

# Mindfulness-Based Stress Release Program for University Employees

## *A Pilot, Waitlist-Controlled Trial and Implementation Replication*

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**Objective:** The aim of this study was to evaluate the effectiveness of a 6-week mindfulness-based stress release program (SRP) on stress and work engagement in fulltime university employees. **Methods:** Perceived stress, workplace wellbeing, and engagement were measured at baseline and within 1 week of the SRP completion, and contemporaneously 6 weeks apart for a waitlist control group. A second program was implemented to examine reproducibility of results. **Results:** Fifty participants undertook the SRPs, and 29 participants were waitlisted. A significant improvement in distress, workplace wellbeing, and vigor was observed within the first SRP group, when compared with the control group. The improvement in distress and wellbeing was reproduced in the second SRP group. **Conclusions:** This study adds to the growing body of research that mindfulness may be an effective method for reducing workplace stress, improving employee wellbeing, and enhancing work engagement.

### BACKGROUND

“Stress” has long been defined as a particular relationship between a person and their environment, whereby the person perceives the environment to be “exceeding his or her resources and endangering their wellbeing.”<sup>1</sup> Although a limited degree of stress might result in improved performance, there is consistent evidence that chronic stress adversely affects physical and mental wellbeing.<sup>2</sup> Large, multicenter studies have demonstrated that stress is an independent risk factor for the development of cardiovascular disease,<sup>3</sup> and the metabolic syndrome,<sup>4</sup> which encompasses obesity, dyslipidemia, hypertension, and insulin resistance. There is evidence for the risk of stress in developing chronic pain,<sup>5</sup> diabetes,<sup>6</sup> cancer,<sup>7</sup> and accelerated ageing as measured by telomere length.<sup>8</sup> Stress has also been linked to a number of adverse

mental health outcomes, including anxiety, depression, and poor cognitive performance.<sup>9</sup> There is a considerable economic impact on society, as these disorders are associated with a greater use of health care services and impaired quality of life.<sup>10</sup>

“Work-related stress” is now the second most common cause of workplace compensation claims in Australia; the direct cost to employers alone is estimated to be greater than \$10 billion annually in terms of lost productivity.<sup>11</sup> Thus, from an individual and public health perspective, there is an imperative to implement low-risk, economically viable, and effective programs to reduce workplace-stress and improve employee outcomes such as productivity, satisfaction, and engagement.

There is a growing body of empirical evidence for the effectiveness of mindfulness-based interventions for stress reduction. Mindfulness involves making a commitment to being fully attentive to the present moment without judgment, in an attitude of openness and acceptance.<sup>12</sup> In a recent meta-analysis,<sup>13</sup> mindfulness programs had a moderate effect size for anxiety [effect size 0.38, 95% confidence interval (95% CI) 0.12 to 0.64] and depression [effect size 0.30 (95% CI 0.00 to 0.59 at 8 weeks and 0.23 (95% CI 0.05 to 0.42) at 6 months] in clinical samples. In a systematic review and meta-analysis of trials in nonclinical samples, mindfulness-based programs have demonstrated evidence to promote psychological wellbeing, compared with an inactive control or standard relaxation techniques, by reducing stress levels as well as increasing empathy and self-compassion.<sup>14</sup>

Mindfulness programs have garnered attention in organizational and industrial psychology literature, as a means to reduce workplace-specific stress and enhance employee engagement and productivity. There is preliminary evidence for effects on empowerment and engagement, as well as burnout, in doctors,<sup>15</sup> and job satisfaction in schools, retail stores, and public offices.<sup>16</sup> In addition to reduced emotional exhaustion, there is randomized controlled evidence for improvements in perceived stress and sleep quality,<sup>17</sup> even with an online mindfulness program.<sup>18</sup> Studies in the realm of business indicate that mindfulness programs are beneficial to improving service quality,<sup>19</sup> communication style,<sup>20</sup> and task performance.<sup>21</sup>

A potential barrier to the use of these programs in the workplace is the time commitment expected of participants. A standard Mindfulness-Based Stress Release (MBSR) program, for example, includes 45 minutes of daily practice in addition to 30 hours of face-to-face training.<sup>22</sup> A less intensive model, the “Stress Release Program” (SRP),<sup>23</sup> was developed independently in 1991 as a structured, 6-week program consisting of weekly practices, using the body, breath, and a series of cognitive strategies and reflective activities designed to enhance both the professional and personal life of participants. The SRP is readily accessible and endorsed throughout Monash University, Melbourne, and has been adapted for online learning as well as face-to-face program delivery.<sup>24</sup> It is embedded in the core curriculum for medical and allied health students, with evidence that it improves student psychological wellbeing.<sup>25</sup>

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Given the methodological limitations of previous workplace-based intervention studies, many of which are uncontrolled and most unreplicated, this current study aims to (1) assess the effectiveness of the SRP on stress, mood, and work engagement in fulltime university employees, compared with a waitlist control group and to (2) investigate whether these effects are the result of self-selection by evaluating a replication group.

METHODS

Participants

- (1) Controlled trial: Participants were adult (>18 years old) employees of the University of Sydney who were willing to commit to the SRP time requirements. To increase generalizability, there were no specific additional inclusion or exclusion criteria. Recruitment took place via standard university avenues, such as flyers on campus and the university intranet. Participants were recruited on the basis of a voluntary, self-selection process, of whom the first 24 were allocated to the first intervention group (SRP1). Group size was limited to ensure it was feasible for all participants to be able to be actively involved in a session, based on prior experience running mindfulness programs in tertiary settings. Once the intervention group maximum number was reached, further interested applicants were invited to be waitlisted for a subsequent SRP. Those who agreed formed the waitlist control group.
(2) Replication: Two months following the completion of the first intervention, the SRP was conducted with a second intervention group (SRP2). The SRP2 was offered to participants who were waitlisted to participate in the first program and second, to other university employees, using the same promotion and recruitment procedures outlined above. Those who participated in the first intervention group were excluded from participating in the SRP2. The intervention, outcome measures, and analyses were identical to those described for the SRP1, although information was collected via an online survey. Data from this group were used to evaluate whether any observed effects resulted from an "early adopter" effect.

Intervention

The intervention was adopted from the well-established Monash University SRP.25 One experienced mindfulness instructor, trained by the pioneers of the SRP, delivered the course. The SRP involves a half-day introductory session to the concepts pertaining to mindfulness, followed by five, 60-minute weekly sessions. A

series of cognitive strategies are incorporated into the mindfulness practice as a model to explain stress, negative emotions, and poor work or academic performance. Each session commences with a brief mindfulness practice, followed by an introduction to the session topic, an opportunity to reflect on the previous week's practice, and a theoretical component of the session. The main cognitive themes covered in the sessions included perception and stress; reacting versus responding to stress; presence of mind; the costs of automatic pilot and multitasking; listening; cultivating curiosity and openness; letting go and acceptance (refer to Fig. 1 for a summary). Between sessions, in addition to the homework set each week, participants were advised to practice formal mindfulness meditation at least 5 minutes per day and practice informal, mindfulness "pauses" (15 to 30 seconds) as needed. They were also encouraged to cultivate informal mindfulness by paying full attention to everyday activities, and explored one of the cognitive practices each week by observing their experience. Encouragement to continue the practice was an ongoing theme throughout sessions. There was no specific adaptation for the university setting.

The waitlist control group completed questionnaires 6 weeks apart regarding their levels of stress, anxiety, and workplace engagement to control for the practice effect associated with psychometric assessments and other nonspecific effects.

Measures

The primary outcomes measured were as follows:

- (1) Participant experience of psychological distress, as measured by a well validated and widely used self-report questionnaire, the Kessler Psychological Distress Scale (K10).26 This is a 10-item questionnaire with questions about anxiety and depressive symptoms that a participant has experienced in the most recent 4-week period. It is the scale used for standardized outcome measures in routine Australian government population-based surveys. The K10 is scored using a five-level response scale on the basis of the frequency of symptoms reported for each question. The maximum possible score is 50, with cut points as follows: scores of 10 to 19 indicate that it is unlikely that the participant is experiencing significant levels of distress; 20 to 24 indicates mild distress; 25 to 29 indicates moderate levels of distress; and 30 to 50 indicates severe levels of distress.
(2) Work-specific measures of employee wellness and work-engagement were measured by means of two questionnaires to evaluate (a) workplace engagement specific to the University of Sydney; and (b) general engagement with the work content.

Mindfulness meditation practice: Students are recommended to punctuate the day with two 5-min "full stops" and as many 15-30-s "commas" as needed. They can increase the duration and frequency of practice according to need and motivation.
Mindfulness-based cognitive tasks: These tasks are set as homework each week and students discuss their insights and experiences the following week.
1. Perception: are events inherently stressful, or stressful depending on how they are perceived?
2. Letting go and acceptance: do thoughts, feelings and events inevitably cause stress, or is it our relationship and attitude to them?
3. Presence of mind: what is the effect of being more in the present moment through a connectedness to the senses rather than preoccupied with the past and future?
4. Limitations: do we impose much stress and avoidant behaviour on ourselves with unexamined, unreasonable and limiting ideas about ourselves?
5. Listening: does much stress and depression originate in the unconscious mental chatter we listen to, and do we have a choice whether to listen to it or not?
6. Self-discipline: what is the cause and effect of not getting on with things when we need to, and not stopping when we need to?
7. Emotions: without suppressing emotions or criticizing their presence, can we cultivate a wiser choice as to which ones to entertain and act upon?
8. Expanding self-interest: what is the effect of being more interested in and responsive to the needs of those in our daily environment?

FIGURE 1. Summary description of the Stress Release Program (adapted from Hased et al, 2009).

**TABLE 1.** Demographics and Baseline Scores of Participants in the First Stress Release Program (SRP1)

	Intervention		Control		Intervention vs Control
<b>Demographics</b>					
Total number	<i>n</i> = 24		<i>n</i> = 29		
Age (mean, years ± SD)	45.8 ± 10.0		42.1 ± 10.3		<i>t</i> (51) = 1.33, <i>P</i> = 0.19
Gender	F = 19, M = 5		F = 25, M = 4		$\chi^2$ = 0.46; 1 df; <i>P</i> = 0.71
Staff type	Academic = 14; General = 10		Academic = 17; General = 12		$\chi^2$ = 0.05; 1 df; <i>P</i> = 1.00
<b>Baseline Scores</b>					
Baseline Scores	<i>n</i>	Mean ± SD	<i>n</i>	Mean ± SD	Comparison
Distress	20	24.8 ± 7.2	29	21.8 ± 9.2	<i>t</i> (47) = 1.21, <i>P</i> = 0.23
University workplace					
Wellbeing	24	26.9 ± 5.8	29	27.9 ± 6.9	<i>t</i> (51) = -0.53, <i>P</i> = 0.60
Engagement		29.0 ± 7.2		29.9 ± 5.7	<i>t</i> (51) = -0.49, <i>P</i> = 0.63
Work engagement					
Absorption	23	4.24 ± 1.04	29	4.05 ± 0.80	<i>t</i> (50) = 0.74, <i>P</i> = 0.47
Dedication		4.15 ± 1.12		4.26 ± 0.95	<i>t</i> (50) = -0.39, <i>P</i> = 0.70
Vigor		3.91 ± 0.94		3.89 ± 0.79	<i>t</i> (50) = 0.06, <i>P</i> = 0.95

Distress, as measured by the K10 total score; university workplace wellbeing and engagement, as measured by The Voice total score for each subscale; work engagement, as measured by the Utrecht Work Engagement Scale.

Engagement can be defined as a positive, fulfilling, work-related state of mind characterized by a high level of energy and strong identification with one’s work.<sup>27</sup>

The first questionnaire is a self-reporting scale that utilized a core set of questions from The Voice Project employee survey<sup>28</sup> (see, Supplemental Digital Content 1, <http://links.lww.com/JOEM/A302>). It has demonstrated psychometric reliability and validity, was specifically designed for the higher education sector, and has been utilized by multiple universities across Australia.<sup>29</sup> The relevant subscales of university workplace wellbeing (wellness and work/life balance) and engagement (including organizational commitment, job satisfaction, and intention to stay) were included. There are eight questions for each subscale of wellbeing and engagement (a total of 16 questions) on a scale of strongly disagree (score of 1) to strongly agree (score of 5), making for a maximum score of 40 in each domain. As per the previously described methodology,<sup>30</sup> scores of greater than 80% (total score >32) are considered high, between 50% and 80% (total score 20 and 32) moderate, and less than 50% (total score <20) are low.

The second questionnaire, the Utrecht Work Engagement Scale (UWES),<sup>31</sup> is a 17-item self-report questionnaire with three subscales assessing vigor, dedication, and absorption at work. Each item is rated on a scale of 0 (never) to 6 (all the time). Vigor (six items) assesses levels of energy and resilience, and the willingness to invest effort in the face of difficulties. Dedication is assessed by five items addressing the sense of significance, inspiration, and meaning derived from one’s work. Absorption is assessed by six items and refers to the sense of immersion in one’s work. This three-factor structure is well validated with high internal consistency.<sup>27</sup> The mean scale score of the three UWES subscales was then computed (range between 0 and 6) as per previously well described methodology.<sup>31</sup>

Participants in each intervention group completed each of the questionnaires at baseline (ie, up to 1 week before the commencement of the study) and then within 1 week of the completion of the 6-week program. The waitlist control group undertook the exact same measures at two time points—contemporaneously 6 weeks apart—that is, once at the commencement of being waitlisted, and then again after 6 weeks of being on the waitlist.

### Data Analysis

IBM SPSS Statistics for Windows (Version 22.0, IBM Corp, Armonk, NY) was used for the analyses and conducted by an independent investigator who was not involved in the delivery of the SRP. Data were checked for normal distribution. A Chi-squared approach was used to examine differences in categorical demographic variables, and independent samples *t* tests were used to compare the continuous outcome variables to examine whether there were any between-group (SRP1 vs control) differences at baseline.

All data were then analyzed on an intention-to-treat (ITT) basis using the Last Observation Carried Forward (LOCF) approach. Since data were normally distributed, change scores [the average difference between post- (T2) and pre-intervention (T1) scores] were calculated for all scales. Between-group comparisons of these change scores were examined using independent *t* tests for both groups (SRP1 vs control). Linear regression analyses were used to control for the effect of the baseline (T1) on the follow-up (T2) scores and calculated change scores for each of the scales.

The same approach was taken to analyze SRP1 compared with SRP2 intervention groups. Those who did not complete the follow-up surveys were compared with those with complete data sets, to examine whether there was any attrition bias.

### Ethical Approval

This study received approval from the University of Sydney Human Research Ethics Committee, reference number 2014/649. Participants for both groups were provided with written information statements and provided written consent to participate in the study.

## RESULTS

### Stress Release Program 1 Versus Waitlist Control

#### Demographics and Baseline Scores

The intervention group consisted of 24 participants (19 females, 5 males) and the waitlist control group consisted of 29 participants (25 female, 4 males). There were no statistically significant differences in gender, age or staff type (academic vs general), or baseline distress or engagement between these groups (see Table 1).

TABLE 2. Between-Group Differences on Pre/Post Levels of Workplace Wellbeing, Engagement, and Psychological Distress

	Intervention			Waitlist Control			Intervention vs Control		
	Baseline Mean ± SD	Follow-Up Mean ± SD	Change Mean (95% CI)	Baseline Mean ± SD	Follow-Up Mean ± SD	Change Mean (95% CI)	Difference Mean (95% CI)		
Distress	24.8 ± 7.2	21.8 ± 6.4	-3.0 (-5.5 to -0.6), <i>P</i> = 0.02*	21.8 ± 9.2	21.5 ± 8.6	-0.3 (-2.0 to 1.3), <i>P</i> = 0.70	-2.7 (-5.5 to -0.03), <i>P</i> = 0.05		
University workplace Wellbeing	26.9 ± 5.8	29.4 ± 4.7	2.5 (0.5-4.5), <i>P</i> = 0.02*	27.9 ± 6.9	27.7 ± 6.4	-0.2 (-1.6 to 1.2), <i>P</i> = 0.77	2.7 (0.4-5.1), <i>P</i> = 0.03*		
Engagement	29.0 ± 7.2	30.3 ± 6.8	1.3 (-0.7 to 3.2), <i>P</i> = 0.21	29.9 ± 5.7	29.8 ± 4.8	-0.03 (-1.3 to 1.3), <i>P</i> = 0.96	1.3 (-1.0 to 3.5), <i>P</i> = 0.26		
Work engagement									
Absorption	4.24 ± 1.04	4.30 ± 0.86	0.06 (-0.20 to 0.32), <i>P</i> = 0.65	4.05 ± 0.80	3.94 ± 0.88	-0.11 (-0.34 to 0.13), <i>P</i> = 0.35	0.17 (-0.17 to 0.51), <i>P</i> = 0.33		
Dedication	4.16 ± 1.12	4.10 ± 1.12	-0.06 (-0.32 to 0.20), <i>P</i> = 0.63	4.27 ± 0.95	4.22 ± 0.87	-0.05 (-0.30 to 0.20), <i>P</i> = 0.70	-0.01 (-0.37 to 0.34), <i>P</i> = 0.94		
Vigor	3.91 ± 0.94	4.30 ± 0.81	0.39 (0.65-3.07), <i>P</i> < 0.01†	3.89 ± 0.79	3.78 ± 0.83	-0.11 (-0.33 to 0.11), <i>P</i> = 0.32	0.50 (0.17-0.83), <i>P</i> < 0.01†		

Distress, as measured by the K10 total score; university workplace wellbeing and engagement, as measured by The Voice total score for each subscale; work engagement, as measured by the Utrecht Work Engagement Scale. CI, confidence interval.

\**P* < 0.05.

†*P* < 0.01.

Of the intervention group, baseline data were obtained for 20 participants (83%) for the K10 (attributed to participants omitting to read the reverse side of the printed forms), 24 participants (100%) for the Voice, and 23 participants (96%) for the UWES scales of vigor, absorption, and dedication. These were the numbers used for each questionnaire in the data analysis for the Stress Release Program (SRP)1 group, with the last observation carried forward method. Follow-up data were obtained for 14 participants (58%) for the K10, 18 participants (75%) for the Voice, and 17 participants (71%) for the UWES subscales. Of the 29 in the waitlist control group, all completed the baseline questionnaires, which was used in the ITT analysis. Twenty-three participants (79%) had follow-up data for all three scales. There were no statistically significant differences in age, gender, or baseline scores between those who did and did not complete follow-up data.

**Pre- and Post Intervention Comparisons**

Using an ITT method with the LOCF, there was a statistically significant improvement in the intervention group in the level of distress [-3.0 (95% CI -5.5 to -0.6, *P* = 0.02], university workplace wellbeing (2.5, 95% CI 0.5 to 4.5, *P* = 0.02), and vigor (0.39, 95% CI 0.65 to 3.07, *P* < 0.01) at follow-up compared with baseline (see Table 2). There were no such changes observed in any of the distress, workplace wellbeing and engagement, nor work content-related vigor, dedication, or absorption scores in the control group (also in Table 2) at follow-up compared with baseline.

There were comparatively greater improvements in workplace wellbeing (mean difference in change score between groups 2.7, 95% CI 0.4 to 5.1, *P* = 0.03) and vigor (0.50, 95% CI 0.17 to 0.83, *P* < 0.01) in the intervention group when compared to the waitlist control group. There was also a trend for reduction in distress (-2.7, 95% CI -5.5 to 0.03, *P* = 0.05) (see Table 2).

**Replication Stress Release Program**

**Demographics and Baseline Scores**

The SRP2 intervention group consisted of 26 participants (23 females and 3 males, mean age 45.8 ± 10.1 years; see Table 3). There was no difference in participant demographics between the SRP1 and SRP2 (Table 3). The baseline level of distress was just significantly lower in the SRP2 group (K10 total = 20.8 ± 7.7) than the SRP1 group (K10 total = 24.8 ± 7.2) (mean difference 4.0, *P* = 0.048), but there were no differences between programs for workplace wellbeing and engagement, nor work-related absorption, dedication, or vigor (Table 3).

All participants (*n* = 26) completed the baseline data, which was then used in an ITT analysis. Only 13 participants (50%) had complete (pre- and post-intervention) data for outcome measures of distress, workplace engagement, and vigor, absorption, and dedication. Those with complete data were less distressed at baseline (K10 total = 18.6 ± 5.4) than those lost to follow-up (23.0 ± 5.3) (mean difference 4.4; *P* = 0.05). There were no statistically significant differences in age, gender, or the other baseline scores between those who did and did not complete follow-up data.

**Pre- and Post Intervention Comparison**

When analyzed by ITT with LOCF, there was a significant improvement for both the total distress score (mean change -1.2, 95% CI -1.9 to -0.5, *P* < 0.01) and workplace wellbeing (mean change 1.5, 95% CI 0.2 to 2.8, *P* = 0.03) (see Table 3). There were no differences in the change scores observed between SRP1 and the replication SRP2 group, although the within-group improvement in vigor in SRP1 (change 0.39, 95% CI 0.65 to 3.07,

**TABLE 3.** Comparative Effectiveness of the First and Second Stress Release Program interventions (SRP1 and SRP2) on Workplace Wellbeing, Engagement, and Psychological Distress

	SRP1	SRP2 (n = 26)	Comparison SRP1 vs SRP2
Participants	Female = 19, male = 5	Female = 23, male = 3	X <sup>2</sup> = 0.80, 1 df; P = 0.37
Mean age (years)	45.8 ± 10.0	45.8 ± 10.1	t (48) = 0.02, P = 0.98
Staff type	Academic = 14, General = 10	Academic = 20, General = 6	X <sup>2</sup> = 1.98, 1 df; P = 0.16
Baseline scores	Mean ± SD	Mean ± SD	Mean (95% CI)
Distress	24.8 ± 7.2	20.8 ± 5.7	3.99 (0.01–7.98), P = 0.05
University workplace Wellbeing	26.9 ± 5.8	27.0 ± 6.6	−0.12 (−3.67 to 3.43), P = 0.95
Engagement	29.0 ± 7.2	29.2 ± 5.4	−0.15 (−3.74 to 3.43), P = 0.93
Engagement specific			
Absorption	4.24 ± 1.04	4.09 ± 0.80	0.15 (−0.38 to 0.68), P = 0.57
Dedication	4.16 ± 1.12	4.12 ± 0.80	0.03 (−0.52 to 0.59), P = 0.90
Vigor	3.91 ± 0.94	3.89 ± 0.80	0.01 (−0.48 to 0.51), P = 0.95
Change scores	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
Distress	−3.0 (−5.5 to −0.6), P = 0.02*	−1.2 (−1.9 to −0.5), P < 0.01 <sup>†</sup>	−1.86 (−4.10 to 0.38), P = 0.10
University workplace Wellbeing	2.5 (0.5–4.5), P = 0.02*	1.5 (0.2–2.8), P = 0.03*	1.00 (−1.32 to 3.32), P = 0.39
Engagement	1.3 (−0.7 to 3.2), P = 0.21	0.6 (−0.4 to 1.6), P = 0.20	0.64 (−1.47 to 2.74), P = 0.55
Engagement specific			
Absorption	0.06 (−0.20 to 0.32), P = 0.65	0.06 (−0.09 to 0.21), P = 0.44	0.00 (−0.28 to 0.28), P = 0.99
Dedication	−0.06 (−0.32 to 0.20), P = 0.63	0.11 (−0.13 to 0.35), P = 0.37	−0.17 (−0.51 to 0.17), P = 0.33
Vigor	0.39 (0.65–3.07), P < 0.01 <sup>†</sup>	0.08 (−0.01 to 0.29), P = 0.41	0.31 (−0.02 to 0.63), P = 0.06

Distress, as measured by the K10 total score; university workplace wellness and engagement, as measured by The Voice total score for each subscale; aspects of engagement, as measured by the Utrecht Work Engagement Scale.

CI, confidence interval.

\*P < 0.05.

<sup>†</sup>P < 0.01.

P < 0.01) was not replicated in SRP2 (change 0.08, 95% CI −0.01 to 0.29, P = 0.41).

### DISCUSSION

The current study adds to the growing body of research that a mindfulness intervention, delivered over six sessions in a tertiary setting, can be an effective method to enhance workplace wellbeing, reduce levels of distress, and may enhance aspects of engagement such as vigor. Even with the small numbers and highly conservative LOCF approach, we found a relative improvement in distress, workplace wellbeing, and vigor at work compared with a waitlist control group who showed no changes in these measures. Importantly, the effect was also observed in the replication program, many of whom were in the first control group wherein no significant effect was observed.

The same SRP has been recognized as effective at reducing stress for an entire cohort of 148 Monash University medical students during a pre-examination period, with noted improvements in scores for depression and the psychological domain of the World Health Organization Quality of Life questionnaire, Depression Anxiety Stress Scale, and Symptom Checklist-90.<sup>25</sup> In this study, there was no control group because the program is embedded as core-curriculum and delivered to the entire cohort. Considering that this runs counter to the universal finding of declining student mental health in pre-examination periods,<sup>32</sup> and that this cohort was not self-selected, this was a positive finding. This SRP has been adopted by other medical schools and incorporated into optional self-care workshops for Harvard medical students.<sup>33</sup> A benefit of this particular study is its comparison to both a waitlist control group and replication. The waitlist controls showed no significant

improvements in distress or workplace engagement, but many went on to participate in the replication (10 out of total 26 SRP2 participants) where benefits were observed. We are not aware of any such replication being conducted previously.

Similar positive results for mindfulness-based programs have been found in other workforce populations. A meta-analysis of the effectiveness of MBSR for physicians demonstrated a significant reduction in stress.<sup>34</sup> Programs that incorporate mindfulness have also been found to increase empowerment and engagement at work compared with a control group in physicians, with an effect that was sustained at 12 months follow-up.<sup>15</sup> The findings have been replicated across other settings, whereby participants from various organizations such as schools, retail stores, and public offices also showed improved job satisfaction and less emotional exhaustion compared with inactive control groups.<sup>16</sup> Reduction in perceived stress has also been demonstrated in a cohort of factory workers.<sup>35</sup> The current study provides evidence for a University workforce consisting of both academic and general administrative staff, adding to the diversity of potential workplaces in which the benefits of mindfulness-based interventions can be observed.

Participants in the SRP1 had an average total Kessler 10 score of 24, indicating mild-to-moderate disorders of mood, anxiety, and fatigue.<sup>36</sup> Following the intervention, there was a significant three-point reduction toward a healthy norm (Kessler 10 score of 21.8). This is replicated with the much smaller (although still significant) improvement in distress seen in the replication SRP2 group, despite baseline scores of the group suggesting a “well” population (average K10 total score of 18.6 at baseline). This differential effect size has previously been attributed to the “floor effect” of mindfulness interventions: that is, people with lower levels of distress may show

a relatively smaller improvement than those with higher levels of distress at baseline.<sup>37</sup> For example, in a meta-analysis of mindfulness-based interventions on depression and anxiety,<sup>38</sup> psychiatric samples had a significantly greater reduction than populations with cancer, pain, and other medical conditions who had lower levels of pre-treatment anxiety and depression. Moreover, there is also evidence of a floor effect of mindfulness interventions in chronic pain<sup>39</sup> and hypertension.<sup>40</sup> Our study is consistent with these previous findings, such that there were greater benefits for those with higher levels of distress before participating in the SRP. Nevertheless, there is still benefit for those with levels in the range of a nonclinical population, as exemplified by the SRP2. The current study was a naturalistic design that essentially had no exclusion criteria in order to maximize real-world applicability.

Both the SRP1 and SRP2 groups showed significant improvement in workplace wellbeing according to the corresponding Voice subscale score. Only the SRP1 found improvement in the UWES vigor subscale, which makes reference to themes of higher levels of energy and resilience. Previous studies have demonstrated that mindfulness in the workplace can improve staff engagement and empowerment,<sup>15,16</sup> although this has been assessed by alternative standards such as the Job Satisfaction Scale<sup>41</sup> and Empowerment at Work Scale.<sup>42</sup> When measured against international (westernized) norms,<sup>31</sup> our cohort rated as “average” (ie, between the 25th and 75th percentile) in their baseline level of vigor, dedication, and absorption as measures of workplace engagement. There was no hint of any improvement in workplace dedication and absorption, even allowing for small sample sizes, which suggests that the SRP may not be useful in addressing such characteristics.

This finding has been replicated in another study using a “mindfulness in motion” intervention in an intensive care unit that similarly used the UWES to assess workplace engagement pre- and post-intervention. In this study, the vigor average score, but not the dedication and absorption subscale scores, significantly increased in the intervention group but not waitlist control group.<sup>43</sup> Similarly, an online mindfulness intervention also demonstrated increased levels of vigor at work pre- and post-intervention and at 6 months follow-up.<sup>18</sup> This may be explained by the aim of mindfulness to train attentional regulation, which does not necessarily equate to greater work content related dedication or absorption. However, it may again be due to the inadequate power of the sample sizes for each intervention group.

Alternatively, the positive findings being limited to the Voice measures of workplace wellbeing may be attributed to its particular role in measuring staff engagement specifically for university employees. It was selected for use in previous staff surveys<sup>30</sup> at the University of Sydney because it has been utilized as a scale for staff engagement across multiple universities across Australia.<sup>30</sup> This does limit the generalizability of the results to other workplace settings, but nevertheless provides evidence for the utility of the SRP in the university setting for improved feelings of control, balancing life and work, feeling a sense of loyalty, and longer-term commitment to their employer. In turn, such improved workplace engagement may be positively related to job performance.<sup>21</sup> This would logically have secondary economic benefits in terms of productivity, which was beyond the scope of this pilot study.

### Limitations

In view of the small sample size of each program and attrition rates, it is important to note that these results should be interpreted with caution. The study is likely to be inadequately powered to detect all clinically significant effects and so the observed effects are all the more pertinent. Thus, further research with a larger study population and more equal gender distribution is warranted.

There is a selection bias inherent in examining participants who had volunteered to participate in the program. This “early

adopters” bias, however, would likely have been present in both the intervention and waitlist control groups. Moreover, there are high rates of noncompletion of the intervention and therefore questionnaires (up to 50% in the SRP2) that are not wholly accounted for. Reasons for attrition have not been explored, but may relate to time commitment, lack of perceived benefit, managers not supporting attendance, or the time in the academic year the SRP was offered. When comparing the data of the noncompleters with those who completed follow-up, there is only a significant difference in the baseline K10 total score in the SRP2, but not in other demographic or clinical characteristics for either program. That is, those in the SRP2 who did not complete the follow-up data had higher levels of distress at baseline consistent with a mild disorder of mood and anxiety according to the total K10 score than those who completed follow-up who fell into the “healthy” range. The potential floor effect from scores within a healthy range could have limited any observable change in distress in SRP2, and thus led to conservative estimates of effect.

Similarly, this study did not monitor compliance of SRP participants such as rates of attendance at sessions and completion of their daily formal and informal mindfulness practice between sessions. Future studies should clarify reasons for noncompletion, which may better our understanding of feasibility. Adherence to the prescribed program throughout the course should also be monitored, to see if a greater amount of mindfulness practice has a larger treatment effect. This would be expected, based on previous research showing a strong relationship between time spent engaged in home practices and improved levels of mindfulness and wellbeing.<sup>44</sup> The follow-up was within 1 week of the program completion, and may represent an “afterglow” effect that may not be sustained. Longer-term follow-up would be useful to examine whether the observed improvements in psychological wellbeing and workplace engagement are sustained over time.

Although the inclusion of a waitlist control group was a strength of the first SRP, we were unable to blind participants to their assigned intervention. Moreover, the lack of an “active” control group, such as a general relaxation group for comparator, makes it difficult to determine whether the effects seen are specific to the techniques provided by the SRP or whether they are nonspecific, such as general relaxation or simply being part of a group. However, previous studies have demonstrated that there are a number of effects specific to mindfulness training when directly compared with general relaxation, such as a reduction in negative ruminative thoughts and behaviours,<sup>45</sup> as well as a reduction in work-related stress and depressive feelings.<sup>46</sup>

### CONCLUSION

This study adds to the growing body of research that mindfulness may be an effective method for reducing workplace distress, improving employee wellbeing, and enhancing work engagement. Although the findings are encouraging and have been replicated in this study, the small sample sizes necessitate caution when interpreting the results. Further research with a larger cohort is warranted to validate and clarify these findings. Given the low cost, low-risk nature of the intervention, mindfulness could be a useful workplace health and engagement-enhancing tool with potential significant socioeconomic benefit for employers, organizations, and society.

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