lack of detected relationships in this study possibly reflects a lack of discriminating power of the MASQ, which has been criticized for not adequately discriminating between anxiety and depression (Boschen and Oei 2006), and may have utility only for assessing general psychological distress (Buckby et al. 2007). Therefore, although there was some significant variation in anxiety symptoms in the sample, it remains unclear what relationship this had to levels of depression, rumination, dysfunctional attitudes, QOL, or ER strategy use. While the MASQ did measure anxiety symptoms, it is possible that such symptoms were not sufficiently severe to demonstrate a significant relationship with reappraisal. Future research should include a wider range of anxiety measures, incorporating indices specifically designed to detect anxiety symptoms, as noted above.

Finally, a question remains as to the validity of the MAAS as an index of mindfulness. Kabat-Zinn (1990) originally conceptualized mindfulness as involving present awareness

without judgment or elaboration. Brown and Ryan (2003) proposed that present-moment awareness intrinsically requires that an individual not engage in any secondary processing such as judgment or elaboration and thus proposed a one-factor model, on which the MAAS is based. More recently, Baer et al. (2006) have proposed a five-factor model of mindfulness, although this is based on a factor analysis of mindfulness-based therapeutic models, rather than mindfulness as a psychological process or construct. It should be noted that the MAAS was the best scale available at time of inception of the study and that there is no conclusive empirical evidence undermining its validity. That said, it is possible that the MAAS measures the attentional aspect of mindfulness but not the acceptance dimension, and so the results of the present study should be interpreted with caution.

Summary and Conclusion

The present study demonstrated that mindfulness is distinct from CR and ES and is more associated with mental health than either cognitive strategy. This concurs with the theoretical notion (e.g., Chambers et al. 2009) that mindfulness differs fundamentally from cognitive ER strategies in the sense that it emphasizes accepting, rather than seeking to change or avoid, affective states. As such, it avoids the potential adverse psychological outcomes associated with unwillingness to remain in contact with the present moment (Hayes 2003; Whelton 2004). This may turn out to be the most important feature of mindfulness—namely, that is offers a way to remain in touch with emotional experience, therefore avoiding the pitfalls of experiential avoidance, while at the same time offering an extremely effective way of staying calm and centered even in the midst of the emotional storm that adolescence and young adulthood can sometimes be.

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