

# The Stress-Buffering Role of Mindfulness in the Relationship Between Perceived Stress and Psychological Adjustment

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Published online: 1 June 2016

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**Abstract** This study examined the potential stress-buffering role of mindfulness (including dimensions of observing, describing, acting with awareness, non-judging, and non-reactivity) in the relationship between perceived stress and psychological adjustment (i.e., depression, anxiety, life satisfaction, and dimensions of psychological well-being) in university students. A total of 481 Australian law students completed an online questionnaire. Hierarchical multiple regression analyses indicated that higher levels of mindfulness were related to improved adjustment on all outcomes. In support of predictions, dispositional mindfulness buffered the effects of perceived stress on depression and anxiety. Further analyses indicated that the ability to describe experience was particularly important in mitigating the effects of stress on depression and anxiety, as was the ability to observe internal and external experiences in mitigating the effects of stress on depression and reduced life satisfaction. Interventions to increase mindfulness, including specific facets of mindfulness, are proposed as a method of protecting the psychological well-being of students confronted with university stressors.

**Keywords** Mindfulness · Stress-buffering · Depression · Anxiety · Well-being · Life satisfaction

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## Introduction

Research indicates that prolonged or excessive stress has deleterious effects on well-being and is related to a range of psychological, behavioural, and physical health difficulties (Gatchel and Kishino 2012). For example, stress in university students is associated with increased risk of depression (Dyson and Renk 2006), anxiety (Eisenberg et al. 2007), headaches (Miczo et al. 2006), alcohol use (Werch et al. 2007), and suicidal ideation (Hirsch and Ellis 1996), as well as poorer academic, emotional, and social adjustment to university (Friedlander et al. 2007). A national review of US college student health ( $N=79,266$ ) found that students reported stress as the most significant factor impacting their academic performance (American College Health Association 2014).

While there is no universally agreed definition of stress, most theories propose that stress originates with the individual being exposed to stressors in the environment (LaMontagne et al. 2010). According to Lazarus and Folkman's (1984) widely used stress and coping framework, stress is conceptualized as "a particular relationship between the person and the environment that is perceived by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19). According to this framework, appraisal is an evaluative process that reflects an individual's subjective interpretation of an event. The appraisal of an event as harmful or threatening will generate stress that may exceed the coping resources available to the person. This theory suggests that the degree to which an individual experiences stress and associated strain is determined by both the objective characteristics of the stressors in their environment, and the individual's appraisal of these stressors, in addition to their coping strategies and coping resources.

Mindfulness is a potentially important coping resource that buffers an individual against the negative effects of stress. Mindfulness is defined as “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn 1994, p. 4). Mindfulness has been conceptualized as both a state-like and trait-like quality that all individuals possess to varying levels, as well as a set of skills that can be developed through formal training and practice (Baer et al. 2006). Research indicates that higher levels of dispositional mindfulness are related to reduced depression and anxiety, and greater well-being (e.g., autonomy, relatedness), pleasant affect, and life satisfaction (Brown and Ryan 2003; Carlson and Brown 2005). Meta-analyses indicate that mindfulness-based therapy (e.g., mindfulness-based stress reduction, Kabat-Zinn 1982) demonstrate large and clinically significant effects in treating anxiety and depression (Khouri et al. 2013) and reduce psychological distress and increase quality of life in non-clinical populations (Khouri et al. 2015).

According to Lazarus and Folkman’s theory, detecting the signs of stress is a necessary prerequisite to implementing positive coping responses. Without a capacity to detect symptoms of stress, the effects of stress tend to accumulate slowly and often remain undetected until a serious health problem arises (Salmon et al. 2004). Kabat-Zinn (1990) proposed that the attentional aspect of mindfulness can be applied to stress management by contributing to greater awareness of the symptoms of stress. Accordingly, higher dispositional mindfulness is likely to lead to an increased awareness of symptoms of stress at low levels, which in turn is likely to enhance coping resources and buffer against the negative effects of stress (Bränström et al. 2011). Further, it has been proposed that higher levels of mindfulness facilitates one’s capacity to receptively observe stressors as they arise with acceptance and equanimity, which in turn buffers primary threat appraisals and increases access to personal coping resources (Bränström et al. 2011; Brown et al. 2007; Creswell and Lindsay 2014). Hence, it has been proposed that mindful individuals have a greater capacity to manage stressors, thus buffering the relationship between stress and poorer psychological outcomes (Bränström et al. 2011; Ciesla et al. 2012).

Although most research has focused on the direct effects of mindfulness on reduced psychological strain, a small number of studies indicate that higher levels of mindfulness may also buffer against or moderate the effects of stress on strain. Using a sample of 317 Australian adolescents, Marks et al. (2010) found that higher mindful awareness attenuated the association between recent life hassles (i.e., negative life experiences) and depression and anxiety. In a prospective study of 78 high school students, Ciesla et al. (2012) found that the mindfulness facets of non-judging of inner experiences, and non-reactivity to inner experiences, buffered the effects of daily life stress on daily changes in dysphoric affect, while the facet of acting with awareness did not. The authors concluded,

“adolescents who respond to their own internal experiences in an accepting and non-judgmental way, and can also let negative experiences pass without reacting to them, appear less likely to experience higher levels of negative affect following the occurrence of a negative life event” (p. 768).

Research further suggests that dispositional mindfulness buffers the relationship between perceived stress and psychological distress in adults. In a randomized controlled trial of 44 undergraduate students, Brown et al. (2012) found that higher levels of mindful attention and awareness were associated with lower stressor-evoked cortisol reactivity and emotional responses (negative affect and anxiety) in a high-stress condition, whereas there was no association between mindfulness and these outcomes in the low-stress condition. In a sample of 382 Swedish adults, Bränström et al. (2011) found that the acting with awareness dimension of mindfulness buffered the effects of stress in the prediction of depression. However, no mindfulness facets moderated the effect of stress on positive states of mind. The authors concluded that heightened mindful awareness may increase coping ability during stressful conditions.

The purpose of the present study was to examine the potential stress-buffering nature of mindfulness on the relationship between perceived stress and psychological adjustment using a sample of law students. While previous stress-buffering research has focused on negative indicators of psychological adjustment, the present study examines positive indicators of adjustment, namely life satisfaction, autonomy, environmental mastery, personal growth, positive relationships with others, purpose in life, and self-acceptance, as well as depression and anxiety. In addition, there have been few studies that have examined the stress-buffering effects of all five dimensions of mindfulness identified by Baer et al. (2006). Accordingly, the present research will examine the stress-buffering nature of observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. It was hypothesized that higher levels of mindfulness would be related to better psychological adjustment, and mindfulness would buffer the relationship between perceived stress and lower psychological adjustment. More specifically, the association between higher perceived stress and lower psychological adjustment would be weaker for participants with higher levels of mindfulness (vs. lower levels of mindfulness), and this beneficial effect of mindfulness would be most evident under high stress (vs. low stress).

## Method

### Participants

Participants were 647 university students enrolled in a Bachelor of Laws at one of three universities in Queensland,

Australia. Four hundred and eighty-one participant responses were sufficiently complete (>80 %) for data analysis. These 481 students (70.76 % females and 29.24 % males) had a mean age of 21.90 years ( $SD = 5.78$ ; range = 17–62) and were in first (22.51 %), second (22.29 %), third (21.44 %), or fourth (33.76 %) year of law school. The majority of students were enrolled in full-time (91.01 %) compared to part-time (8.99 %) study. Participants completed the questionnaire at the start (i.e., weeks 1–4, 0.64 %), mid (i.e., weeks 5–9, 15.29 %), or end of semester (i.e., week 10 onwards, 84.07 %). The majority of students were employed (66.45 %) compared to unemployed (33.55 %) and reported that they did not currently practice meditation (93.01 % compared to 6.99 % who practiced meditation).

### Procedure

Data were collected via an online questionnaire entitled “Law Student Well-being.” Three Queensland law schools e-mailed an advertisement regarding the study to students, included the study advertisement on their electronic learning portal for students, and/or forwarded the advertisement to the University’s Law Society. Participation was voluntary. Inclusion criterion was current enrolment in a Bachelor of Laws (single or dual program). There were no exclusion criteria. Accurate response rates could not be determined because the number of students who accessed their university portal or email could not be monitored.

### Measures

The online questionnaire contained seven self-report measures. Descriptive data and internal reliability coefficients (Cronbach’s 1951 alpha) for each measure are included in Table 1. Previous research indicates that all measures used have satisfactory validity and reliability.

Perceived law student stress was measured using the 16-item Law Student Perceived Stress Scale (LSPSS; Bergin and Pakenham 2014). The LSPSS measures the degree to which students perceived various law school stressors as stressful. The LSPSS measures four subscales of law student stress (academic demands, social isolation, career pressure, and study/life imbalance) and can also be used as a unidimensional construct. Participants were asked to indicate how stressful they found items relating to potential sources of stress in law school, if at all. A sample item is “The amount of material to be learned (e.g., readings, cases).” Participants rated how stressful they found each item on a 5-point scale (1 *Not at all stressful* to 5 *Very stressful*). The validity and reliability of the LSPSS have previously been established, and total LSPSS scores demonstrate convergent validity with the Perceived Stress Scale (Cohen et al. 1983;  $r = .61$ , Bergin and Pakenham 2014).

Mindfulness was measured using the 39-item Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006). The FFMQ measures five unique mindfulness facets: observing (e.g., “When I’m walking, I deliberately notice the sensations of my body moving”), describing (e.g., “I am good at finding words to describe my feelings”), acting with awareness (e.g., “When I do things, my mind wanders off and I’m easily distracted”), non-judging of inner experience (e.g., “I criticize myself for having irrational or inappropriate emotions”), and non-reactivity to inner experience (e.g., “I perceive my feelings and emotions without having to react to them”). Each subscale consisted of eight items (with the exception of the seven item non-reactivity scale) and items were rated on a 5-point scale (1 *Never or very rarely true* to 5 *Very often or always true*). Three of the describing items and all of the acting with awareness and non-judging items were reverse scored. Higher scores indicate greater levels of mindfulness. The FFMQ has been recommended for fine-grained analyses of mindfulness, and scores on each subscale can also be summed to yield a total mindfulness score (Sauer et al. 2013).

Depression and anxiety symptoms were measured using the short-form *Depression Anxiety Stress Scale* (Lovibond and Lovibond 1995), a well-established screening questionnaire for non-clinical samples. Respondents were asked how they felt over the past week and responded on a 4-point scale (0 *Did not apply to me at all* to 3 *Applied to me very much or most of the time*). The depression and anxiety subscales each consist of seven items. Sample items include: “I felt down hearted and blue” (depression), and “I was aware of action in my heart in the absence of physical exertion” (anxiety).

Life satisfaction was assessed with the 5-item *Satisfaction with Life Scale* (Diener et al. 1985), a global measure of subjective satisfaction with life. A sample item is, “I am satisfied with my life”. Each item was rated on a 7-point scale (1 *Strongly disagree* to 7 *Strongly agree*).

Psychological well-being was assessed with the 54-item *Ryff Psychological Well-being Scales* (Ryff and Keyes 1995). This scale is a measure of six distinct elements of positive functioning that encompass well-being: autonomy (e.g., “I have confidence in my opinions, even if they are contrary to the general consensus”), environmental mastery (e.g., “In general, I feel I am in charge of the situation in which I live”), personal growth (e.g., “I think it is important to have new experiences that challenge how you think about yourself and the world”), positive relationships with others (e.g., “People would describe me as a giving person, willing to share my time with others”), purpose in life (e.g., “Some people wander aimlessly through life, but I am not one of them”), and self-acceptance (e.g., “I like most aspects of my personality”). Each subscale consists of nine items and responses are scored on a 6-point scale (1 *Strongly disagree* to 6 *Strongly agree*).

**Table 1** Summary of descriptive statistics for all measures ( $n = 481$ )

Measure	Internal reliability $\alpha$	M	SD	Range
Total perceived stress	.89	57.03	10.76	19–80
Total mindfulness	.89	117.92	17.69	63–173
Observing	.79	25.05	5.56	8–40
Describing	.91	26.97	6.42	8–40
Acting with awareness	.89	23.39	6.03	8–40
Non-judging	.90	22.37	6.92	8–40
Non-reactivity	.82	20.13	4.57	7–35
Depression	.90	7.75	5.50	0–21
Anxiety	.84	5.98	4.89	0–21
Life satisfaction	.90	21.35	7.17	5–35
Psychological well-being				
Autonomy	.84	36.81	7.48	9–53
Environmental mastery	.81	32.71	7.25	9–52
Personal growth	.80	40.05	6.60	14–54
Positive relationships	.86	36.35	8.44	9–54
Purpose in life	.78	38.20	6.82	14–54
Self-acceptance	.90	33.89	8.86	9–54

## Data Analyses

Prior to analysis, all variables were examined in SPSS for missing data and fit between their distributions and the assumptions of multivariate analysis. Listwise deletion was utilized to remove participants who had completed less than 80 % of the data. One case identified through Mahalanobis distance as a multivariate outlier ( $p < .001$ ) was removed (Tabachnick and Fidell 2007), leaving  $n = 480$  cases for final analyses. Preliminary data analyses were conducted to examine relationships between the demographic variables (age, gender, year of study, time of semester completing questionnaire, full-time/part-time study status (FTPT), university attending, and engagement in meditation practice), predictors, and outcome variables and to identify demographic variables that needed to be controlled for in further analysis (see Table 2 for bivariate correlations between the variables). Due to the number of preliminary analyses conducted, a significance level of  $p < .01$  was used. As indicated in Table 2, older students experienced fewer symptoms of psychological distress and improved well-being, and female students experienced more anxiety and lower levels of environmental mastery and self-acceptance than male students. Full-time students reported higher levels of depression and anxiety, lower levels of autonomy, environmental mastery, purpose in life, and self-acceptance. Age, gender, and FTPT study status were controlled for in all subsequent analyses.

To test the study hypotheses, separate hierarchical multiple regression analyses were conducted for each outcome variable. All predictor variables were expressed in mean deviation form and interaction terms were the product of these mean-

centred variables (Aiken and West 1991). The predictor variables were entered in the following steps: (a) the control variables (age, gender, FTPT study status), (b) the main effect of total perceived law student stress, (c) the main effect of mindfulness, and (d) the two-way interaction between perceived stress and mindfulness. Mindfulness was inserted after perceived stress to examine the unique variance of mindfulness in outcomes. Preliminary analysis of the covariates at step 1 revealed that FTPT was not significantly related to the outcome variables. For this reason, and due to its significant relationship with the covariate variable of age ( $r = -.32$ ,  $p < .001$ ), it was removed from further analyses. Table 3 displays a summary of the regression models. To examine the potential main and moderating effects of the five mindfulness subscales, the set of regression analyses was repeated with the five subscales replacing total mindfulness at step 3, and the five two-way interactions between each subscale and total perceived stress were entered in step 4 (see Steps 3b and 4b of Table 3). Significant two-way interactions were followed up with simple slope analyses using the unstandardized regression coefficients ( $B$ ) of the regression lines for law students low (1 SD below mean) and high (1 SD above mean) on the moderator variable (Jaccard et al. 1990).

## Results

As indicated in Table 2, bivariate correlations confirmed that perceived stress was significantly positively correlated with depression and anxiety symptoms and negatively correlated with life satisfaction and all well-being dimensions. As

**Table 2** Bivariate correlations among the demographic, predictor, and outcome variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1. Age	—																			
2. Gender <sup>a</sup>	-.09	—																		
3. FTPT <sup>b</sup>	-.32***	-.02	—																	
4. Meditation <sup>c</sup>	.09*	-.02	.03	—																
5. Total perceived stress	-.10*	.25***	.10*	.01	—															
6. Total mindfulness	.17**	-.22***	-.07	.09*	-.37***	—														
7. Observing	.02	-.07	-.03	.15**	-.03	.41***	—													
8. Describing	.13**	-.12**	-.03	.07	-.24***	.67***	.20***	—												
9. Acting with awareness	.14**	-.11*	-.08	-.03	-.32***	.69***	.04	.30***	—											
10. Non-judging	.14**	-.11*	-.04	.03	-.28***	.64***	-.14**	.24***	.45***	—										
11. Non-reactivity	.06	-.32***	.02	.08	-.21***	.55***	.25***	.20***	.18***	.20***	—									
12. Depression	-.18***	.09	.15**	-.02	.46***	-.57***	-.08	-.33***	-.51***	-.49***	-.25***	—								
13. Anxiety	-.21***	.14**	.13**	.01	.44***	-.42***	.08	-.27***	-.39***	-.43***	-.20***	.68***	—							
14. Autonomy	.25***	-.16***	-.13**	.11*	-.25***	.47***	.14***	.48***	.27***	.25***	.24***	-.33***	-.31***	—						
15. Environmental mastery	.12***	-.11*	-.11*	.05	-.51***	.59***	.10*	.38***	.53***	.43***	.26***	-.67***	-.50***	.39***	—					
16. Personal growth	.10*	.02	-.06	.10*	-.27***	.42***	.19***	.39***	.25***	.23***	.16***	-.46***	-.38***	.45***	.55***	—				
17. Positive relationships	.09*	.07	-.02	.03	-.34***	.47***	.16***	.41***	.36***	.29***	.13***	-.56***	-.39***	.36***	.64***	.57***	—			
18. Purpose in life	.14*	-.01	-.14**	.05	-.28***	.42***	.05	.34***	.42***	.26***	.13***	-.53***	-.35***	.36***	.63***	.68***	.50***	—		
19. Self-acceptance	.12*	-.13**	-.10*	.09	-.45***	.56***	.11*	.40***	.38***	.44***	.31***	-.68***	-.46***	.49***	.74***	.60***	.62***	.61***	—	
20. Life satisfaction	-.01	-.02	-.08	.05	-.36***	.47***	.15***	.35***	.33***	.34***	.20***	-.57***	-.35***	.33***	.64***	.49***	.55***	.54***	.77***	—

<sup>a</sup> Gender was coded as -1 = male, 1 = female

<sup>b</sup> Full-time/Part-time (FTPT) study status was coded as -1 = part-time, 1 = full-time

<sup>c</sup> Meditation was coded as -1 = does not practice meditation, 1 = practices meditation

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**Table 3** Hierarchical multiple regression analysis of perceived stress and mindfulness on depression, anxiety, life satisfaction and dimensions of psychological well-being

Step and independent variables	Depression			Anxiety			Life satisfaction			Autonomy			Environmental mastery		
	$\beta$	Total $R^2$	$\Delta R^2$	$\beta$	Total $R^2$	$\Delta R^2$	$\beta$	Total $R^2$	$\Delta R^2$	$\beta$	Total $R^2$	$\Delta R^2$	$\beta$	Total $R^2$	$\Delta R^2$
<i>Step 1</i>															
Age	-.17***	.04	.04	-.20***	.05	.05	-.01	.00	.00	.22***	.08	.08	.11*	.02	.02
Gender <sup>a</sup>	.06			.10*			-.02			-.14**			-.09		
<i>Step 2</i>															
Stress	.45***	.23	.19***	.43***	.23	.18***	-.38***	.13	.13***	-.19***	.11	.04***	-.49***	.25	.25
<i>Step 3a</i>															
Total MF	-.48***	.42	.19***	-.28***	.30	.07***	.45***	.30	.17***	.41***	.25	.14***	.48***	.44	.44
<i>Step 4a</i>															
Stress × Total MF	-.09*	.43	.01*	-.09*	.30	.01*	.01	.30	.00	.06	.26	.00	-.02	.44	.44
<i>Step 3b</i>															
O	-.06			.11**			.14***			.04			.06		
D	-.11**			-.10*			.20***			.38***			.14***		
AA	-.25***			-.15***			.10*			.05			.31***		
NJ	-.27***			-.21***			.24***			.07			.17***		
NR	-.09*	.45	.22***	-.07	.36	.13***	.06	.31	.17***	.10*	.31	.19***	.09*	.47	.47
<i>Step 4b</i>															
Stress × O	-.09**			-.01			.10*			.04			.05		
Stress × D	-.10*			-.10*			.02			.05			.01		
Stress × AA	-.05			-.02			-.01			.03			.04		
Stress × NJ	.05			.00			-.03			-.02			-.07		
Stress × NR	.13	.48	.03***	-.01	.37	.01	-.03	.32	.01	-.03	.31	.01	-.04	.48	.48
<i>Step and independent variables</i>															
	$\Delta R^2$	Environmental mastery	Personal growth	Positive relationships	Purpose in life	Self-acceptance									
		$\Delta R^2$	$\beta$	$\beta$	$\beta$	$\beta$	Total $R^2$	Total $R^2$	Total $R^2$	Total $R^2$	Total $R^2$	Total $R^2$	Total $R^2$	Total $R^2$	$\Delta R^2$
<i>Step 1</i>															
Age	.02**		.11*	.08	.02	.14**	.02*	.02*	.02	.10*	.03	.03	.10*	.03**	.03**
Gender <sup>a</sup>			.04	.01*	.08	.02			.02	-.11*			-.11*		
<i>Step 2</i>															
Stress	.23***		-.27***	.08	-.07***	-.35***	.13	.12***	-.28***	-.43***	.20	.07***	-.43***	.20	.17***
<i>Step 3a</i>															
Total MF	.19***		.39***	.21	.13***	.44***	.30	.16***	.39***	.49***	.40	.13***	.49***	.40	.20***
<i>Step 4a</i>															
Stress × Total MF	.00		-.04	-.04	-.04	-.04	.30	.00	-.04	.00	.22	.00	.00	.40	.00
<i>Step 3b</i>															
O			.14***				.12***		.01	.09*			.09*		
D			.29***				.27***		.22***	.21***			.21***		
AA			.05				.18***		.29***	.08			.08		
NJ			.12*				.13**		.05	.29***			.29***		
NR			.04				.00		.02	.14***			.14***		
<i>Step 4b</i>															
Stress × O			.02				.06		.04	.06			.06		
Stress × D			.03				.03		.05	.04			.04		
Stress × AA			-.03				-.03		-.03	-.03			-.03		
Stress × NJ			-.05				-.07		-.08	-.03			-.03		
Stress × NR			-.05				-.10		-.03	-.02			-.02		
Total MF	.01		-.05	.24	.01	.34	.34	.02*	-.03	.27	.01	.42	.42	.01	.01

Steps 3b and 4b represent a separate regression analysis, with steps 1 and 2 the same as the regression analysis above. Stress = total perceived stress; Total MF = total mindfulness

O observing, D describing, AA acting with awareness, NJ non-judging of inner experience, NR non-reactivity to inner experience

<sup>a</sup> Gender was coded as -1 = male, 1 = female

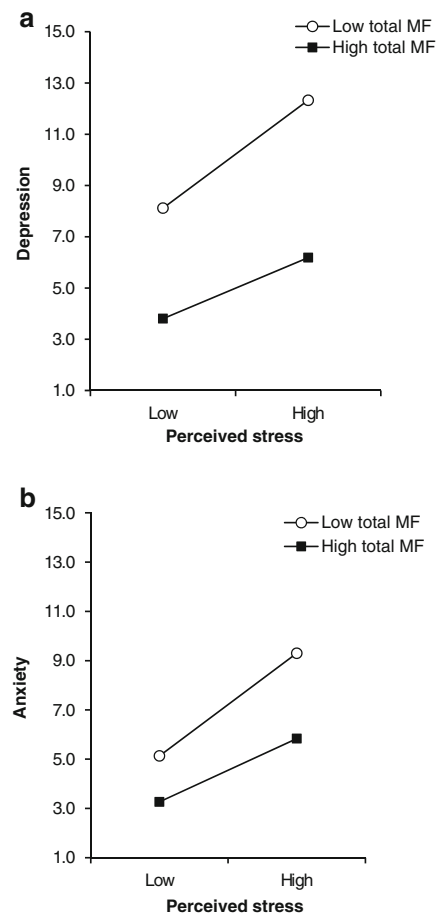
\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$



expected, total mindfulness was negatively related to symptoms of depression and anxiety and positively related to life satisfaction and well-being. The mindfulness facets of describing, acting with awareness, non-judging, and non-reactivity had significant negative correlations with depression and anxiety and significant positive correlations with life satisfaction and well-being. The mindfulness facet of observing was not significantly correlated with depression or anxiety; however, it was significantly positively correlated (albeit weakly,  $r \leq .19$ ) with life satisfaction and all well-being dimensions (with the exception of purpose in life).

Entry of perceived stress in step 2 explained a significant amount of variance in all outcome variables, after controlling for age and gender. Perceived stress was positively related to symptoms of depression and anxiety and negatively related to life satisfaction, autonomy, environmental mastery, personal growth, positive relationships with others, purpose in life, and self-acceptance. Entry of total mindfulness in step 3 (see step 3a of Table 3) further explained unique variance in all outcomes after controlling for perceived stress, age, and gender. As hypothesized, greater mindfulness was related to lower depression and anxiety, and higher life satisfaction and greater well-being across all six dimensions. Entry of the five mindfulness subscales (see step 3b of Table 3) yielded a significant effect on all outcome variables after controlling for age, gender, and perceived stress. The mindfulness facet of describing was related to better psychological adjustment on all outcomes. Non-judging was related to better psychological adjustment on all outcomes, except for autonomy and purpose in life, and acting with awareness was related to better outcomes on all variables except for autonomy, personal growth, and self-acceptance. The facet of non-reactivity was significantly related to fewer symptoms of depression and was positively related to autonomy, environmental mastery, and self-acceptance. Observing had a positive main effect on life satisfaction, personal growth, positive relationships, and self-acceptance, however, in contrast to other mindfulness facets, had a positive main effect on symptoms of anxiety.

Entry of the two-way interaction term between perceived stress and total mindfulness accounted for a significant increment of variance in depression and anxiety scores (see step 4a of Table 3), indicating mindfulness moderated the impact of stress on depression and anxiety. Simple slopes analysis indicated that, although perceived stress predicted depression at both low,  $B = .20$ ,  $t(456) = 7.41$ ,  $p < .001$ , and high levels of mindfulness,  $B = .11$ ,  $t(456) = 4.19$ ,  $p < .001$ , as expected, the relationship between perceived stress and depression was weaker at higher levels of mindfulness (see Fig. 1a). As can be seen in Fig. 1b, a similar pattern of results emerged on anxiety for students with lower levels of mindfulness,  $B = .20$ ,  $t(456) = 7.41$ ,  $p < .001$  compared to higher levels of mindfulness,  $B = .12$ ,  $t(456) = 4.57$ ,  $p < .001$ . While the mitigating effects of total mindfulness on depression and anxiety

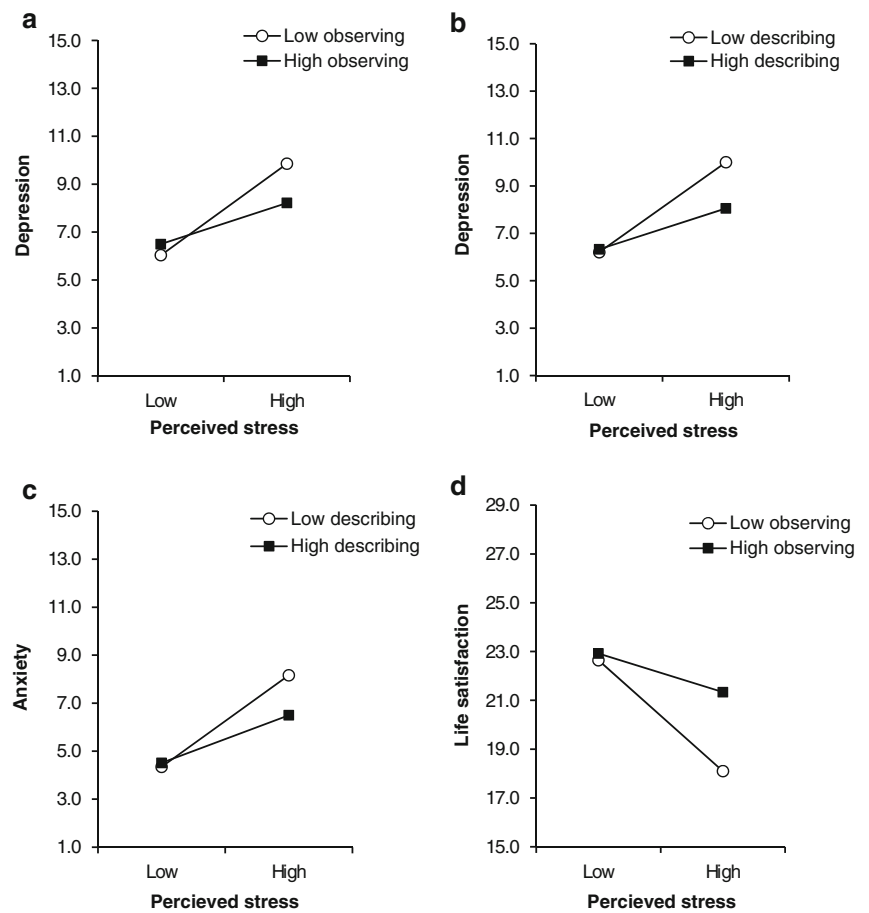


**Fig. 1** Two-way interaction of perceived stress and total mindfulness (total MF) on **a** depression and **b** anxiety

were present at both high and low stress, they were more pronounced at high stress.

Regression analyses examining the moderating role of the five mindfulness facets on the relationship between perceived stress and psychological adjustment showed four significant two-way interactions on depression, anxiety, and life satisfaction (see step 4b of Table 3). Entry of the two-way interactions in step 4b accounted for a significant increment of variance in depression scores, and the interaction term between perceived stress and observing, and perceived stress and describing, were statistically significant. Simple slopes analysis indicated that, in support of our hypothesis, the positive effect of perceived stress on depression was weaker for students with higher levels of observing,  $B = .08$ ,  $t(456) = 2.85$ ,  $p = .005$ , compared to students with lower levels of observing,  $B = .18$ ,  $t(456) = 6.72$ ,  $p < .001$ , and the mitigating effect of observing was evident at high stress (see Fig. 2a). Similarly, the positive effect of perceived stress on depression was weaker for students with higher levels of describing,  $B = .08$ ,  $t(456) = 2.78$ ,  $p = .006$  compared to students with lower levels of describing,  $B = .18$ ,  $t(456) = 6.56$ ,  $p < .001$  (see Fig. 2b).

**Fig. 2** Two-way interaction of **a** perceived stress and observing on depression, **b** perceived stress and describing on depression, and **c** perceived stress and describing on anxiety, and **d** perceived stress and observing on life satisfaction



In relation to anxiety, the two-way interaction between perceived stress and describing was significant, although entry of the five two-way interactions in step 4b did not account for a significant increment of variance in anxiety scores. Simple slopes analysis indicated a similar pattern of results to the two-way interaction between stress and describing on depression, with the positive relationship between perceived stress and anxiety being weaker for students with higher levels of describing,  $B = .09$ ,  $t(456) = 3.24$ ,  $p = .001$ , compared to students with lower levels of describing,  $B = .18$ ,  $t(456) = 6.68$ ,  $p < .001$  (see Fig. 2c).

In relation to life satisfaction, the two-way interaction between perceived stress and observing was significant, although entry of the five two-way interactions in step 4b did not account for a significant increment of variance in life satisfaction scores. The beneficial effects of higher observing on life satisfaction were further most evident under high stress, whereby low-observing students reported significantly lower life satisfaction,  $B = -.22$ ,  $t(457) = -5.35$ ,  $p < .001$ . In contrast, for students with high levels of observing, their levels of life satisfaction were not significantly affected under high stress,  $B = -.08$ ,  $t(457) = -1.77$ ,  $p = .077$  (see Fig. 2d). No mindfulness subscale moderated the effect of perceived stress on the six psychological well-being outcomes, and acting with

awareness, non-judging of inner experience, and non-reactivity to inner experience did not moderate the effect of perceived stress on any outcome variables.

## Discussion

The purpose of the present study was to examine the potential stress-buffering role of mindfulness in the relationship between perceived stress and positive and negative indicators of psychological adjustment in law students. Previous research indicates that law students report elevated levels of psychological distress and are at greater risk for depression compared with community norms and other university student groups (e.g., Kelk et al. 2010). In addition, although numerous legal academics have claimed that mindfulness is related to improved well-being of law students (e.g., Halpern 2012; Riskin 2002; Rogers 2012), to our knowledge, there are no published studies that have examined the beneficial direct or stress-buffering effects of mindfulness on law students. The present study results indicated that higher levels of mindfulness were related to better psychological adjustment on all outcome variables, after controlling for the effects of age, gender, and perceived stress. In contrast to predictions, observing was *positively* related to



anxiety. A higher tendency to notice internal stimuli may be related to heightened interoceptive awareness and an increased likelihood of noticing sensations that, if perceived as dangerous, may trigger panic (e.g., increased heart rate; Desrosiers et al. 2013; Ehlers and Breuer 1996). This finding is also consistent with previous findings that high observing is only associated with reduced distress in experienced meditators (Baer et al. 2008). The present study found that non-judging of inner experience was related to reduced anxiety, highlighting the importance of taking a non-judgmental view towards internal cues in order to lower anxiety.

Examination of total levels of mindfulness indicated that the stress-buffering effects of mindfulness on depression and anxiety were present at both high and low stress conditions, although they were more pronounced at high stress. Clearer buffering effects emerged on the mindfulness subscales, finding that the ability to describe experiences attenuated the relationship between perceived stress and depression and anxiety. Higher describing may be particularly important at times of high stress as it is related to reduced experiential avoidance of distressing experiences (Baer et al. 2006; Desrosiers et al. 2013) and increased concrete thinking (Behar et al. 2012; Desrosiers et al. 2013). The ability to describe events and label internal experiences with words (e.g., “sadness has arisen”; Baer 2009) is also necessary for communication and self-control (Linehan 1993a). Communication at times of high stress may enable receipt of social support, professional help, or facilitate effective problem solving, thereby reducing vulnerability to depression and anxiety resulting from high stress.

The results indicated that observing buffered the relationship between perceived stress with depression and reduced life satisfaction. This study appears to be the first to examine the stress-buffering effect of mindfulness on life satisfaction and found that, for students with high levels of observing, levels of life satisfaction were not affected under conditions of high stress. High observing indicates a greater tendency to notice external stimuli and may be associated with a lack of ruminative thought (that is, repeated and passive focus on the causes, consequences, and symptoms of distress without taking action to alleviate symptoms; Nolen-Hoeksema et al. 2008), during periods of high stress. Exposure to chronic or uncontrollable university stressors (e.g., heavily weighted examinations) may increase rumination due to unresolvable discrepancies between student’s current state, and their desired state (e.g., to achieve high grades; Michl et al. 2013; Watkins 2008). In a recent systematic review and meta-analysis, Gu et al. (2015) found that repetitive negative thinking mediated the effects of mindfulness-based interventions on mental health outcomes. Future research should examine whether the stress-buffering effects of observing are stronger for students who practice meditation due to findings that the effect of life events on distress is weakest amongst high observing meditators (Neale-Lorello and Haaga 2015).

In contrast to predictions, mindfulness did not buffer the negative effects of stress on psychological well-being. A potential explanation for this finding is that while high levels of mindfulness may reduce vulnerability to depression and anxiety resulting from high stress (e.g., through reducing primary threat appraisals and increasing access to personal coping resources), for psychological well-being to flourish at times of high stress, individuals may also need access to particular positive coping resources. For example, research indicates that having an optimistic disposition (i.e., a positive outlook on one’s own future experience) is related to better subjective well-being at times of adversity or difficulty (Carver et al. 2010). Accordingly, it may be that individuals who can both disengage from detrimental cognitive or emotional reactivity (i.e., high mindfulness), and maintain an optimistic attitude, do not experience reduced well-being at times of high stress. These individuals may be less likely to view university stress as pervading other dimensions of their life and may maintain positive attitudes regarding their purpose in life and personal relationships and experience personal growth and self-acceptance at times of high stress. While recent research indicates that optimism has a direct relationship with well-being, and mindfulness has an additional indirect influence on well-being via optimism (Malinowski and Lim 2015), the joint role of mindfulness and optimism in buffering the effects of stress on well-being does not appear to have been examined. Future research should examine the potential three-way interaction between stress, mindfulness, and other psychological resources such as optimism, hope and positive affect, on well-being.

The study results suggest that the beneficial effects of being able to describe and observe one’s experience on reduced psychological distress only emerge at periods of high stress, which may explain previous inconsistent or non-significant direct relationships between these facets and reduced depression and anxiety (e.g., Baer et al. 2006; Cash and Whittingham 2010). The facets of mindfulness found to buffer stress in the present study are in contrast to previous research which has found that acting with awareness, non-reactivity to inner experience, and non-judging of inner experience moderate the relationship between stress and depression and anxiety (Bränström et al. 2011; Ciesla et al. 2012; Marks et al. 2010). The present results support further examination of the stress-buffering effects of describing and observing and suggest that these facets may be beneficial in certain populations, may buffer the relationship between specific sources of stress (i.e., law school stress) and psychological adjustment, and/or may be particularly important in the promotion of positive adjustment.

Regarding practice implications, the study findings suggest that higher levels of mindfulness may improve students’ psychological adjustment and ability to cope with high stress in university. The practical implication of a stress-buffering

effect of mindfulness is that distress may, in practice, be reduced by increasing levels of mindfulness in students without necessarily having to change the environment. These findings are important because many of the reported stress-inducing practices in law school are steeped in tradition and are unlikely to change in the near future (Sheehy and Horan 2004). Research indicates that participation in mindfulness-based interventions increases mindfulness levels in university students (Shapiro et al. 2007) and highly stressed individuals (Carmody and Baer 2008; Baer et al. 2012) and fosters adjustment to university (Ramler et al. 2015). Furthermore, specific techniques can be utilized within these interventions to increase facets of mindfulness (Carmody and Baer 2008). The study results suggest that clinical use of mindfulness with students experiencing depressive and anxiety symptoms should emphasize increasing non-judging of inner experience and acting with awareness. For students experiencing high stress, mindfulness interventions should target the ability to describe and observe experiences. Due to previous findings that describing only shows small increases during traditional mindfulness-based interventions (Carmody and Baer 2008; Carmody et al. 2009), describing may need to be explicitly modelled to participants (Baer et al. 2012) or specific exercises for labelling experiences could be incorporated (as used in other mindfulness-based interventions such as dialectical behavioral therapy, Linehan 1993b; and acceptance and commitment therapy, Hayes et al. 1999). Due to the positive relationship between observing and anxiety, caution must be exercised in implementing interventions that focus on observing distressing experiences without also cultivating other mindfulness facets (in particular, non-judging of inner experiences; Desrosiers et al. 2013).

Although the present study had a number of strengths, including the use of a comprehensive measure of stress specific to the population of study (in comparison to previous stress-buffering research), its methodological limitations must be noted. The cross-sectional design means that causality cannot be inferred and the possibility of reverse causality cannot be ruled out (i.e., lower distress may enable a more mindful posture towards one's experiencing). The use of self-report means that reporting biases may have influenced the study results (although no substantial association between mindfulness and social desirability has been detected; Sauer et al. 2013), and that the results may have been inflated by common method variance (CMV; Spector 1992). The low-to-moderate correlations found in the present study, as well as the significant interactions, argue against the effects of CMV, which is likely to inflate bivariate correlations and result in an underestimation of interactions (Evans 1985).

In conclusion, the study results suggest that mindfulness is a potentially important protective factor in helping students cope with high stress in university. In particular, the ability to describe experiences may be particularly important in

mitigating the effect of stress on depression and anxiety, as is the ability to observe internal and external experiences in mitigating the effects of stress on depression and reduced life satisfaction. Future research should investigate the potential mechanisms through which describing and observing may buffer the effects of perceived stress on outcomes (for example, reduced rumination), as well as the potential joint role of mindfulness and personal coping resources (e.g., optimism) in buffering the effects of stress on positive adjustment outcomes.

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