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David S. Black, Ph.D.

Highlights by  
Seth Segall, Ph.D.

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## Interventions

Articles testing the applied science and implementation of mindfulness-based interventions

Buric, I., Farias, M., Kurtev, S., & Brazil, I. A. (2023). **Feasibility and preliminary outcomes of intensive mindfulness and yoga on prisoners with personality disorders: A randomised controlled preliminary study.** *Brain Behavior and Immunity Integrative.* [\[link\]](#)

Chancey, J. B., Heddy, B. C., Lippmann, M., ...& Abraham, E. (2023). **Using an Online-Based Mindfulness Intervention to Reduce Test Anxiety in Physics Students.** *Journal of Cognitive Enhancement.* [\[link\]](#)

Davis, J. P., Pedersen, E. R., Borsari, B., ...& Bunyi, J. (2023). **Development of a mobile mindfulness smartphone app for post-traumatic stress disorder and alcohol use problems for veterans: Beta test results and study protocol for a pilot randomized controlled trial.** *Contemporary Clinical Trials.* [\[link\]](#)

Deshpande, A. G., Johnson, J. R., Casta, A. M., ...& Reiff, M. (2023). **The impact of a mindfulness-based stress reduction program on university students' mental health: A mixed-methods evaluation.** *Journal of American College Health.* [\[link\]](#)

Díaz-Silveira, C., Santed-Germán, M.-Á., Burgos-Julián, F. A., ...& Alcover, C.-M. (2023). **Differential efficacy of physical exercise and mindfulness during lunch breaks as internal work recovery strategies: A daily study.** *European Journal of Work and Organizational Psychology.* [\[link\]](#)

Ghonchehpour, A., Forouzi, M. A., Dehghan, M., ...& Targari, B. (2023). **The effect of mindfulness-based stress reduction on rejection sensitivity and resilience in patients with thalassemia: A randomized controlled trial.** *BMC Psychiatry.* [\[link\]](#)

Hanley, A. W., Hinich, J., Kennedy, A., ...& Garland, E. L. (2023). **The Analgesic Effects of Nurse-Led, Ultra-Brief Mindfulness Interventions: A Randomized Controlled Trial.** *Mindfulness.* [\[link\]](#)

Hatch, S., Finlayson, M., Rej, S., & Kessler, D. (2023). **Virtually-delivered Emotion Focused Mindfulness Therapy (EFMT) group vs. wait-list control for late-life anxiety: A randomized controlled trial.** *The American Journal of Geriatric Psychiatry.* [\[link\]](#)

Hulsbosch, L. P., Potharst, E. S., Schwabe, I., ...& Nyklíček, I. (2023). **Online mindfulness-based intervention for women with pregnancy distress: A randomized controlled trial.** *Journal of Affective Disorders.* [\[link\]](#)

Lai, Y.-H., Lee, K.-H., Huang, T.-W. (2023). **Relative efficacy of mindfulness-based relapse prevention among illicit drug abusers: A randomized clinical trial.** *Current Psychology.* [\[link\]](#)

Oskoui, B. S., Mehrabi, E., Nourizadeh, R., & Esmaeilpour, K. (2023). **The effect of mindfulness-based counseling on the childbirth experience of primiparous women: A randomized controlled clinical trial.** *BMC Pregnancy and Childbirth.* [\[link\]](#)

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Sarfraz, A., Siddiqui, S., Galante, J., & Sikander, S. (2023). **Feasibility and Acceptability of an Online Mindfulness-Based Intervention for Stress Reduction and Psychological Wellbeing of University Students in Pakistan: A Pilot Randomized Controlled Trial.** *International Journal of Environmental Research and Public Health.* [\[link\]](#)

Siripanya, S., Parinyanitikul, N., Tanaka, H., & Suksom, D. (2023). **Home-Based Buddhist Walking Meditation Mitigates Cardiotoxicity of Anthracycline Chemotherapy in Breast Cancer Patients: A Randomized Controlled Trial.** *Journal of Integrative and Complementary Medicine.* [\[link\]](#)

Wang, Y., Kou, J., Han, B. (2023). **Effect of online modified mindfulness-based stress reduction training on the resilience of nursing interns in China.** *Nursing Open.* [\[link\]](#)

Zhu, P., Liu, X., Shang, X., ...& Wu, Q. (2023). **Mindfulness-Based Stress Reduction for Quality of Life, Psychological Distress, and Cognitive Emotion Regulation Strategies in Patients With Breast Cancer Under Early Chemotherapy—A Randomized Controlled Trial.** *Holistic Nursing Practice.* [\[link\]](#)

### Associations

Articles examining the correlates and mechanisms of mindfulness

Aly, M., Ogasawara, T., Kamijo, K., & Kojima, H. (2023). **Neurophysiological Evidence of the Transient Beneficial Effects of a Brief Mindfulness Exercise on Cognitive**

**Processing in Young Adults: An ERP Study.** *Mindfulness.* [\[link\]](#)

Andreu, C. I., García-Rubio, C., Melcón, M., ...& Albert, J. (2023). **The effectiveness of a school mindfulness-based intervention on the neural correlates of inhibitory control in children at risk: A randomized control trial.** *Developmental Science.* [\[link\]](#)

Berardi, V., Fowers, R., Rubin, G., & Stecher, C. (2023). **Time of Day Preferences and Daily Temporal Consistency for Predicting the Sustained Use of a Commercial Meditation App: Longitudinal Observational Study.** *Journal of Medical Internet Research.* [\[link\]](#)

Lautwein, F., Schallenburger, M., Scherg, A., ...& Neukirchen, M. (2023). **Mindfulness and compassion training on daily work with patients and within the multiprofessional palliative care team: A retrospective self-assessment study.** *BMC Palliative Care.* [\[link\]](#)

Reed, P. (2023). **Focused-attention mindfulness increases sensitivity to current schedules of reinforcement.** *Journal of Experimental Psychology: Animal Learning and Cognition.* [\[link\]](#)

Siwik, C. J., Adler, S. R., Moran, P. J., ...& Hecht, F. M. (2023). **Preventing Depression Relapse: A Qualitative Study on the Need for Additional Structured Support Following Mindfulness-Based Cognitive Therapy.** *Global Advances in Integrative Medicine and Health.* [\[link\]](#)

Wang, H., Yang, Y., Zhang, X., ...& Yi, J. (2023). **Research on Mindfulness-Based Stress Reduction in Breast Cancer Patients Undergoing Chemotherapy: An**

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**Observational Pilot Study.** *Alternative Therapies in Health and Medicine.* [\[link\]](#)

West, N. T., Harmon, B. E., Rawlett, K. E., ...& Puett, R. C. (2023). **Perceptions of mindfulness practices as a support for individuals managing caregiving responsibilities and chronic disease: A qualitative study.** *Chronic Illness.* [\[link\]](#)

Zuo, H., Wang, L. (2023). **The influences of mindfulness on high-stakes mathematics test achievement of middle school students.** *Frontiers in Psychology.* [\[link\]](#)

### Methods

Articles developing empirical procedures to advance the measurement and methodology

Cernasov, P. M., Kinard, J. L., Walsh, E., ...& Smoski, M. (2023). **Parsing within & between-person dynamics of therapy homework completion and clinical symptoms in two cognitive behavioral treatments for adults with anhedonia.** *Behaviour Research and Therapy.* [\[link\]](#)

Chang, Y.-K., Gill, D. L., Creswell, J. D., ...& Nien, J.-T. (2023). **Effect of mindfulness-based intervention on endurance performance under pressure and performance-relevant mental attributes an interdisciplinary perspective: Protocol for a mindfulness-based peak performance (MBPP) trial.** *Contemporary Clinical Trials.* [\[link\]](#)

Fincham, G. W., Mavor, K., & Dritschel, B. (2023). **Effects of Mindfulness Meditation Duration and Type on Well-being: An Online Dose-Ranging Randomized Controlled Trial.** *Mindfulness.* [\[link\]](#)

Lv, J., Peng, H., Yu, T., & Huang, X. (2023). **The effect of the mindfulness-based interventions on inflammaging: Protocol for a systematic review and meta-analysis.** *PLOS ONE.* [\[link\]](#)

Prasath, P. R., Xiong, Y., & Zhang, Q. (2023). **A practical guide to planning, implementing, and evaluating the mindfulness-based well-being group for international students.** *The Journal of Humanistic Counseling.* [\[link\]](#)

Reangsing, C., Moonpanane, K., Pitchalard, K., ...& Oerther, S. (2023). **Effects of mindfulness-based interventions on psychological outcomes in college and university students during COVID-19 pandemics: A systematic review and meta-analysis.** *Journal of Clinical Psychology.* [\[link\]](#)

Sala, M., Aslan, M., Gueorguieva, R., ...& Garrison, K. A. (2023). **A Network Investigation of Core Mindfulness Processes.** *Mindfulness.* [\[link\]](#)

Ward, K., Herekar, A., Wang, P., & Lindsay, K. L. (2023). **Feasibility and Acceptability of a Mindfulness-Based Smartphone App among Pregnant Women with Obesity.** *International Journal of Environmental Research and Public Health.* [\[link\]](#)

Wilkinson, S., Ribeiro, L., Krägeloh, C. U., ...& Medvedev, O. N. (2023). **Validation of the Comprehensive Inventory of Mindfulness Experiences (CHIME) in English Using Rasch Methodology.** *Mindfulness.* [\[link\]](#)

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## Reviews

Articles reviewing content areas of mindfulness or  
conducting meta-analyses of published research

Abdolalipour, S., Mohammad-Alizadeh Charandabi, S., Mashayekh-Amiri, S., & Mirghafourvand, M. (2023). **The effectiveness of mindfulness-based interventions on self-efficacy and fear of childbirth in pregnant women: A systematic review and meta-analyses.** *Journal of Affective Disorders.* [\[link\]](#)

Crane, R. S., Callen-Davies, R., Francis, A., ...&Vallejo, Z. (2023). **Mindfulness-Based Stress Reduction for Our Time: A Curriculum that is up to the Task.** *Global Advances in Integrative Medicine and Health.* [\[link\]](#)

Erbe, R. G., Meindl, P., Dykhuis, E. M., ...& Tilman, L. T. (2023). **A reasoned action approach to meditation behavior among cadets at the United States Military Academy.** *Military Psychology.* [\[link\]](#)

Ferreira, G. F., Demarzo, M. (2023). **Trends of Research on Mindfulness: A Bibliometric Study of an Emerging Field.** *Trends in Psychology.* [\[link\]](#)

Galante, J., Grabovac, A., Wright, M., ...& Sacchet, M. D. (2023). **A Framework for the Empirical Investigation of Mindfulness Meditative Development.** *Mindfulness.* [\[link\]](#)

Lucas-Thompson, R. G., Moran, M. J. (2023). **Advancing the Study of Mindfulness-Based Interventions in Relation to Psychological Health.** *International Journal of Environmental Research and Public Health.* [\[link\]](#)

McQuade, B. M., Park, Y. S., Jarrett, J. B., & Riddle, J. (2023). **Leveraging Mindfulness to Reduce Stress and Improve Quality of Life Among Pharmacy Students.** *American Journal of Pharmaceutical Education.* [\[link\]](#)

Wright, M. J., Sanguinetti, J. L., Young, S., & Sacchet, M. D. (2023). **Uniting Contemplative Theory and Scientific Investigation: Toward a Comprehensive Model of the Mind.** *Mindfulness.* [\[link\]](#)

Zheng, Y., Yan, L., Chen, Y., ...& Zeng, X. (2023). **Effects of Loving-Kindness and Compassion Meditation on Anxiety: A Systematic Review and Meta-Analysis.** *Mindfulness.* [\[link\]](#)

## Trials

Research studies newly funded by the National  
Institutes of Health (APR 2023)

None reported.

## Highlights

A summary of select studies from the issue, providing  
a snapshot of some of the latest research

**H**igh-stakes exams can determine one's future in terms of promotion, graduation, acceptance into a university, or employment. School mathematics exams are especially high-stake in East-Asian cultures where examinations have long been a prime means of advancement. Fears over how math test performance may affect one's future, or how family and peers might react can lead to considerable test anxiety. This can create a cycle where anxiety impairs performance, and impaired performance exacerbates anxiety. **Zuo & Wang** [*Frontiers in Psychology*] used quantitative and qualitative methods to investigate how a mindfulness-based intervention affected math test performance in Chinese middle-school students.

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The researchers selected an eighth-grade class of middle school students (67% male; age range = 12-13 years) in an urban area of Jiangsu Province, China. The study lasted for one month, during which the students took four weekly geometry tests rated as equivalent in difficulty. The first and third tests were taken as usual, but for the second and fourth tests, the students listened to a 15-minute audio tape prior to the test. The audio tape contained a breath-and-body focused meditation and included relaxation instructions. The tape also instructed students to imagine having negative thoughts and emotions during a math test, and to identify these thoughts and emotions non-judgmentally and return to present-moment awareness.

After the fourth test, students participated in group discussions about whether they found the meditations useful. Two students who benefitted from meditation and two students who did not were selected for subsequent in-depth interviews. The discussion and interviews were transcribed, coded, and thematized to offer qualitative insights into how the meditations affected student math anxiety and self-efficacy.

The results showed that students performed better on average after the meditations than without them (Cohen's  $d = 0.27$ ). All math tests were scored on a 10-point scale, with an average score of 6.73 without meditation and 7.11 with meditation. The qualitative analysis revealed that the meditations helped students to focus more on math problems in the moment, worry less about performance outcomes, and obsess less over test time-constraints or difficult problems. The students who didn't benefit reported finding the meditations "mysterious" or "magic" and associated them negatively with Buddhist religion.

The study shows a mindfulness meditation specifically designed to address math anxiety can objectively improve math exam performance. Qualitative interviews revealed

that the students who benefited from meditation were able to focus more on solving math problems without being distracted. The study is limited by its reliance on a single classroom sample and only four measurement points.

Although behavior therapies are increasingly integrating mindfulness meditation, little is known about how this practice affects reward-based conditioning. Some research suggests that mindfulness can assist individuals in responding more rapidly to changes in reward contingencies, but it is not clear why. One possibility is that people learn verbal rules that help them respond to specific reward schedules, and mindfulness enables people to let go of previously learned verbal rules that no longer apply when reward schedules change. Another possibility is that mindfulness helps people pay closer attention to the reward schedule that is currently in effect.

**Reed [Journal of Experimental Psychology: Animal Learning and Cognition]** conducted four experiments to investigate how mindfulness affects responses to changes in reward schedule. Two different reward schedules were used in the experiments: 1) a random ratio (RR) schedule, which rewarded participants only after a certain number of responses, and 2) a random interval (RI) schedule, which rewarded participants only after a certain amount of time had elapsed. The RR schedule encouraged rapid bursts of responses, whereas the RI schedule encouraged participants to pause for a while after receiving a reward. All four studies used healthy, meditation-naïve participants drawn from a university psychology department.

The first study explored whether mindfulness could help people better differentiate between schedules—that is, to respond at higher rates during an RR schedule and lower rates during an RI schedule. Forty participants (58% male; average age = 21 years) sat at a computer and pressed a space bar with the goal of maximizing game points. Every participant completed 8

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alternating RR and RI schedule trials. A yellow or brown screen icon appeared that indicated the trial was an RR or RI trial, but participants were not informed of what the color signified. A rewarded trial earned participants 60 points, but each space bar press cost them one point. The RR schedule offered a reward after 20 space bar presses, whereas the RI schedule offered a reward for the first space bar press after a certain period of time had elapsed.

Prior to playing the game, participants were randomly assigned to a 10-minute mindfulness or relaxation intervention, delivered via audio recording. The mindfulness intervention asked participants to focus on their breath and return to it whenever their minds wandered. The relaxation intervention asked participants to relax and let their minds wander. Both groups gradually increased their response rates during RR and decreased them during RI, but the mindfulness group showed a significantly greater differentiation between the schedules. This supports the hypothesis that mindfulness helps one pay better attention to reward schedules.

The second study investigated whether a mindfulness group would respond faster to a change in contingency schedule than a relaxation control. Thirty-two participants (75% male, average age = 21 years) were randomly assigned to a mindfulness or relaxation intervention. The experimental situation was the same as in study 1, except that the color icons associated with each schedule were switched midway through the game. The results showed that, once again, the mindfulness group was better able to differentiate between the schedules than the control group. In addition, they responded faster to changes in reward contingency and to changes in the color signaling the contingency, compared to the controls.

The third study compared the effects of mindfulness versus a no-intervention control on the speed of contingency reversal learning using 32 participants (69% male; average age

= 24 years). In this study, participants were asked to verbalize the rule they thought was in effect after each trial. In study 3, participants first completed four trials of the game before experiencing the mindfulness or control intervention. They then played eight trials, as in study 2. The mindfulness group significantly outperformed controls in differentiating between the RR and RI schedules and accurately verbalizing the contingency in effect for each trial.

The fourth study examined whether mindfulness works by promoting awareness of current contingencies or by reducing interference from previously learned contingencies using 80 participants (64% female; average age = 21 years). Participants were trained on an alternating RR/RI schedule until their response rate was higher during the RR schedule. They then randomly assigned to mindfulness or relaxation training. Half of each group play the game as noted before, while the other half played the game with the color icon signaling the reward contingency switched. The results were consistent with the prior studies. The mindfulness group recognized changes in contingency faster and showed a more differentiated response to them than controls. Moreover, the mindfulness group responded appropriately to the changed contingencies after the icon switching faster than controls. The results support the hypothesis that mindfulness promotes situational awareness, leading to more appropriate responding to reward contingencies.

Taken together, these studies demonstrate mindfulness increases behavior differentiation between reward schedules compared to relaxation and no-treatment controls. Mindfulness also leads to faster learning of reward schedule switches. Finally, it appears to enhance performance by increasing present-moment awareness, rather than by reducing interference from previous learning. Although the study's "relaxation" intervention conflates relaxation with mind-wandering, it does not alter the overall interpretation of the findings.