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*A randomised controlled trial of a mindfulness-based mobile app evaluating
mindfulness, perceived stress, wellbeing and emotion reactivity*

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ABSTRACT

The prevalence of university students experiencing high levels of stress, and the adverse effects of stress, provide a rationale for preventative services to reduce stress. Mindfulness-based therapies have shown promise attenuating stress and improving psychosocial wellbeing in student populations. Research has highlighted improvements in mood, stress and emotion regulation with mindfulness practice. The portability and ubiquity of mobile phones make them a promising target for health interventions. Few studies have tested the efficacy of mindfulness based mobile apps (MBMAs) and the viability of this format of delivery remains largely unknown. Some preliminary results suggest benefits. It is proposed that a MBMA may provide feasible and effective mental health support for students.

Methods: To assess the efficacy of a MBMA, a sample of n54 university students new to mindfulness participated in a RCT. The study compared 7-days of mindfulness practice with an MBMA to an active control. It was hypothesised that mindfulness would reduce on measures of perceived stress, negative affect and emotion reactivity, and increase mindfulness and positive affect compared to the control.

Results: No significant group differences were found for perceived stress or wellbeing. Both groups demonstrated a significant parallel decrease in negative affect with a large effect size. The mindfulness group reported significantly more *acting with awareness* compared to the control with a small effect size. Both groups demonstrated a significant parallel increase in mindfulness on FMI, FFMQ full scale and *Non-React* with large effect sizes. The mindfulness group reported significantly less emotion reactivity after listening to anger stories compared to the control with medium effect sizes. No significant differences to fear stories, facial EMG or Emotion Stroop were detected.

Conclusion: The results of this study failed to provide support for the use of a MBMA to reduce student stress. Results indicate a MBMA intervention for seven days may cultivate the ability to *act with awareness*. The results provide partial support that a MBMA may

reduce emotion reactivity. However, these findings should be viewed in the context of the failure to detect differences in the other measures of interest and the low power of the study. App interventions may require more time to generate beneficial effect in a non-meditating sample.

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ABBREVIATIONS

ACT	Acceptance and Commitment Therapy
ANOVA	Analysis of Variance
BPD	Borderline Personality Disorder
DBT	Dialectical Behaviour Therapy
ECG	Electrocardiogram
EMG	Electromyography
FEMG	Facial Electromyography
FMI	Freiburg Mindfulness Inventory
FFMQ	Five Facet Mindfulness Questionnaire
MBCT	Mindfulness Based Cognitive Therapy
MBMA	Mindfulness Based Mobile Application
MBSR	Mindfulness Based Stress Reduction
MBT	Mindfulness Based Therapy
MBI	Mindfulness Based Intervention
M-health	Mobile Health
MDD	Major Depressive Disorder
NA	Negative Affect
PANAS	Positive and Negative Affect Scale
PA	Positive Affect
PSS	Perceived Stress Scale
RCT	Randomised Controlled Trial
RDEES	Range and Differentiation of Emotional Experience Scale
SAM	Subjective Affective Manikin
WQ	Workload Questionnaire

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