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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*

Bauer, C. C., Caballero, C., Scherer, E.,...Gabrieli, J. D. E. (2019). **Mindfulness training reduces stress and amygdala reactivity to fearful faces in middle-school children.** *Behavioral Neuroscience.* [\[link\]](#)

Chien, W. T., Cheng, H. Y., McMaster, T. W.,...Wong, J. C. (2019). **Effectiveness of a mindfulness-based psychoeducation group programme for early-stage schizophrenia: An 18-month RCT.** *Schizophrenia Research.* [\[link\]](#)

Damião Neto, A., Lucchetti, A. L., da Silva Ezequiel, O., Lucchetti, G. (2019). **Effects of a required large-group mindfulness meditation course on first-year medical students' mental health and quality of life: A RCT.** *Journal of General Internal Medicine.* [\[link\]](#)

Dowsey, M., Castle, D., Knowles, S.,...Choong, P. (2019). **The effect of mindfulness training prior to total joint arthroplasty on post-operative pain and physical function: A RCT.** *Complementary Therapies in Medicine.* [\[link\]](#)

Garland, E. L., Hanley, A. W., Kline, A., Cooperman, N. A. (2019). **Mindfulness-oriented recovery enhancement reduces opioid craving among individuals with opioid use disorder and chronic pain in medication assisted treatment: Ecological momentary assessments from a stage 1 RCT.** *Drug and Alcohol Dependence.* [\[link\]](#)

Hanley, A. W., de Vibe, M., Solhaug, I.,...Garland, E. L. (2019). **Mindfulness training reduces neuroticism over a 6-year longitudinal RCT in Norwegian medical and psychology students.** *Journal Research in Personality.* [\[link\]](#)

Hassirim, Z., Lim, E. C., Lo, J. C., Lim, J. (2019). **Pre-sleep cognitive arousal decreases following a 4-week introductory mindfulness course.** *Mindfulness.* [\[link\]](#)

Johns, S. A., Beck-Coon, K., Stutz, P. V.,...Stump, T. E. (2019). **Mindfulness training supports quality of life and advance care planning in adults with metastatic cancer and their caregivers: Results of a pilot study.** *American Journal of Hospice and Palliative Medicine.* [\[link\]](#)

Khoshkerdar, P., Raeisi, Z. (2019). **The effect of MBSR on body image concerns of adolescent girls with dysfunctional eating attitudes.** *Australian Journal of Psychology.* [\[link\]](#)

Kindel, H. R., Rafoth, M. A. (2019). **The effects of teaching mindfulness on stress in physical therapy students-a RCT.** *Health Professions Education.* [\[link\]](#)

Mehrsafar, A. H., Strahler, J., Gazerani, P.,...Zadeh, A. M. (2019). **The effects of mindfulness training on competition-induced anxiety and salivary stress markers in elite Wushu athletes: A pilot study.** *Physiology & Behavior.* [\[link\]](#)

Simshäuser, K., Lüking, M., Kaube, H.,...Schmidt, S. (2019). **Is MBSR a promising and feasible intervention for patients suffering from migraine? A randomized controlled pilot trial.** *Complementary Medicine Research.* [\[link\]](#)

Wimmer, L., von Stockhausen, L., Bellingrath, S. (2019). **Improving emotion regulation and mood in teacher trainees: Effectiveness of**

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**two mindfulness trainings.** *Brain and Behavior.* [link]

Woods-Giscombe, C. L., Gaylord, S. A., Li, Y.,...Smith, S. (2019). **A mixed-methods, RCT to examine feasibility of a mindfulness-based stress management and diabetes risk reduction intervention for African Americans with prediabetes.** *Evidence-Based Complementary and Alternative Medicine.* [link]

## ASSOCIATIONS

Articles examining the correlates and mechanisms of mindfulness

Chan, E. Y., Wang, Y. (2019). **Mindfulness changes construal level: An experimental investigation.** *Journal of Experimental Psychology: General.* [link]

Korponay, C., Dentico, D., Kral, T. R.,...Davidson, R. J. (2019). **The effect of mindfulness meditation on impulsivity and its neurobiological correlates in healthy adults.** *Scientific Reports.* [link]

Macinko, J., Upchurch, D. M. (2019). **Factors associated with the use of meditation, US adults 2017.** *Journal of Alternative and Complementary Medicine.* [link]

McClintock, A. S., Goldberg, S. B., Coe, C. L., Zgierska, A. E. (2019). **Mindfulness practice predicts interleukin-6 responses to a mindfulness-based alcohol relapse prevention intervention.** *Journal of Substance Abuse Treatment.* [link]

Rowland, Z., Wenzel, M., Kubiak, T. (2019). **Effects of an ultra-brief computer-based mindfulness training on mindfulness and self-control: A RCT using a 40-day**

**ecological momentary assessment.** *Mindfulness.* [link]

Shepherd, G. (2019). **'Normally I'd get really agitated, but I just laughed!': What do participants reflect upon on a transactional analysis/mindfulness based anger management programme?** *British Journal of Guidance & Counselling.* [link]

Trautwein, F. M., Kanske, P., Böckler, A., Singer, T. (2019). **Differential benefits of mental training types for attention, compassion, and theory of mind.** *Cognition.* [link]

Zhang, W., Ouyang, Y., Tang, F.,...Li, H. (2019). **Breath-focused mindfulness alters early and late components during emotion regulation.** *Brain and Cognition.* [link]

Zhao, X. R., Chen, Z. F., Kang, C. Y.,...Zhang, Y. L. (2019). **MBCT is associated with distinct resting-state neural patterns in patients with generalized anxiety disorder.** *Asia-Pacific Psychiatry.* [link]

Zollars, I., Poirier, T. I., Pailden, J. (2019). **Effects of mindfulness meditation on mindfulness, mental well-being, and perceived stress.** *Currents in Pharmacy Teaching and Learning.* [link]

## METHODS

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

Adler-Neal, A. L., Waugh, C. E., Garland, E. L.,...Zeidan, F. (2019). **The role of heart rate variability in mindfulness-based pain relief.** *The Journal of Pain.* [link]

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Ahn, H., Zhong, C., Miao, H.,...Abdi, S. (2019). **Efficacy of combining home-based transcranial direct current stimulation with mindfulness-based meditation for pain in older adults with knee osteoarthritis: A randomized controlled pilot study.** *Journal of Clinical Neuroscience.* [\[link\]](#)

Chan, S. H., Tse, S., Chung, K. F.,...Lo, H. H. (2019). **The effect of a brief mindfulness-based intervention on personal recovery in people with bipolar disorder: A RCT (study protocol).** *BMC Psychiatry.* [\[link\]](#)

Emerson, L. M., de Diaz, N. N., Sherwood, A.,...Farrell, L. (2019). **Mindfulness interventions in schools: Integrity and feasibility of implementation.** *International Journal of Behavioral Development.* [\[link\]](#)

Frank, P., Stanszus, L., Fischer, D.,...Grossman, P. (2019). **Cross-fertilizing qualitative perspectives on effects of a mindfulness-based intervention: An empirical comparison of four methodical approaches.** *Mindfulness.* [\[link\]](#)

Mediavilla, R., Muñoz-Sanjose, A., Rodriguez-Vega, B.,...de Diego, A. (2019). **Mindfulness-based social cognition training (socialmind) versus psychoeducational multicomponent intervention for people with a first episode of psychosis: A study protocol for a RCT.** *BMC Psychiatry.* [\[link\]](#)

Prestel, M., Riedl, R. (2019). **Enhancing mindfulness by combining neurofeedback with meditation.** *Journal of Consciousness Studies.* [\[link\]](#)

Przyrembel, M., Vrticka, P., Engert, V., Singer, T. (2019). **Loving-kindness meditation-a queen of hearts?: A physio-phenomenological investigation on the**

**variety of experience.** *Journal of Consciousness Studies.* [\[link\]](#)

Ritvo, P., Daskalakis, Z. J., Tomlinson, G.,...Bai, S. (2019). **An online mindfulness-based cognitive behavioral therapy intervention for youth diagnosed with major depressive disorders: Protocol for a RCT.** *JMIR Research Protocols.* [\[link\]](#)

Tree, J. M., Patterson, J. G. (2019). **A test of feasibility and acceptability of online MBSR for lesbian, gay, and bisexual women and men at risk for high stress: Pilot study.** *JMIR Mental Health.* [\[link\]](#)

## REVIEWS

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

Bernstein, A., Vago, D. R., Barnhofer, T. (2019). **Understanding mindfulness, one moment at a time: An introduction to the special issue.** *Curr Opin Psychol.* [\[link\]](#)

Cass, A. R., Abara, N. O., Bueso, F. J.,...Linebarger, C. A. (2019). **Is MBCT effective in the treatment of anxiety?** *Evidence-Based Practice.* [\[link\]](#)

Cooley, C. (2019). **Escaping the prison of mind: Meditation as violence prevention for the incarcerated.** *Health Promotion Practice.* [\[link\]](#)

Cousineau, T. M., Hobbs, L. M., Arthur, K. C. (2019). **The role of compassion and mindfulness in building parental resilience when caring for children with chronic conditions: A conceptual model.** *Frontiers in Psychology.* [\[link\]](#)

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Faedda, N., Natalucci, G., Baglioni, V.,...Guidetti, V. (2019). **Behavioral therapies in headache: Focus on mindfulness and cognitive behavioral therapy in children and adolescents.** *Expert Review of Neurotherapeutics.* [\[link\]](#)

Gibson, J. E. (2019). **Mindfulness, interoception, and the body: A contemporary perspective.** *Frontiers in Psychology.* [\[link\]](#)

Gillions, A., Cheang, R., Duarte, R. (2019). **The effect of mindfulness practice on aggression and violence levels in adults: A systematic review.** *Aggression and Violent Behavior.* [\[link\]](#)

Keaulana, S., Antonio, M., Schoch, H., Banna, J. (2019). **A literature review of the role of mindfulness practices in nutrition for mothers and their children.** *American Journal of Lifestyle Medicine.* [\[link\]](#)

Lyzwinski, L. N., Edirippulige, S., Caffery, L., Bambling, M. (2019). **Mindful eating mobile health apps: Review and appraisal.** *JMIR Mental Health.* [\[link\]](#)

Ong, J. C., Moore, C. (2019). **What do we really know about mindfulness and sleep health?** *Current Opinion in Psychology.* [\[link\]](#)

Parnas, S., Isobel, S. (2019). **Using relational mindfulness to facilitate safety in the clinical encounter.** *Australasian Psychiatry.* [\[link\]](#)

Sabe, M., Sentissi, O., Kaiser, S. (2019). **Meditation-based mind-body therapies for negative symptoms of schizophrenia: Systematic review of RCTs and meta-analysis.** *Schizophrenia Research.* [\[link\]](#)

Schroevens, M. J., Fleer, J. (2019). **Why are researchers not interested in studying**

**individual mindfulness-based interventions?** *Mindfulness.* [\[link\]](#)

Turgon, R., Ruffault, A., Juneau, C.,...Shankland, R. (2019). **Eating disorder treatment: A systematic review and meta-analysis of the efficacy of mindfulness-based programs.** *Mindfulness.* [\[link\]](#)

Zeidan, F., Baumgartner, J. N., Coghill, R. C. (2019). **The neural mechanisms of mindfulness-based pain relief: A functional magnetic resonance imaging-based review and primer.** *Pain Reports.* [\[link\]](#)

## TRIALS

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

Drexel University (E. Forman, PI). **Mindfulness and acceptance-based intervention for obesity.** NIH/NIDDKD project #1R01DK119658-01A1. [\[link\]](#)

ICAHN Mount Sinai (R. Goldstein, PI). **Neuroimaging response inhibition and salience attribution changes during mindfulness-based treatment of human heroin addiction.** NIH/NCCIH project #1R01AT010627-01. [\[link\]](#)

University of Alabama (C. Chapman-Lambert, PI). **Feasibility of the MBSR intervention for Black women living with HIV.** NIH/NCCIH project #1K23AT010567-01. [\[link\]](#)

University of California, San Diego (F. Zeidan, PI). **The role of endogenous opioids in mindfulness-based chronic pain relief.** NIH/NCCIH project #1R21AT010352-01. [\[link\]](#)

University of Delaware (L. Jaremka, PI). **Mindfulness and romantic relationship quality.** NIH/NCCIH project #1R21AT010515-01. [\[link\]](#)

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## HIGHLIGHTS

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

Total hip and knee replacements are among the highest volume elective surgical procedures performed today. The vast majority of joint replacement patients report significant post-operative reductions in pain and disability. Nonetheless, about 15% of patients report poor surgical outcomes marked by continuing pain, disability, and dissatisfaction. Pre-surgical levels of distress related to depression and anxiety are the best predictors of which patients are likely to fare poorly after surgery.

Medical professionals are interested in psychological interventions that could improve post-surgical outcomes. **Dowsey et al. [Complementary Therapies in Medicine]** tested whether pre-surgical Mindfulness-Based Stress Reduction (MBSR) could improve physical and psychological wellbeing outcomes after joint replacement surgery.

The researchers randomly assigned 127 Australian arthritis patients (average age = 65 years; female = 72%) with moderate-to-severe psychological distress (based on a psychological assessment cut-off score) who were surgically approved for knee or hip replacement to either surgery and post-operative care as usual, or a standard 8-week MBSR program followed by surgery and post-operative care as usual. Out of this sample, 45 MBSR assignees and 56 treatment-as-usual assignees eventually underwent surgery. Surgical patients were seen by their treating surgeons during 12-month surgical follow-up appointments.

Patients completed a self-report osteoarthritis measure that included subscales assessing pain, stiffness, and functional disability, as well as a total overall

score that can serve as a single measure of global symptom severity. They also completed measures of general physical and psychological wellbeing, pain-management self-efficacy, and mindfulness (using the Five Facet Mindfulness Questionnaire). Assessments were completed at baseline, 3 months, and 12 months.



MBSR participants reported significantly less pain at 12 months than controls. They also reported significantly greater improvement on the global measure of overall osteoarthritis pain, stiffness, and functional disability. A significantly larger proportion of MBSR participants (91%) were rated as having made clinically meaningful improvements ( $\geq 10\%$  improvement) in pain than controls (75%). Additionally, a significantly greater proportion of MBSR participants (91%) showed clinically meaningful improvement ( $\geq 9\%$  improvement) in functional disability than did controls (66%). In an unexpected finding a greater proportion of MBSR patients (31%) than control patients (10%) never proceeded to surgery at all, many of them citing symptom improvement as their reason for not electing surgery.

The study shows that MBSR improves pain and functional outcomes for psychologically distressed arthritis patients undergoing joint replacement surgery. The study is limited by the loss of follow-up information on patients who did not proceed with surgery, and the absence of a time-and-attention placebo control. Moreover, recruitment for the study proved difficult, with many patients declining to participate due to lack of interest, poor health, or logistical concerns.

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The stress response is associated with brain activity in the amygdala and the prefrontal cortex. The amygdala initiates the fight, flight, or freeze response to fear-inducing stimuli, while the prefrontal cortex helps modulate this response. A higher degree of connectivity between these brain regions is thought to enhance emotional regulation. These conclusions are based on research with adults. Little is known about the neural basis for children's responses to stress, however, and whether it can be beneficially modified by mindfulness-based interventions.

**Bauer et al. [Behavioral Neuroscience]** tested whether mindfulness training reduces stress levels in middle school children, and if so, whether it is done by inducing changes in the amygdala and its connectivity to a region of the prefrontal cortex. This is the first study investigating the effects of a mindfulness-based intervention on children's brain activity.

All 6th graders in a Boston charter school were randomly assigned to an 8-week mindfulness training program or an 8-week computer coding training program. The researchers requested the 6th graders' families to permit their children to participate in the functional magnetic imaging (fMRI) portion of the study. Forty children received permission (average age = 12 years; 70% female; 53% Caucasian; Average WASI IQ = 98), and 33 of their fMRI protocols were usable.

Mindfulness and computer coding groups met four times a week for 45 minutes during the last class of the school day. Each mindfulness session included 15 minutes of mindfulness exercises involving focused attention on the present moment and related didactic instruction and group discussion. Exercises included focused breath meditations, attention to the senses, open monitoring, and practice in noticing thoughts. Control group sessions involved teaching the SCRATCH programming language using didactic instruction, collaborative learning, and group discussion. The SCRATCH program was developed by MIT Media Labs and is used around the world to introduce children to computer programming. All children completed self-report measures of

perceived stress and positive and negative affect at baseline and post-intervention.

The children participating in the fMRI portion of the study were shown images of happy, fearful, and neutral facial expressions while undergoing scanning. They were scanned at baseline and post-intervention. Scans were analyzed for right amygdala reactivity to fearful facial expressions and amygdala functional connectivity with the ventromedial prefrontal cortex.



At baseline, stress level was associated with greater negative affect ( $r=.47$ ) and less positive affect ( $r=-.37$ ). As hypothesized by the researchers, baseline stress level ( $r=.41$ ) and negative affect ( $r=.45$ ) were significantly correlated with higher amygdala activation to fearful facial expressions.

At post-intervention, mindfulness participants had significantly greater reductions in stress levels (Cohen's  $d=0.56$ ) and a trend towards reduced negative affect ( $d=0.36$ ) compared to controls. Right amygdala activation in response to fearful facial expressions decreased to a significantly greater degree ( $d=0.48$ ) for mindfulness participants than controls. Stress change scores and amygdala activity change scores ( $r=.31$ ) were significantly correlated in the mindfulness group only. Functional connectivity between the amygdala and ventromedial prefrontal cortex while viewing fearful facial expressions significantly declined over time for the control group but not for the mindfulness group (Cohen's  $f^2=.27$ ). At post-intervention, amygdala-prefrontal cortex functional connectivity was significantly greater for mindfulness participants than controls.

The study demonstrates the efficacy of a school-based mindfulness program in reducing middle-school children's stress levels and amygdala activation to fear-related stimuli. This is the first mindfulness intervention study with children to use a brain-based marker to assess outcome. Mindfulness programs that reduce childhood stress may have an important role to play in reducing the incidence of mental health problems in adolescence and adulthood.