The Effect of Mindfulness Programs on Collegiate Test Anxiety

Nate P. Priebe, Principal Investigator
Beth Kurtz-Costes, Faculty Advisor
Department of Psychology and Neuroscience, University of North Carolina at Chapel Hill

BACKGROUND

Test anxiety affects approximately one in five college students, leading to negative academic outcomes.[1] Characterized as a situation specific personality trait, test anxiety has both cognitive (worrying and rumination) and affective (debilitating physiological arousal) components.[2] Mindfulness-based interventions (MBIs) are behavioral interventions that involve experiential training of open, nonjudgmental attentional awareness.[3] MBIs have been found to reduce worrying and rumination.[4] Limited research using MBIs to treat test anxiety found that compared to a waitlist control, a MBI led to reductions in test anxiety in college students.[5] This study uses online MBIs of two different lengths and an active control condition to investigate the effects of mindfulness trainings on test anxiety in college students.

HYPOTHESES

1) Changes in mindfulness would be negatively associated with changes in test anxiety
2) Mindfulness would increase more from a six-week mindfulness intervention than from a three-week or sham mindfulness intervention
3) Test anxiety would decrease more from a six-week mindfulness intervention than from a three-week or sham mindfulness intervention
4) Cognitive test anxiety would decrease more than affective test anxiety in the mindfulness interventions

METHOD

Participants (N = 71)

- Full time undergraduate students
- Age: 18-47 (M = 19.4) years
- 71.8% female
- 59.2% White

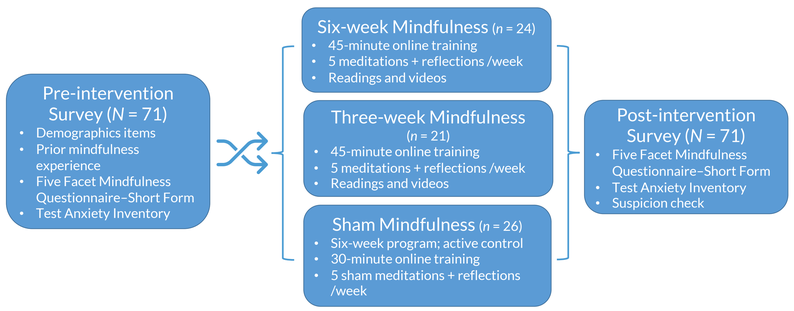
Measures

- Five Facet Mindfulness Questionnaire–Short Form[6] (α = .82 pre-, α = .83 post-)
  - 23 items scored 1 (never) to 5 (very often)
- Test Anxiety Inventory[7] (α = .95 pre-, α = .95 post-)
  - 20 items scored 1 (almost never) to 4 (almost always)

Intervention

- Randomized control trial design, shown in Figure 1
- Mindfulness programs were adapted from an online Mindfulness-Based Stress Reduction course[8] that included instructional readings and videos
- Sham mindfulness condition used sham meditations, which lack instruction that cultivates greater attentional awareness, instead of mindfulness meditations
- Participants reported completion of all exercises in online weekly surveys

Figure 1. Randomized control trial study design.



RESULTS

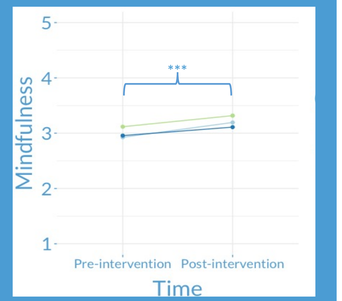
Hypothesis Testing

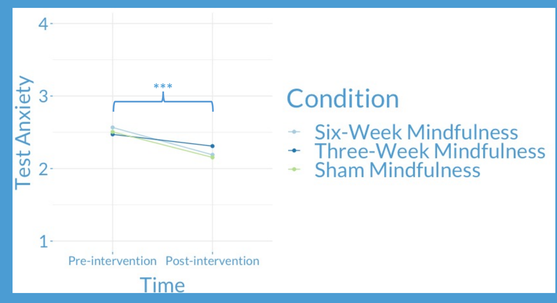
- Changes in mindfulness were negatively correlated with changes in test anxiety (see Table 1)
- Mindfulness significantly increased post-intervention, but increases in mindfulness did not differ by condition (see Figure 2)
- Test anxiety significantly decreased post-intervention, but decreases in test anxiety did not differ by condition (see Figure 3)
- Test anxiety scores differed by component (cognitive vs affective), however decreases in test anxiety components did not differ by condition (see Table 2)

Table 1. ***Means, Standard Deviations and Bivariate Correlations of Primary Variables***

Variable	*M*	*SD*	1	2
1. Prior mindfulness experience	2.52	0.69		
2. Change in mindfulness	0.21	0.39	.01	
3. Change in test anxiety	-0.26	0.44	.14	**-.48****

Note. * p < .05. ** p < .01.





Above: **Figure 2.** ***Pre- and Post-Intervention Mindfulness by Condition***

Left: **Figure 3.** ***Pre- and Post-Intervention Test Anxiety by Condition***

Note. *** p < .001.

Table 2. ***Mean Affective and Cognitive Test Anxiety Scores Pre- and Post-intervention by Condition***

	Six-week mindfulness (n = 24)		Three-week mindfulness (n = 21)		Sham Mindfulness (n = 26)		Full sample (N = 71)	
Variables	*M* (*SE*)		*M* (*SE*)		*M* (*SE*)		*M* (*SE*)	
Test Anxiety	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
Affective	2.73 (0.69)	2.33 (0.83)	2.74 (0.74)	2.43 (0.56)	2.73 (0.70)	2.33 (0.69)	2.73 (0.70)	2.36 (0.70)
Cognitive	2.40 (0.77)	2.04 (0.68)	2.18 (0.52)	2.12 (0.61)	2.37 (0.69)	1.97 (0.53)	2.33 (0.08)	2.04 (0.60)

Note. Time 1 = Pre-intervention; Time 2 = Post-intervention.

RESULTS CONTINUED

Supplemental Analyses

- Women reported significantly higher pre-intervention test anxiety than men
- Participants in the six-week mindfulness (M = 25.9) and sham mindfulness (M = 21.6) conditions completed significantly more meditations than participants in the three-week condition (M = 13.7), $F(2, 44) = 13.74$, p < .001
- Participants in the three-week mindfulness condition completed greatest proportion of assigned meditations (M = 91.3%), $F(2,44) = 3.47$, p = .040

DISCUSSION

Interpreting Findings

As hypothesized, changes in mindfulness were negatively associated with changes in test anxiety. This correlation adds to a body of evidence establishing the negative relationship between these two traits. While reported mindfulness increased and test anxiety decreased post-intervention, the nonsignificant Time x Condition interactions fail to provide sufficient evidence to support hypothesis 2, 3, or 4. The null differences in outcomes between treatment conditions suggest that length of intervention and intervention content do not have clear effects on mindfulness or test anxiety. The sham mindfulness intervention led to similar reductions in test anxiety and increases in mindfulness as the mindfulness interventions. Thus, non-specific components of the intervention such as written reflection and structured quiet alone time might account for the changes in the primary variables. Given the findings, it is possible that mindfulness trainings do not reduce test anxiety more than alternative behavioral interventions.

Limitations

Participant attrition reduced 40% of the original 119 participants, making it difficult to detect small differences between groups and to detect how changes in test anxiety components differed. Environmental factors during data collection such as the COVID-19 pandemic might have created heightened stress in participants[9] and might account for high levels of participant attrition. Exclusively using self-report measures exposed this study to response biases.

Future Directions for Research

Including objective behavioral measures of mindfulness and test anxiety in addition to self-report measures would strengthen the findings of future studies and potentially elucidate differences in the effects of MBIs and active controls. Given the unexpected effects of the sham mindfulness intervention, future research should compare changes in the components of mindfulness using a large sample assigned to MBIs or a variety of active controls. Furthermore, including a waitlist control condition in addition to an active control would account for potential confounding variables like maturation and experience with university-level examinations. Repeated assessment of mindfulness and test anxiety throughout the program and at multiple post-intervention follow-ups would allow researchers to avoid some limitations of subjective self-reports as well as investigate whether the effects of these interventions are sustained over time.

REFERENCES

[1]Thomas, C. L., Cassady, J. C., & Heller, M. L. (2017). The influence of emotional intelligence, cognitive test anxiety, and coping strategies on undergraduate academic performance. *Learning and Individual Differences, 55*, 40–48. https://doi.org/10.1016/j.lindif.2017.03.001
[2]Spielberger, C. D., Anton, W. D., & Bedell, J. (1976). The nature and treatment of test anxiety. In M. Zuckerman & C. D. Spielberger (Eds.), *Emotions and anxiety: New concepts, methods, and applications.* (1977-26895-005). Lawrence Erlbaum.
[3]Crane, R. S., Brewer, J., Feldman, C., Kabat-Zinn, J., Santorelli, S., Williams, J. M. G., & Kuyken, W. (2017). What defines mindfulness-based programs? The warp and the weft. *Psychological Medicine, 47*(6), 990–999. https://doi.org/10.1017/S0033291716003317
[4]Querstret, D., & Cropley, M. (2013). Assessing treatments used to reduce rumination and/or worry: A systematic review. *Clinical Psychology Review, 33*(8), 996–1009. https://doi.org/10.1016/j.cpr.2013.08.004
[5]Lothes, J. E., Mochrie, K., Wilson, M., & Hakan, R. (2019). The effect of dbt-informed mindfulness skills (what and how skills) and mindfulness-based stress reduction practices on test anxiety in college students: A mixed design study. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*. https://doi.org/10.1007/s12144-019-00207-y
[6]Bohlmeijer, E., ten Klooster, P. M., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric properties of the Five Facet Mindfulness Questionnaire in depressed adults and development of a short form. *Assessment, 18*(3), 308–320. https://doi.org/10.1177/1073191111408231
[7]Spielberger, C. D. (1980). *Test Anxiety Inventory: Preliminary Professional manual.* Consulting Psychologists Press.
[8]Potter, D. (2020). *Palouse Mindfulness: Mindfulness-Based Stress Reduction*. https://palousemindfulness.com/
[9]Copeland, W. E., McGinnis, E., Bai, Y., Adams, Z., Nardone, H., Devadanam, V., Rettew, J., & Hudziak, J. J. (2021). Impact of COVID-19 Pandemic on College Student Mental Health and Wellness. *Journal of the American Academy of Child & Adolescent Psychiatry, 60*(1), 134-141.e2. https://doi.org/10.1016/j.jaac.2020.08.466