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*Editor-in-Chief*  
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*

Bouw, N., Huijbregts, S. C., Scholte, E., Swaab, H. (2019). **MBSR in prison: Experiences of inmates, instructors, and prison staff.** *Intern J Offend Therapy Comparative Criminology.* [\[link\]](#)

Chadi, N., Weisbaum, E., Malboeuf-Hurtubise, C.,...Vo, D. X. (2019). **In-person vs. EHealth mindfulness-based intervention for adolescents with chronic illnesses: A pilot randomized trial.** *Adolescent Psychiatry.* [\[link\]](#)

Crivelli, D., Fronza, G., Balconi, M. (2019). **Neurocognitive enhancement effects of combined mindfulness-neurofeedback training in sport.** *Neuroscience.* [\[link\]](#)

Dakwar, E., Nunes, E. V., Hart, C. L.,...Levin, F. R. (2019). **A single ketamine infusion combined with mindfulness-based behavioral modification to treat cocaine dependence: A RCT.** *American Journal of Psychiatry.* [\[link\]](#)

Husain, F. T., Zimmerman, B., Tai, Y.,...Gobin, R. L. (2019). **Assessing MBCT intervention for tinnitus using behavioural measures and structural MRI: A pilot study.** *International Journal of Audiology.* [\[link\]](#)

Lilly, M., Calhoun, R., Painter, I.,...Meischke, H. (2019). **Destress 9-1-1—an online mindfulness-based intervention in reducing stress among emergency medical dispatchers: A RCT.** *Occupation Environmental Medicine.* [\[link\]](#)

Liu, X. (2019). **Effect of a mindfulness-based intervention program on comprehensive mental health problems of Chinese undergraduates.** *Community Mental Health Journal.* [\[link\]](#)

Messer, D., Horan, J. J., Larkey, L. K., Shanholtz, C. E. (2019). **Effects of internet training in**

**mindfulness meditation on variables related to cancer recovery.** *Mindfulness.* [\[link\]](#)

Mohamadi, J., Ghazanfari, F., Drikvand, F. M. (2019). **Comparison of the effect of dialectical behavior therapy, MBCT and positive psychotherapy on perceived stress and quality of life in patients with irritable bowel syndrome: A pilot RCT.** *Psychiatric Quarter.* [\[link\]](#)

O'Driscoll, M., Sahm, L. J., Byrne, H.,...Byrne, S. (2019). **Impact of a mindfulness-based intervention on undergraduate pharmacy students' stress and distress: Quantitative results of a mixed-methods study.** *Currents in Pharmacy Teaching and Learning.* [\[link\]](#)

Price, C. J., Merrill, J. O., McCarty, R. L.,...Tsui, J. I. (2019). **A pilot study of mindful body awareness training as an adjunct to office-based medication treatment of opioid use disorder.** *J Substance Abuse Treatment.* [\[link\]](#)

Solhaug, I., de Vibe, M., Friborg, O.,...Rosenvinge, J. H. (2019). **Long-term mental health effects of mindfulness training: A 4-year follow-up study.** *Mindfulness.* [\[link\]](#)

Stanszus, L. S., Frank, P., Geiger, S. M. (2019). **Healthy eating and sustainable nutrition through mindfulness? Mixed method results of a controlled intervention study.** *Appetite.* [\[link\]](#)

Thomas, E. A., Mijangos, J. L., Hansen, P. A.,...Garland, E. L. (2019). **Mindfulness-Oriented Recovery Enhancement restructures reward processing and promotes interoceptive awareness in overweight cancer survivors: Mechanistic results from a stage 1 RCT.** *Integrative Cancer Therapies.* [\[link\]](#)

Wirth, M. D., Franco, R., Wagner Robb, S.,...O'Rourke, M. A. (2019). **RCT of a 4-week mindfulness intervention among cancer survivors compared to a breathing control.** *Cancer Investigation.* [\[link\]](#)

Zhang, H., Li, Y., Li, M., Chen, X. (2019). **A RCT of MBSR for insomnia secondary to cervical**

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**cancer: Sleep effects.** *Applied Nursing Research.* [\[link\]](#)

Zhu, T., Chen, S. (2019). **Can mindfulness-based training improve positive emotion and cognitive ability in Chinese non-clinical population? A pilot study.** *Frontiers in Psychology.* [\[link\]](#)

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Articles examining the correlates and mechanisms of mindfulness

Allone, C., Corallo, F., Scarlata, F.,...Bramanti, P. (2019). **Mindfulness interventions and pain management in a patient with encephalomyelitis.** *Complementary Therapies in Clinical Practice.* [\[link\]](#)

Chatwal, M. S., Vinci, C., Reich, R. R.,...Gray, J. E. (2019). **Mindful fellows: Study results from a pilot wellness curriculum in hematology oncology.** *Journal of Clinical Oncology.* [\[link\]](#)

Dickenson, J. A., Alley, J., Diamond, L. M. (2019). **Subjective and oxytocinergic responses to mindfulness are associated with subjective and oxytocinergic responses to sexual arousal.** *Front Psychol.* [\[link\]](#)

Kerr, D. C., Ornelas, I. J., Lilly, M. M.,...Meischke, H. (2019). **Participant engagement in and perspectives on a web-based mindfulness intervention for 9-1-1 telecommunicators: Multimethod study.** *J Medical Intern Res.* [\[link\]](#)

Kinman, G., Grant, L., Kelly, S. (2019). **It's my secret space: The benefits of mindfulness for social workers.** *British J Social Work.* [\[link\]](#)

Krick, A., Felfe, J. (2019). **Who benefits from mindfulness? The moderating role of personality and social norms for the effectiveness on psychological and physiological outcomes among police officers.** *Journal of Occupational Health Psychology.* [\[link\]](#)

Kubota, R., Nixon, R. D. (2019). **The effect of mindfulness training on rumination and intrusions after analogue trauma.** *Australian Psychologist.* [\[link\]](#)

Lueke, A., Lueke, N. (2019). **Mindfulness improves verbal learning and memory through enhanced encoding.** *Memory & Cognition.* [\[link\]](#)

Pontin, E. E., Hanna, J., Senior, A. (2019). **Piloting a mindfulness-based intervention to veterinary students: Learning and recommendations.** *Journal of Veterinary Medical Education.* [\[link\]](#)

Roos, C. R., Brewer, J. A., O'Malley, S. S., Garrison, K. A. (2019). **Baseline craving strength as a prognostic marker of benefit from smartphone app-based mindfulness training for smoking cessation.** *Mindfulness.* [\[link\]](#)

Sevinc, G., Hölzel, B. K., Greenberg, J.,...Lazar, S. W. (2019). **Strengthened hippocampal circuits underlie enhanced retrieval of extinguished fear memories following mindfulness training.** *Biological Psychiatry.* [\[link\]](#)

Swain, N., Lennox Thompson, B., Gallagher, S.,...Mercer, S. (2019). **Gratitude enhanced mindfulness (GEM): A pilot study of an internet-delivered programme for self-management of pain and disability in people with arthritis.** *Journal of Positive Psychology.* [\[link\]](#)

von Hammerstein, C., Khazaal, Y., Dupuis, M.,...Romo, L. (2019). **Feasibility, acceptability and preliminary outcomes of a MBRP program in a naturalistic setting among treatment-seeking patients with alcohol use disorder: A prospective observational study.** *BMJ Open.* [\[link\]](#)

Wathugala, M., Saldana, D., Juliano, J. M.,...Liew, S. - L. (2019). **Mindfulness meditation effects on poststroke spasticity: A feasibility study.** *J Evidence-Based Integrative Medicine.* [\[link\]](#)

Zhu, J., Wekerle, C., Lanius, R., Frewen, P. (2019). **Trauma-and stressor-related history and symptoms predict distress experienced during a brief mindfulness meditation sitting: Moving**

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toward trauma-informed care in mindfulness-based therapy. *Mindfulness*. [link]

## METHODS

Articles developing empirical procedures to advance the measurement and methodology of mindfulness

Burns, B. M., Merritt, J., Chyu, L., Gil, R. (2019). **The implementation of mindfulness-based, trauma-informed parent education in an underserved Latino community: The emergence of a community workforce.** *American Journal of Community Psychology*. [link]

Cortazar, N., Calvete, E., Fernández-González, L., Orue, I. (2019). **Development of a short form of the five facet mindfulness questionnaire--adolescents for children and adolescents.** *Journal of Personality Assessment*. [link]

Fish, M. T., Saul, A. D. (2019). **The gamification of meditation: A randomized-controlled study of a prescribed mobile mindfulness meditation application in reducing college students' depression.** *Simulation & Gaming*. [link]

Fredrickson, B. L., Arizmendi, C., Cappellen, P. V.,...Salzberg, S. (2019). **Do contemplative moments matter? Effects of informal meditation on emotions and perceived social integration.** *Mindfulness*. [link]

Kor, P. P., Liu, J. Y., Chien, W. T. (2019). **Effects on stress reduction of a modified MBCT for family caregivers of those with dementia: Study protocol for a RCT.** *Trials*. [link]

Lester, E. G., Murrell, A. R. (2019). **Becoming mindful of measurement: An experimental-experiential analogue study of state mindfulness measures.** *Mindfulness*. [link]

Liu, B., Rice, V. J. (2019). **A pilot study investigating preferred background sounds**

during mindfulness meditation: What would you like to hear? *Work*. [link]

Milligan, K., Sibalis, A., McKeough, T.,...Segalowitz, S. J. (2019). **Impact of mindfulness martial arts training on neural and behavioral indices of attention in youth with learning disabilities and co-occurring mental health challenges.** *Mindfulness*. [link]

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Pelham, W. E., Gonzalez, O., Metcalf, S. A.,...Mackinnon, D. P. (2019). **Item response theory analysis of the five-facet mindfulness questionnaire and its short forms.** *Mindfulness*. [link]

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Sesel, A. L., Sharpe, L., Beadnall, H. N.,...Naismith, S. L. (2019). **The evaluation of an online mindfulness program for people with multiple sclerosis: Study protocol.** *BMC Neurology*. [link]

Tian, L., Zhang, Y., Li, L.,...Li, Y. (2019). **The efficacy of mindfulness-based interventions for patients with COPD: A systematic review and meta-analysis protocol.** *BMJ Open*. [link]

Yaari, M., Sheehan, J., Oberklaid, F., Hiscock, H. (2019). **Early minds: A pilot RCT of a mindfulness program in early learning centres.** *Pilot and Feasibility Studies*. [link]

Zhang, Q., Wang, Z., Wang, X.,...Zhou, R. (2019). **The effects of different stages of mindfulness**

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### meditation training on emotion regulation.

*Frontiers in Human Neuroscience.* [link]

Zhang, X., Tan, S. S., Fierloos, I.,...Macchione, S. (2019). **Evaluation design of the social engagement framework for addressing the chronic-disease-challenge (SEFAC): A mindfulness-based intervention to promote the self-management of chronic conditions and a healthy lifestyle.** *BMC Public Health.* [link]

## REVIEWS

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

Andersen, D. T. (2019). **Mindfulness meditation: Another context for the necessary and sufficient conditions.** *Journal of Humanistic Psychology.* [link]

Carvalho, A. F., Fernandes, B. S., Brunoni, A. R. (2019). **MBSR for fibromyalgia: A step closer to precision psychiatry?** *Brain, Behavior, and Immunity.* [link]

Hilton, L. G., Marshall, N. J., Motala, A.,...Hempel, S. (2019). **Mindfulness meditation for workplace wellness: An evidence map.** *Work.* [link]

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Kostova, Z., Levin, L., Lorberg, B., Ziedonis, D. (2019). **Mindfulness-based interventions for adolescents with mental health conditions: A systematic review of the research literature.** *Journal of Child and Family Studies.* [link]

Leeth, C. D., Villarreal, V., Styck, K. M. (2019). **Mindfulness interventions for children and adolescents with ADHD: A review of objectives and skills.** *J Creativity in Mental Health.* [link]

Roche, A. I., Kroska, E. B., Denburg, N. L. (2019). **Acceptance and mindfulness-based interventions for health behavior change: Systematic reviews and meta-analyses.** *Journal of Contextual Behavioral Science.* [link]

Sapthiang, S., Van Gordon, W., Shonin, E. (2019). **Health school-based mindfulness interventions for improving mental health: A systematic review and thematic synthesis of qualitative studies.** *Journal of Child and Family Studies.* [link]

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Weare, K. (2019). **Mindfulness and contemplative approaches in education.** *Current Opinion in Psychology.* [link]

Xue, J., Zhang, Y., Huang, Y. (2019). **A meta-analytic investigation of the impact of mindfulness-based interventions on ADHD symptoms.** *Medicine.* [link]

Zhang, X., Liu, D., Li, Y.,...Wang, G. (2019). **Effects of mindfulness-based interventions on quality of life of women with breast cancer: A systematic review.** *J Comparative Effective Research.* [link]

## TRIALS

Research studies newly funded by the National Institutes of Health (JUN 2019)

University of California, San Francisco (O. Tymofiyeva, PI). **Neural mechanisms of meditation training in healthy and depressed adolescents: A MRI connectome study.** NIH/NCCIH project #1R61AT009864-01. [link]

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## HIGHLIGHTS

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

Emergency medical dispatchers (EMDs) face stressful job demands. In addition to dispatching emergency medical personnel, EMDs provide emergency advice over the phone and may be the last person to speak to an injured party alive. They are also subject to rotating shifts and mandatory overtime.

While EMDs might benefit from stress reduction interventions, the nature of their workplaces makes it difficult to implement time-intensive group-based trainings. **Lily et al. [Occupational and Environmental Medicine]** conducted a randomized controlled study to discover whether an on-line mindfulness-based intervention could successfully reduce stress among EMDs.

The researchers randomly assigned 323 North American EMDs (82% female; 90% Caucasian; modal age = 25-55 years) to either a mindfulness-based intervention or a wait list control. The mindfulness program (Destress 9-1-1) was delivered once per week for seven weeks in 20-30 minute online modules. Each module included a brief video introduction to the theme of the week, an audio-guided mindfulness exercise, and suggestions for mindfulness activities to engage in during the week. The program was modeled after mindfulness-based stress reduction (MBSR), but required less time in terms of coursework, meditation length, and suggested weekly practice. Participants were assessed on measures of stress and mindfulness (using the Mindful Attention Awareness Scale, or MAAS) at baseline, post-intervention, and 3-month follow-up.

Attrition was fairly high with 32% of mindfulness assignees and 18% of controls failing to complete the post-intervention assessment, and 47% of mindfulness assignees and 38% of controls failing to complete the 3-month follow-up. Of those assigned to the mindfulness intervention, 25% completed 0

modules, 20% completed 1-5 modules, and 55% completed 6-7 modules over the seven weeks. Mindfulness assignees engaged in practice an average of twice per week. The relatively high attrition rate may reflect the fact that many EMDs weren't permitted to participate in the intervention during work hours.



Results showed the mindfulness group displayed a significantly greater reduction in stress than the control group. While stress scores in the mindfulness group decreased by an average of 8 points from baseline to post-intervention (Cohen's  $d = 0.34$ ), control group scores increased by an average of 2 points. At the 3-month follow-up, the mindfulness group retained its improvement and the control group showed no change from baseline. There were no significant post-intervention group differences in mindfulness.

While there were no significant differences between the groups in post-intervention mindfulness, baseline levels of mindfulness for the total sample were associated with lower stress ( $r = -.71$ ). Individuals who showed the largest increases in mindfulness from baseline to post-intervention (regardless of group) showed the greatest decreases in stress ( $r = -.53$ ).

The study shows decreased levels of stress in EMDs who were assigned to an on-line mindfulness intervention. This decrease in stress occurred in the absence of measurable changes in mindfulness. Nevertheless, there were associations between higher baseline levels of mindfulness and increases in mindfulness over time and lower levels of stress. The study is limited by its relatively high attrition rate.

Overcoming irrational fears involves recognizing when stimuli previously associated with danger have ceased their association with that danger. This means "extinguishing" a learned connection between a stimulus and its previously feared negative consequences.

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Mindfulness can help with fear extinction by enabling individuals to approach previously feared stimuli with an attitude of non-reactive acceptance. **Sevinc et al. [Biological Psychiatry]** studied whether a mindfulness-based intervention affects the brain activity underlying the fear extinction process.

The researchers assigned 94 meditation-naive adults (average age = 32 years; 64% female) to either an 8-week mindfulness-based stress reduction (MBSR) program or an 8-week exercise-based stress management education program. Stress education consisted of 8 weekly 2 hour group sessions that included 40 minutes of light aerobic exercise and didactic presentations on coping with stress through exercise, nutrition, humor, and sleep hygiene. Two weeks before and after intervention, participants underwent a two-day classical fear conditioning and fear extinction paradigm while being monitored by brain imaging (fMRI).

In the fear conditioning paradigm, participants were presented with images of rooms with either red, blue, or yellow lights. An annoying electric shock immediately followed the images of the rooms with the red or blue lights, but not the yellow lights. Fear was considered “conditioned” to the red or blue lights when exposure to those images led to an increase in skin conductance. After the conditioned skin conductance response (SCR) was acquired, participants were then repeatedly exposed to the image with the red light without a consequent shock in order to extinguish the skin conductance response to that image while maintaining the conditioned skin conductance response to the blue light.

The next day, participant SCRs to the images were reassessed in a “recall” session. The researchers were testing if the SCR to the red light remained extinguished while those to the blue light remained intact. The researchers were interested in the role of the hippocampus during these trials and how it functionally related to other brain regions. The hippocampus is a brain region that is critically involved in the contextual encoding and retrieval of fear extinction memories. Participants were also administered measures of perceived stress, anxiety, emotional

regulation difficulties, and mindfulness before and after the intervention.

The results showed that both MBSR (Cohen’s  $d=0.56$ ) and stress education ( $d=0.57$ ) significantly reduced perceived stress. There was also a marginal advantage ( $p=.05$ ; partial  $\eta^2=0.63$ ) for MBSR for anxiety reduction.



Significant relationships were found between a number of brain structures and the retention of extinction learning. Higher baseline hippocampal activity was associated with better retention of extinction learning ( $r=.79$ ). While there was no significant difference in extinction retention between groups, only MBSR participants significantly improved their extinction retention at post-intervention.

MBSR participants also showed significantly increased supramarginal gyrus activity while recalling extinguished stimuli, and this increased activity was positively correlated with MBSR home practice ( $r=.38$ ). MBSR participants also displayed increased functional connectivity between the left hippocampus and the right supramarginal gyrus, while stress education participants did not. The supramarginal gyrus is part of the brain’s memory retrieval network.

MBSR resulted in increased functional coupling between the hippocampus and the portion of the sensory cortex associated with the hand that had been administered the shocks. Post-MBSR increases in hippocampal gray matter were associated with increased connectivity between the hippocampus and the left dorsolateral prefrontal and retrosplenial cortices, two regions previously implicated in the recall of fear extinction.

The results show that while MBSR and stress education both reduce stress, MBSR has unique effects on how the brain processes fear extinction. MBSR induces changes in hippocampal structure and functional connectivity that enhance the retention of fear extinction. These changes highlight one way in which mindfulness helps to regulate emotions and reduce stress and anxiety.