Relationship between mindfulness, depression, anxiety and stress: Mediating role of self-efficacy

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ABSTRACT

This study used self-report measures to examine the connection between mindfulness, self-efficacy, anxiety, depression, and stress. We administered the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R), New General Self-Efficacy Scale (NGSE), and Depression Anxiety Stress Scales (DASS21) to a non-clinical sample of Indian IT professionals (n = 382). The findings revealed that mindfulness was positively linked to self-efficacy, while it was negatively related to anxiety, stress, and depression. Furthermore, self-efficacy was negatively linked to anxiety, stress, and depression. In fact, according to the results of the mediation analysis, the role of self-efficacy worked as a partial mediator in the association between mindfulness, stress, depression and anxiety.

1. Introduction

Recent years have witnessed a surge in research on mindfulness across Psychology, Psychiatry and related disciplines. Mindfulness refers to various traits, practices, and processes that lead to a positive mental state characterized by awareness, along with non-elaborative and nonjudgmental attention (Bishop et al., 2004; Brown & Ryan, 2003; Brown, Ryan, & Creswell, 2007; Kabat-Zinn & Hanh, 1990). Further, mindfulness positively relates to the ability to pay attention to both internal (e.g., emotions, cognitions and their behavioral and somatic consequences) and external (e.g., social interaction, and environmental surroundings) stimuli, but more dispassionately than before (Glomb, Duffy, Bono, & Yang, 2011). Some of the common definitions of mindfulness include the following: "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994). Similarly, other definitions conceptualize it as "attentional control" (Teasdale, Segal, & Williams, 1995); "complete attention to one's experience on a moment-to-moment basis" (Marlatt & Kristeller, 1999) and "moment-by-moment awareness" (Germer, Siegel, & Fulton, 2005). It has also been described as "the bringing of one's awareness to current experiences through observing and attending to the changing field of thoughts, feelings, and sensations from moment to moment" (Bishop et al., 2004). Importantly, it benefits both an individual's well-being and health, clinically (e.g. Crane et al., 2017; Kuyken et al., 2015; Mitchell et al., 2017) as well as non-clinically (e.g., Bränström, Duncan, &

Moskowitz, 2011; Brown & Ryan, 2003; Tan & Martin, 2016).

1.1. Mindfulness, anxiety, stress and depression

The emphasis of this study rests upon the relationship between mindfulness, stress, anxiety and depression. A significant amount of research has shown that mindfulness is negatively associated to stress (Bao, Xue, & Kong, 2015; Nezlek, Holas, Rusanowska, & Krejtz, 2016; O'Loughlin, Fryer, & Zuckerman, 2019), anxiety (Bajaj, Robins, & Pande, 2016; Jankowski & Bąk, 2019; Raphiphatthana, Jose, & Kielpi-kowski, 2016; Walsh et al., 2009) and depression (Bajaj et al., 2016; Christopher & Gilbert, 2010; Desrosiers, Vine, Klemanski, & Nolen-Hoeksema, 2013; Kircaburun, Griffiths, & Billieux, 2019). It has been regarded as one of the most well-established components that lead to happiness. It enables individuals to observe events and thoughts as they are, and reframe themselves in a way that allows them to be more present in the moment (Brown & Ryan, 2003). More attentive individuals feel less stress, as they respond to it more adaptively. In fact, both mindfulness and stress have been shown to be negatively associated at the within-person level (Bao et al., 2015). Its practice is meant to develop an attitude that ideas are transitory, and the responses to those thoughts are mere precursors to emotion. In both clinical and nonclinical groups, growing evidence suggests that mindfulness-based treatments may successfully enhance positive mood and decrease stress (Bao et al., 2015; Nezlek et al., 2016). According to meta-analyses,

mindfulness-based treatments (MBIs) are effective in treating mood disorders and anxiety, and reducing anxious and depressed symptoms (Hofmann, Sawyer, Witt, & Oh, 2010). Interestingly, training on mindfulness has a positive effect on regions of the human brain involved in emotion regulation and stress impulse response (Hölzel et al., 2011). Mindfulness techniques are based on the idea that experiencing the present moment non-judgmentally can successfully mitigate the effects of stressors. Often, as individuals, we focus excessively on our past and/or future, which results in excessive cognitive activity to control negative emotional experiences or repetitive threatening thoughts of negative emotional events, triggering the stressors (Desrosiers et al., 2013). This in turn, increases depression, anxiety, and stress (Hofmann et al., 2010; Kabat-Zinn, 2003). Furthermore, mindful people react to stressful events more reflectively rather than reflexively (Desrosiers et al., 2013). Thus, mindfulness is considered to be at odds with experiential avoidance techniques, which involve attempting to reduce the intensity or frequency of unpleasant internal sensations that have been associated with higher levels of depression, anxiety, and stress (Tan & Martin, 2016).

1.2. Self-efficacy as mediator

Prior studies (Bayır & Aylaz, 2021; Hanley, Palejwala, Hanley, Canto, & Garland, 2015) have shown a link between mindfulness and self-efficacy. In fact, in a recent study, Chan, Yu, and Li (2021) revealed a substantial connection between mindfulness and self-efficacy. Self-efficacy refers to the belief in one's own capacity, and has thereby been proven to have a significant influence on human accomplishment (Bandura, 1997). Mindfulness techniques in effect, may help you become more conscious of your own self-efficacy, by becoming more aware of your point of view in every circumstance, whether it includes objects, people, locations, or ideas. Thus, mindfulness impacts self-efficacy, while increased self-efficacy affects the levels of anxiety, stress, and depression in turn.

In fact, self-efficacy has significantly been linked to anxiety (Muris, 2002; Rouxel, 1999; Thomasson & Psouni, 2010), depression (Ali & Nair, 2021; Muris, 2002), and stress (Delahaij & Van Dam, 2017; Karademas & Kalantzi-Azizi, 2004; Lu, Siu, & Cooper, 2005). Based on extant literature, we consider self-efficacy as a general motivational trait that is significantly more resistant to transient effects, wherein individuals believe they are capable of achieving task demands under various situations. The malleability of self-efficacy judgments, and the process by which these judgments are generated, are quintessential aspects of the Social Cognitive Theory (SCT) (Bandura, 1997). SCT proposes that judgments of self-efficacy are an interpretative activity of the individuals' enactive mastery and vicarious experience (Bandura, 1997; Gundlach, Martinko, & Douglas, 2003). While mindfulness techniques help individuals to become more conscious of their own self-efficacy, SCT proposes that the individuals' judgments of their self-efficacy in dealing with environmental realities, essentially affect emotional reactions and cognitive processes (Bandura, 1997). People who believe they are inefficient in dealing with environmental demands/realities are more likely to exaggerate their personal shortcomings and challenges, which in turn, results in stress, anxiety, or depression. Thus, mindfulness being non-judgmental in essence, helps in accepting internal thoughts and feelings, and thereby heightens awareness of environmental cues and contingencies (Friese & Hofmann, 2016; Noetel, Ciarrochi, Van Zanden, & Lonsdale, 2019). In the process, it augments high self-efficacy, which in turn, acts as a protective barrier against stress, anxiety, or depression.

In this study, we assume self-efficacy to mediate the connection between mindfulness, depression, stress, and anxiety. To the best of our knowledge, no previous research seems to have investigated the effect of mindfulness on stress, anxiety, and depression via self-efficacy, especially in the context of Indian IT professionals.

Working in the IT industry is indeed difficult and stressful. IT professionals typically experience a large workload, late-night calls, aggressive deadlines, irate users, and unforeseen difficulties. Due to these factors, they experience stress, anxiety, and depression. Thus, based on our study, we believe that we could possibly provide some insight into the possible psychological process for assisting IT workers in decreasing anxiety, stress, and depression.

2. Methods

2.1. Participants and procedure

We contacted the HR departments of several IT companies, describing the overall purpose of the study, while seeking their cooperation. Once the HR agreed to aid in our research, we distributed the questionnaire to employees of these IT firms, through the HR officials. We promised to maintain complete data confidentiality through the HR representatives. Our purposive sample comprised 382 individuals, who understood the aim of the study, and completed the whole questionnaire anonymously. In terms of the demographic profiles, men employees were the highest (i.e. 52.9%). On an average they were 35 to 40 years of age (SD = 5.41 years); 85.9% were graduates, while their average work experience at the present company was 4.49 years (SD = 2.67 years).

2.2. Measures

2.2.1. Mindfulness

We used the 12 statements cognitive and affective mindfulness scale-revised (CAMS-R) to assess mindfulness on a four-point Likert-type scale (ranging from 1 = 'rarely/not at all' to 4 = 'almost always') (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). Notably, Cronbach's alpha score for mindfulness was 0.94. Some of our sample items included: "It's easy for me to keep track of my thoughts and feelings" and "I try to notice my thoughts without judging them."

2.2.2. Self-efficacy

We used the eight-item new general self-efficacy Scale (NGSE) to assess self-efficacy (Chen, Gully, & Eden, 2001). It was a self-report questionnaire with a Likert-type scale (ranging from 1 = 'strongly disagree' to 5 = 'strongly agree'). Herein, the Cronbach alpha score for self-efficacy was noted to be 0.92. The NGSE is based on social-cognitive theory and assesses work-related self-efficacy. Some of our sample items included: "When facing difficult tasks, I am certain that I will accomplish them;" "Even when things are tough, I can perform quite well."

2.2.3. Depression anxiety and stress

We used the Depression Anxiety Stress Scales abbreviated version-21 (DASS-21) to evaluate depression stress, and anxiety (Lovibond & Lovibond, 1993). Specifically, the scale included seven items for depression, seven statements for anxiety, and seven statements for stress respectively. The participants were asked to evaluate their symptoms on a four-point scale (ranging from 0 = 'did not apply to me at all' to 3 = 'apply to me very much, or most of the time'). Herein, the Cronbach alpha values for depression, stress, and anxiety were 0.91, 0.89, and 0.90, respectively. Some of the sample items for depression included: "I found it difficult to work up the initiative to do things;" "I was unable to become enthusiastic about anything." Items for anxiety included: "I was worried about situations in which I might panic and make a fool of myself;" "I was aware of dryness of my mouth. Items for stress included: "I found myself getting agitated;" "I found it difficult to relax."

3. Results

3.1. Data analysis

We used Structural Equation Modeling (SEM) along with Analysis of Movement Structure (AMOS) in order to investigate the link between

mindfulness and depression, anxiety, and stress. Notably, all the variables were normally distributed (Kurtosis and Skewness <1). Further, we evaluated two kinds of models: measurement models and structural model. At first, we applied confirmatory factor analysis (CFA) to compare both models, i.e. MM1– a single factor model in which all items are loaded onto one common factor, and MM2- a model in which the five variables are evaluated as five different factors (i.e. self-efficacy, mindfulness, depression, anxiety, and stress). Then, we evaluated two other structural models using self-efficacy as a mediator: SM1–fully mediation model and SM2–partial mediation model (the hypothesized model).

3.2. Descriptive statistics

Table 1 provides the descriptive data, i.e. mean, standard deviation, reliability coefficients, and relationships between mindfulness, self-efficacy, depression, anxiety, and stress. Notably, all the reliability coefficients were at least adequate, while all the variable correlations were statistically significant.

3.3. Validity

We then determined convergent validity using the following criteria: (i) composite reliability (CR) must be greater than 0.7, and (ii) average variance extracted (AVE) must be greater than 0.5 (Fornell & Larcker, 1981). Generally, when the squared root of AVE for each variable is greater than the correlations between it and other components, discriminant validity is established (Hair, Black, Babin, & Anderson, 2009). Our results showed that the research did show evidence of both convergent and discriminant validity (Table 2).

3.4. Measurement model

Further, in order to assess the model fit of the measurement and structural models, we used the chi-squared test, degrees of freedom, comparative fit index (CFI), root mean square error of approximation (RMSEA), expected cross validation index (EVCI) and Akiike information criterion (AIC). The following are the cut-off values for the fit indices, which in turn, indicate excellent fit: chi-square statistic/degree of freedom 3 or less, RMSEA <0.06; CFI > 0.95: AIC and EVCI smallest value for model fit (Hu & Bentler, 1999). Then, we used a maximum-likelihood estimate to assess mediation analysis, followed by 5000 bootstrap samples with 95% confidence intervals to assess the indirect effects.

Post this we used confirmatory factor analysis (CFA) to assess the measurement model, before testing the hypotheses. The uni-dimensional, MM1-a single factor model fit all indices poorly. On the other hand, the correlated MM2-a model with five variables performed well on all metrics, such as [x^2= 1132.146**, df= 762, x^2/df = 1.486, SRMR = 0.039; CFI = 0.964; RMSEA = 0.036; RMSEA 90% CI = [0.031, 0.040]; EVCI = 3.491; AIC = 1330.146].

Comparing MM1 and MM2 on several criteria revealed that MM2 was the best fit for the data.

3.5. Structural model

To determine the optimum structural model fit, fully mediated and partially mediated models were examined. Table 3 shows a summary of the model fit. First, there is a completely mediated model (SM1) with self-efficacy acting as a mediator in the connection between mindfulness, depression, anxiety, and stress (Fig. 1). Model-SM1 predicted model fit indices were:[x^2= 1335.033**, df= 762, x^2/df = 1.752, SRMR = 0.126; CFI = 0.944; RMSEA = 0.044; RMSEA 90% CI = [0.040, 0.048]; EVCI = 4.024; AIC = 1533.033]. Then the partially mediating model was tested, with self-efficacy playing a mediating role in the connection between mindfulness, depression, anxiety, and stress (model SM2), as compared to model SM1, adding three direct paths from mindfulness to depression, anxiety, and stress provided excellent fit of indices:[x^2= 1049.520**, df= 754, x^2/df = 1.392, SRMR = 0.079; CFI = 0.971; RMSEA = 0.032; RMSEA 90% CI = [0.027, 0.037]; EVCI = 3.316; AIC = 1263.520]. The results indicated that all direct paths, i.e., mindfulness, significantly and positively predicted self-efficacy(β = 0.39; $p < 0.001$). Self-efficacy was significantly negatively associated with stress($\beta = -0.19; p < 0.001$), anxiety($\beta = -0.24; p < 0.001$), and depression ($\beta = -0.18; p < 0.01$). Furthermore, mindfulness significantly and negatively predicted stress ($\beta = -0.34; p < 0.001$), anxiety ($\beta = -0.31; p < 0.001$), and depression ($\beta = -0.18; p < 0.01$). A Chi-squared difference test ($\Delta x^2 = 285.513$; $\Delta df = 8$) was used for model comparison (between models SM1 and SM2). The findings showed that by using the aforementioned direct paths, the model fit improved substantially. Consequently, model SM2, the partially mediating model, was obviously better than model SM1. When data were compared, we inferred that the partially mediating model SM2 was the best for any. Thus, self-efficacy served as a partial mediator between mindfulness and stress, mindfulness and anxiety, as well as mindfulness and depression (Fig. 2).

3.6. Mediation analysis

To evaluate a mediation analysis, we employed a bootstrapping technique, containing asymmetric confidence interval (CI). Notably, if an interval for a mediation effect includes no zero at 95% bootstrapping CI, the mediation analysis is significant at the *p* value. In our case, we used the original dataset to produce 5000 bootstrapping samples (with a 95% confidence interval) ($N = 382$). The indirect impact of mindfulness on stress, anxiety, and depression through self-efficacy were ($\beta = -0.074; p < 0.001$) with a confidence interval of 95% CI [−0.132, −0.026], ($\beta = -0.091; p < 0.001$) with a confidence interval of 95% CI [−0.150, −0.044] and ($\beta = -0.070; p < 0.001$) with a confidence interval of 95% CI [−0.122, −0.024] respectively (Table 4). These findings show that the indirect impact was indeed significant. Furthermore, since the direct link between mindfulness and stress, anxiety, and depression was significant, the mediation was also partially considered.

The findings thereby support the SM2 model that described the variance of the mediator, self-efficacy ($R^2 = 0.15$) as well as three of the outcomes: depression($R^2 = 0.09$) , anxiety ($R^2 = 0.21$), and stress ($R^2 = 0.20$) .

Table 1

Mean, standard deviation (SD), reliabilities and inter-correlations among study variables.

Observed variables	Mean	SD	1	2	3	4	5
1. Mindfulness	29.12	10.90	*0.94*				
2. Self-efficacy	23.93	8.95	0.354**	*0.92*			
3. Anxiety	11.35	5.50	−0.325**	−0.308**	*0.90*		
4. Stress	12.02	5.18	−0.341**	−0.282**	0.589**	*0.89*	
5. Depression	12.11	5.28	−0.193**	−0.218**	0.400**	0.420**	*0.91*

Note: N = 382; Bold and italics values represent the Cronbach's α coefficients are shown on the major diagonal.
Correlation is significant at ** p < 0.001.

Table 2
Convergent and discriminant validity.

	CR	AVE	Anxiety	Mindfulness	Self-efficacy	Depression	Stress
Anxiety	0.91	0.58	*0.76*				
Mindfulness	0.93	0.55	−0.35	*0.74*			
Self-efficacy	0.93	0.62	−0.34	0.38	*0.79*		
Depression	0.92	0.62	0.44	−0.22	−0.24	*0.78*	
Stress	0.90	0.56	0.65	−0.37	−0.31	0.46	*0.75*

CR: Composite reliability, AVE: Average Variance Extracted.
Note: Bold and italicized values represent the square root of the average variance extracted from the associated construct.

Table 3
Fit Indices among competing models.

Model	x^2	df	x^2/df	CFI	SRMR	RMSEA	RMSEA 90% CI	AIC	EVCI	Δx^2	Δdf
Measurement model											
MM1- single-factor model	6897.335**	779	8.854	0.406	0.160	0.144	[0.140, 0.147]	7061.335	18.534		
MM2-five factor model	1132.146**	762	1.486	0.964	0.039	0.036	[0.031, 0.040]	1330.146	3.491	5765.189	17
Structural model											
SM1- fully mediation model	1335.033**	762	1.752	0.944	0.126	0.044	[0.040, 0.048]	1533.033	4.024		
SM2- partial mediation model	1049.520**	754	1.392	0.971	0.079	0.032	[0.027, 0.037]	1263.520	3.316	285.513	8

CFI: Comparative Fit Index, RMSEA: Root Mean Square Error of Approximation, SRMR: Standardized Root Mean Square Residual, AIC: Akaike's Information Criterion, EVCI: Expected Cross validation Index.
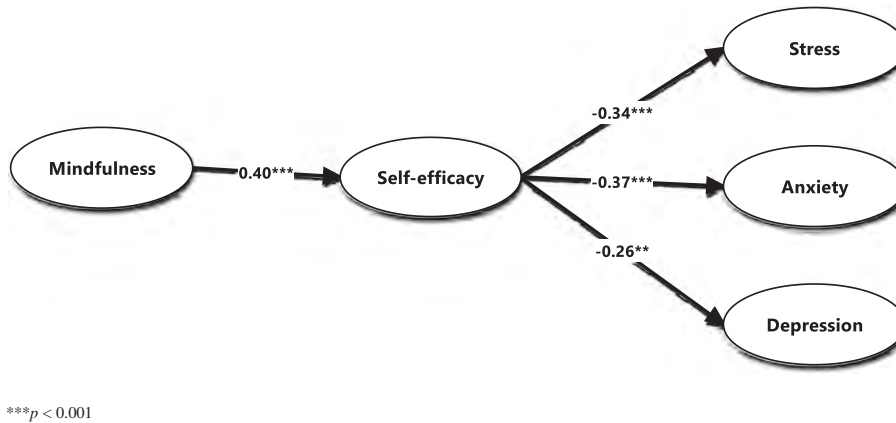

***$p < 0.001$

Fig. 1. Fully mediated model SM1
***p < 0.001.
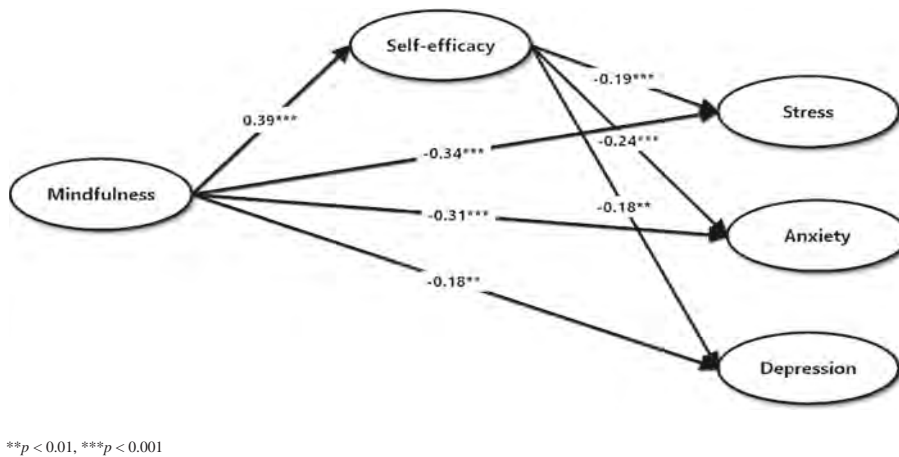

**$p < 0.01$, ***$p < 0.001$

Fig. 2. Partially mediated model SM2
**p < 0.01, ***p < 0.001.

Table 4
The mediation model's indirect effect bootstrapped with 95% confidence intervals (CI).

Model pathways	Point estimate	95% Lower and upper bootstrap CI
Mindfulness ———> Self-efficacy———> Anxiety	−0.091	[−0.150, −0.044]
Mindfulness ———> Self-efficacy———> Stress	−0.074	[−0.132, −0.026]
Mindfulness ———> Self-efficacy———> Depression	−0.070	[−0.122, −0.024]

4. Discussion

This study was done to investigate the role of self-efficacy as a mediator between mindfulness and stress, anxiety and depression in Indian IT employees. Consistent with previous research, mindfulness was shown to have a substantial correlation with stress (Bao et al., 2015; Nezlek et al., 2016; O'Loughlin et al., 2019), anxiety (Bajaj et al., 2016; Jankowski & Bąk, 2019; Raphiphatthana et al., 2016; Walsh et al., 2009), and depression (Bajaj et al., 2016; Christopher & Gilbert, 2010; Desrosiers et al., 2013; Kircaburun et al., 2019). Although some prior research did examine the role of mediators in mindfulness and stress anxiety and depression, there have hardly been any studies into the partial mediating role of self-efficacy in mindfulness, stress depression and anxiety. According to our findings, self-efficacy substantially partially mediates the relationship between mindfulness and employee stress, anxiety and depression. The findings have supported the research hypotheses. These findings are consistent with prior research on the link between self-efficacy and stress (Delahaij & Van Dam, 2017; Karademas & Kalantzi-Azizi, 2004; Lu et al., 2005), anxiety (Muris, 2002; Rouxel, 1999; Thomasson & Psouni, 2010) and depression (Ali & Nair, 2021; Muris, 2002). Partial mediating findings also indicate that mindfulness has both direct and indirect relationships with depression, anxiety, and stress. Possibly mindful employees, while dealing with stressors being accepting and non-judgmentally present at the moment avoids the negative interpretation of stressors on a recurrent basis. Additionally, mindful employees may deal with stressful events reflectively by observing each stressor as something new, avoiding thereby psychological inflexibility, related to higher levels of depression, anxiety, and stress.

As described in the preceding sections, our model was partially supported by data, with the best model fit being represented by the SM2 model. Thus, mindfulness also has an indirect effect that is mediated by self-efficacy benefits on depression, anxiety, and stress. Mindfulness techniques shifts harmful thoughts or feelings and redirect attention to more beneficial, task-relevant cues to enhance the performance of employees resulting in increased self-efficacy (Noetel et al., 2019). Further, mindful individuals' enhanced awareness, along with a nonjudgmental attitude may develop self-awareness and regulation, which in turn facilitates them to notice self-critical thoughts about their abilities as mere thoughts rather than truths. SCT proposes that individuals who are less prone to have negative ideas or critical thoughts about their abilities augment their self-efficacy. Employees with low self-efficacy believe that they are inefficient in dealing with environmental demands or lack overall competence to perform across a wide variety of tasks, which does cause stress, anxiety, and depression. Thus, mindfulness does act as a buffer against low self-efficacy, which in turn exerts its beneficial effects on stress, anxiety, and depression.

4.1. Limitations and directions for future research

Our findings have their own limitations. To begin, the respondents in our study were educated (engineers), and thus were 'white-collar' (private sector IT company) employees. Based on the same, they may be more open to creating their own perspective than the 'less-educated' or the 'blue-collar employees'. Resultantly, they were more alert and sensitive to the organizational environment. Future studies may extend this research under diverse settings, which possibly would improve the generalizability of our findings. Further, individuals with higher mindfulness have higher self-awareness and regulation, which help them notice the self-critical thoughts, and identify them as thoughts rather than truth; we feel this hypothesis needs to be tested in the future. Despite the fact that the theories we used support the direction of the anticipated relationships, there has been no causal claims about the relationship between mindfulness, self-efficacy, anxiety, depression, and stress because this is a cross-sectional study. Nevertheless, despite these limitations, this study does add to extant literature. The findings affirm the role of self-efficacy as a partial mediator between mindfulness and stress, anxiety and depression in Indian IT professionals. This finding may be useful in determining how to apply mindfulness interventions targeted at decreasing psychological stress, anxiety, and depression.

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