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


training paradigms in high worriers. *Mindfulness.* [link]


Panahi, F., Faramarzi, M. (2016). *The effects of mindfulness-based cognitive therapy on depression and anxiety in women with premenstrual syndrome.* *Depression Research and Treatment.* [link]


Van der Gucht, K., Takano, K.,...Raes, F. (2016). *A mindfulness-based intervention for adolescents and young adults after cancer treatment: Effects on quality of life, emotional distress, and cognitive vulnerability.* *Journal of Adolescent and Young Adult Oncology.* [link]


**ASSOCIATIONS**

*Articles examining the correlates and mechanisms of mindfulness*

Berkovich-Ohana, A., Glicksohn, J., Ben-Soussan, T. D., Goldstein, A. (2016). *Creativity is enhanced by long-term mindfulness training and is negatively correlated with trait default-mode-related low-gamma inter-hemispheric connectivity.* *Mindfulness.* [link]


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International Journal for the Advancement of Counselling. [link]


Im, S., Follette, V. M. (2016). Rumination and mindfulness related to multiple types of trauma exposure. *Translational Issues in Psychological Science*. [link]


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Fulwiler, C., Siegel, J. A., Allison, J.,...King, J. A. (2016). Keeping weight off: Study protocol of an RCT to investigate brain changes associated...
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with mindfulness-based stress reduction. BMJ Open. [link]


REVIEW

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


Semple, R. J., Drouotman, V., Reid, B. A. (2017). Mindfulness goes to school: Things learned (so far) from research and real-world experiences. Psychology in the Schools. [link]


TRIALS

Research studies newly funded by the National Institutes of Health (DEC 2016)

National University of Natural Medicine (A. Senders, PI). MBSR for multiple sclerosis: Feasibility, durability, and clinical outcomes. NIH/NCCIH project #5K23AT008211-03. [link]

University of California, San Francisco (O. Tymofiyeva, PI). A network approach to study brain plasticity in children with cognitive training. NIH/NCCIH project #1R21HD086654-01.
Schizophrenia is a severe, prolonged psychiatric illness affecting over 3,000,000 Americans with symptoms including delusions, hallucinations, apathy, and social withdrawal. The standard treatment for schizophrenia involves medication, education, and social support. Despite treatment, most patients suffer from residual symptoms that can negatively impact vocational and social functioning and quality of life. Using a randomized, controlled, multisite design, Wang et al. [Neuropsychiatric Disease and Treatment] compared the efficacy of a novel six-month mindfulness-based psycho-educational program in reducing schizophrenic symptoms and disability to that of standard psychiatric care with and without conventional psycho-education.

The researchers recruited 138 patients with schizophrenic-spectrum disorders (52% male, average age = 24) from two Hong Kong outpatient clinics and randomly assigned them to one of three conditions: 1) a Mindfulness-Based Psycho-educational Group (MBPG), 2) a Conventional Psycho-educational Group (CPG) or 3) treatment-as-usual (TAU) alone. MBPG and CPG were both offered as supplements to treatment-as-usual, and were delivered in twelve two-hour bimonthly sessions over the course of six months. MBPG focused on increasing awareness of bodily sensations, thoughts, and feelings relating to illness, controlling negative thoughts and perceptions, and enhancing illness management, problem-solving and relapse prevention. It emphasized acceptance and de-centering strategies and included mindfulness home practice. CPG emphasized education on schizophrenia, survival and life skills, relapse prevention, and resilience promotion. TAU included medication, psychiatric consultation, brief education about illness and treatment, nurse and social work services, and referrals for medical treatment and psychological counseling as indicated.

Outcome measures were obtained at baseline, and at 1 week and 6 months after intervention completion. Measures included psychosocial functioning, re-hospitalization, psychiatric symptoms, insight into illness/treatment, recovery, and mindfulness (the Five Facet Mindfulness Questionnaire of FFMQ).

The MBPG patients showed significantly greater improvement in psychosocial functioning, positive and negative symptoms, recovery, and insight into their illness (overall partial η² = .54) than either the CPG or TAU patients. These patients were also significantly less likely to be re-hospitalized: 37% of the TAU, 27% of the CPG, and 11% of the MBGP patients were re-hospitalized during the 6-month follow-up. The magnitude of differences between the groups was moderate-to-large. For example, on the Positive and Negative Symptoms Scale at 6-month follow-up, MBGP patients earned lower average symptom scores (70) than either CPG (84) or TAU (97) patients. MBGP patients showed significant increases in mindfulness on the FFMQ, which was not administered to the other groups. Ninety-five percent of the patients successfully completed the six-month interventions (they attended at least 7 classes and were available for follow-up data collection). No adverse reactions were observed for any group.

This study shows that a mindfulness-based psychoeducational intervention expressly designed for schizophrenic patients can be well tolerated and result in better illness outcomes than either standard treatment alone or standard treatment supplemented by a more typical psychoeducational approach. This is an important finding because of the widely held belief that psychotic patients can neither tolerate nor benefit from mindfulness-based interventions. The study is limited by the fact that older schizophrenic patients with longer disease courses are underrepresented in its sample, and that the advanced practice nurses running the different groups may not have had an equivalent extent of training in the interventions used.
Dispositional mindfulness is the generalized tendency to be mindful in daily life, but mindfulness levels can also be situational. Parenting-specific mindfulness, for example, is mindfulness occurring within the context of parenting. It’s the tendency to be nonjudgmental, accepting and emotionally aware of and compassionate toward oneself and one’s child, and to be able to listen to one’s child with full attention. Parenting-specific mindfulness may benefit the parent-child relationship by helping parents and children cope with stress within the family relationship. Laurent et al. [Developmental Psychology] tested this hypothesis by measuring the impact of both maternal dispositional mindfulness and parenting-specific mindfulness on maternal and infant stress hormone (cortisol) levels during and after exposure to a stressor.

The researchers recruited 73 low-income mother-infant pairs (77% Caucasian; average maternal age = 27; 51% married; median income=$10,000-$19,000) who were part of a larger longitudinal study. At 3 months postpartum, the mothers completed self-report measures of dispositional mindfulness (the Five Facet Mindfulness Questionnaire), parenting-specific mindfulness (Interpersonal Mindfulness in Parenting-Infant Version) and the degree of life stress during the prior three months. At 6 months postpartum, the mother-infant pairs participated in a “still face” task in which the mother maintained an unwavering neutral facial expression while face-to-face with her infant for two full minutes. The mother’s failure to react to the infant’s attention-getting bids during this task is stressful for the infant, who striving to regain the mother’s attention and failing to do so, may start to whine or cry in response to not receiving attention. Samples of maternal and infant saliva were obtained prior to, immediately after, and 15 and 45 minutes after the still face task. The saliva was assayed for cortisol, a hormone that reflects physiological stress. The researchers then studied the impact of maternal dispositional and parenting-specific mindfulness (as measured at 3 months postpartum) on maternal and infant peak cortisol levels during the still face task, and also the rate it took for cortisol levels to return to baseline after the task (the rate of recovery from stress).

Parenting-specific mindfulness demonstrated significant effects, while dispositional mindfulness failed to show significance on any of the outcomes. Higher levels of parenting-specific mindfulness were significantly associated with faster maternal cortisol recovery (accounting for 14% of the variance). There was also a significant interaction between parenting-specific mindfulness and the degree of life stress experienced by the mothers experienced on cortisol recovery rates after the still face task (accounting for 24% of the variance). Mothers who were low on parenting-specific mindfulness and high on life stress had a faster rate of cortisol return to baseline; mothers with high levels of parenting-specific mindfulness and high levels of life stress showed a slower rate of cortisol return to baseline. Lastly, infants of mothers who had high levels of parenting-specific mindfulness and high on levels of life stress had lower peak cortisol levels (accounting for 10% of the variance). In other words, mindful parents with high stress lives showed an extended stress response with slow recovery, while their offspring showed less of a peak stress response. It may be that parenting-specific mindfulness prolongs maternal stress arousal since the mindful mothers are more fully attentive to their infants’ distress, and this higher degree of maternal attunement in turn protects their infants from higher physiological stress levels.

The study underscores the value of construing mindfulness as something embedded and deployed within specific life contexts such as parenting, rather than as a disposition that generalizes equally across all behavioral domains. It demonstrates that parental mindfulness influences and moderates physiological stress in mother-infant pairs. The pattern of findings in this study may be specific to lower-income families, as they may, on average, experience higher levels of life stress compared to families with higher incomes.
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Interventions
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Kuhlmann, S. M., Huss, M., Bürger, A., Hammerle, F. (2017). Coping with stress in medical students: Results of a randomized controlled trial using a mindfulness-based stress prevention training (Medimind) in Germany. BMC Medical Education. [link]

Luu, K., Hall, P. A. (2017). Examining the acute effects of hatha yoga and mindfulness meditation on executive function and mood. Mindfulness. [link]


Panahi, F., Faramarzi, M. (2017). The effects of mindfulness-based cognitive therapy on
depression and anxiety in women with premenstrual syndrome. Depression Research and Treatment. [link]


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**METHODS**

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


intervention for people with Parkinson’s disease: The study protocol of a randomised pilot trial. *Pilot and Feasibility Studies.* [link]


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**REVIEWS**

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


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**TRIALS**

*Research studies newly funded by the National Institutes of Health (JAN 2017)*

None reported.
Social Anxiety Disorder (SAD) is a psychiatric condition affecting approximately 7% of Americans. Symptoms include fear, embarrassment, and humiliation in social situations, along with avoidance of social interactions. People with SAD have negative beliefs about their social acceptability and self-worth, creating fear that others will discover their self-perceived negative qualities. Altering these negative self-beliefs may be an effective way to reduce the severity of SAD symptoms.

Thurston et al. [Journal of Anxiety Disorders] conducted a randomized, controlled study to test the effects of Mindfulness-Based Stress Reduction (MBSR) and Cognitive Behavioral Group Therapy (CBGT) on positive and negative self-evaluations and their relationship to social anxiety symptoms in patients with SAD.

The researchers randomly assigned 108 volunteers (56% female; mean age = 33 years; 43.5% Caucasian, 39% Asian, 9.3% Hispanic, 8.3% other) with SAD to a 12-week MBSR program, CBGT program, or wait-list control. The volunteers completed a Self-Referential Encoding Task (SRET) and a self-report scale of social anxiety at baseline and after the assigned intervention. The SRET was also completed by a separate group of 40 healthy controls that served as a baseline comparison group. The SRET measures participants' positive and negative self-views by having them select the words that best describe themselves from pairs of computer-presented negative and positive adjectives.

The standard curriculum-based MBSR intervention omitted the usual “retreat day” in the sixth week of the program, but extended the program by adding four additional weekly group sessions so that it better matched the 12-week CBGT program. The CBGT program taught cognitive restructuring and relapse prevention and offered graded exposure to feared social situations, both in-program and the “real world.”

At baseline, participants with SAD had significantly higher negative self-views (Cohen’s d=2.9) and lower positive self-views (d=2.4) than the healthy control comparison group. There was a significant negative association (r = -0.26) between positive self-views and social anxiety symptoms. After intervention, MBSR participants showed significant increases in positive self-views (d=0.09) and decreases in negative self-views (d=0.7) and decreases in negative self-views (d=0.8) of similar magnitude. Wait-listed controls showed smaller magnitude increases in positive self-views (d=0.03) and decreases in negative self-views (d=0.04).

The MBSR and CBGT groups increased positive self-views by 19 and 17 points respectively, while the wait-listed controls increased their positive self-views by only 7 points. MBSR participants had significantly larger improvements than wait-listed controls yet their improvements were not significantly different from those of CBGT participants. For both MBSR (R² = 0.23) and CBGT (R² = 0.27), improvements in positive self-views were associated with improvements in social anxiety symptoms. Decreases in negative self-views, however, had no effect on social anxiety symptoms.

The results show that MBSR and CBGT are equally effective in increasing positive self-views and decreasing social anxiety in people diagnosed with SAD. They may each achieve the same result, however, through different mechanisms. For example, CBGT may increase positive self-views through cognitive restructuring, and MBSR through enhanced cognitive flexibility and decreased
attachment to prior notions of the self. The possible differences in mechanisms were not explicitly tested in this study, however. The finding that increased positive self-views are associated with symptom improvement while decreased negative self-views are not suggests that an increased focus on cultivating positive self-views may be more effective than disputing negative ones among people with SAD.

What percentage of Americans practice mindfulness meditation, and how do they differ from those who do not? Every year the Centers for Disease Control and Prevention’s National Center for Statistics (NCS) conducts an annual National Health Interview Survey using U.S. Census Bureau-trained interviewers. They visit some 35,000-40,000 households, obtaining self-report health data from a representative sample of 75,000-100,000 Americans, which provides the most complete snapshot of the nation’s health in any given year. Additionally, every five years, the NCS and the National Center for Complementary and Integrative Health jointly collect supplementary data on the use of alternative and complementary medicine. Morone et al. [Journal of Alternative and Complementary Medicine] analyzed data from the 2012 surveys to assess the prevalence of mindfulness meditation practice, who uses it, and why.

The 2012 NHIS survey collected information from 108,131 adults. The researchers examined the data from respondents who reported using “mindfulness meditation including Vipassana, Zen Buddhist meditation, Mindfulness-based Stress Reduction and Mindfulness-based Cognitive Therapy” during the previous 12 months. It also compared them to respondents who reported they did not practice mindfulness meditation on various demographic variables, health behaviors, acute and chronic illnesses, and physical and mental health issues.

On the basis of this data, the researchers estimated that well over two million American adults engaged in mindfulness meditation in 2012. Women made up 61% of the mindfulness meditators. As a group, mindfulness meditators were an average of seven years older than non-meditators, and while more likely to be white and college educated, did not differ in terms of socio-economic status. Mindfulness meditation practice was more prevalent in Western states, and less prevalent in the South.

Mindfulness meditators were more likely to smoke, but also more likely to engage in regular moderate exercise. Mindfulness meditators (mean BMI = 27.3 kg/m²) were less likely to be obese than non-meditators (mean BMI = 30.6 kg/m²). While mindfulness meditators were 12-15% more likely to report aches and pains and 19% more likely to report acute head and chest colds, they were 3-11% less likely to report chronic diseases such as hypertension, heart disease, and COPD. On the other hand, mindfulness meditators were 10% more likely to report mental disorders, 26% more likely to report having been nervous, 11% more likely to report having been sad, 16% more likely to report feeling stressed, and 27% more likely to report having had insomnia. All of these differences were statistically significant.

The observed higher levels of pain and negative emotions in mindfulness meditators is probably due to the fact that these are the symptoms that often motivate people to start meditating, rather than being the result of meditation. The results suggest that with the notable exception of smoking, meditators are generally more likely to engage in healthy behaviors and, despite their older age, be less likely to be obese or report a variety of chronic illnesses. Their increased likelihood of smoking may reflect their greater levels of anxiety, sadness, mental illness, and stress, which may also account for their increased frequency of acute colds. This study broadens our understanding of who currently engages in mindfulness meditation in the U.S. and why. The study is limited by the lack of information on practitioners’ duration, frequency, and consistency of mindfulness practice.
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**Interventions**

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


Hoge, E. A., Bui, E., Palitz, S. A.,...Simon, N. M. (2017). The effect of mindfulness meditation training on biological acute stress responses in...
generalized anxiety disorder. Psychiatry Research. [link]


**Associations**

Articles examining the correlates and mechanisms of mindfulness


Carswell, J., Frewen, P. (2017). Experiences of psychopathology distract from focused
attention during mindfulness meditation: Assessment in relation to meditation breath attention scores in mental health help-seeking participants. *Mindfulness*. [link]


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MINDFULNESS RESEARCH MONTHLY

Vol. 8 - No. 3
MAR 2017

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TRIALS

Research studies newly funded by the National Institutes of Health (FEB 2017)

H. Lee Moffitt Cancer Center (C. Vinci, PI).
Applying mHealth to tobacco-related health disparities: Enhancing aspects of resiliency to aid cessation efforts. NIH/NIMHD project #4R00MD010468-03. [link]

University of California, San Francisco (F. Hecht, PI).
Training researchers in clinical integrative medicine. NIH/NCCIH project #3T32AT003997-10S1. [link]
People with generalized anxiety disorder (GAD) suffer from excessive and uncontrollable worry concerning a broad array of everyday matters (work, money, health, relationships, etc.) along with a range of physical symptoms (headache, fatigue, muscle tension, etc.) associated with stress. As a result, people with GAD often miss days at work and tend to use medical and mental health services at a higher rate than the average person. GAD is often treated with medication and psychotherapy, and in recent years, mindfulness-based interventions have been added as an additional treatment alongside more traditional approaches.

In a secondary analysis of a previously published randomized, controlled clinical trial, Hoge et al. [Journal of Psychosomatic Medicine] investigated whether Mindfulness-Based Stress Reduction (MBSR) reduced the number of GAD sufferers’ missed days at work and the number of their visits to primary care and mental health care professionals to a greater degree than a stress management education (SME) control.

The 57 individuals with GAD (mean age = 39; 56% female; 83% Caucasian) whose data were analyzed in this study were a subset of a larger cohort of individuals with GAD who were randomly assigned to either a standard 8-week MBSR program or an 8-week SME program. The SME program covered topics relevant to stress including time management, nutrition, exercise, and sleep. The subgroup of patients whose data was included in this analysis completed the World Health Organization Health Performance and Work Questionnaire (HPQ) at baseline, after intervention, and at 24-week follow-up. The HPQ is a self-report measure of illness-related absences from work and visits to primary care and mental health professionals.

At immediate post-intervention, the MBSR group had significantly decreased the number of partial days (from 1.4 days to 0.5 days a month) they had missed employment due to physical or mental health problems, whereas the control group increased (from 0.7 to 1.2 days a month) their partial days of work missed. This between groups difference in partial days missed was no longer significant at 24-week follow-up. There were no significant changes over time, however, in full days of work missed or in health care utilization. The amount of home mindfulness practice MBSR participants engaged in during the follow-up period had associations that trended towards significance with both mental health utilization and partial days of work missed. The more participants practiced, the less they missed partial workdays (r = -.45) or visited mental health professionals (r = -.43).

The study shows a decrease in partial workdays missed for MBSR participants with GAD, and a tendency for mental health care utilization and partial days missed to decrease with increased mindfulness practice. It lends support to previous research demonstrating the benefits of MBSR for persons with anxiety disorders. Previous studies failed to measure partial workdays missed, but this may be the most sensitive measure of how anxiety disorders impact work performance, as employees with GAD may come late to work, or leave early depending on their mental state. A relatively high dropout rate (19%) for MBSR participants limited power to detect differences at 24-week follow-up.
Migraines are disabling headaches lasting from several hours to several days that are characterized by severe, pulsating pain usually localized to one side of the head. Migraine sufferers may also experience nausea and sensitivity to light, sound or smell. Their headaches may also be preceded by visual disturbances (e.g., blind spots and zigzag patterns) that signal their impending onset. Migraines are considered “chronic” when they occur more than 15 days a month over a period of three months. Chronic migraines are often complicated by medication overuse, which tends to make migraines worse and harder to manage. The treatment of chronic migraine complicated by medication overuse is complex, and physicians are interested in behavioral approaches that can either supplement or be used instead of medications.

Grazzi et al. [Journal of Headache and Pain] conducted a non-randomized exploratory clinical trial of a mindfulness-based intervention compared to prescribed medications intended to prevent headache onset for patients with combined chronic migraine and medication overuse.

Patients with chronic migraine and medication overuse who were being treated at a neurology clinic were withdrawn from their medication in a structured day treatment program. At the end of the program, they were invited to participate in a clinical trial of either mindfulness training (MT) or prophylactic medication (MED). A total of 44 patients (average age = 45) were enrolled in the study, and assignment to treatment was self-selected. The MT intervention, based on Mindfulness-Based Stress Reduction, involved six weekly 45-minute small group sessions. MT participants practiced maintaining a non-judgmental, present-moment focus during sitting meditation.

Patients in the MED condition were prescribed medications to take before their headaches began including valproate, botulinum toxin, pizotifen, amitriptyline, and beta blockers. Patients in both groups could take medication for acute headaches (primarily triptans and NSAIDs) once headaches had begun. Participants in both groups completed daily diaries documenting their headaches and medication use. They also completed self-report measures of headache impact, migraine disability, depression, and anxiety at baseline, and at 3, 6, and 12 months. The researchers also evaluated participants at 3, 6, and 12 months to see whether they had achieved a 50% reduction in headache frequency and whether they still met the diagnostic criteria for chronic migraine.

Headache frequency, medication use, and depression severity significantly decreased for both treatments over time, without significant differences between treatments. Headache-related disability significantly decreased for both groups at 3- and 6-month follow-up, but not at 12 months. Only one measure called the Headache Impact Test, a self-report measure of pain severity, fatigue and mood, showed different treatment outcomes over time. While the MT group's scores on that test didn’t change significantly, the MED group's scores significantly improved at 3 months and 12 months, but not at 6 months. There was no difference between treatments at 12 months in terms of those meeting the criteria of a 50% reduction in headache frequency (50% of MT patients and 53% of MED patients) or those no longer meeting chronic migraine diagnostic criteria (65% of MT patients and 74% of MED patients).

The results support a role for mindfulness in the treatment of chronic migraine with medication overuse. The results suggest that mindfulness training may be as effective in reducing headache frequency, depression, headache-related disability, and acute medication use as prescribed medication to prevent headache onset. The study is limited by its lack of random assignment, a placebo control, and measures of adherence to treatment and home practice.
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**INTERVENTIONS**

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Yılmaz, E., Okanlı, A. (2017). Test of mindfulness-based psychosocial skills training to improve insight and functional recovery in schizophrenia. *Western J Nursing Research.* [link]

**ASSOCIATIONS**
Articles examining the correlates and mechanisms of mindfulness


**TRIALS**

Research studies newly funded by the National Institutes of Health (MAR 2017)

None reported.


**Highlights**

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

Mindfulness training has been shown to improve performance on behavioral measures of executive control including attention, working memory, emotional and cognitive control, and decision making. Research also suggests that a brain region known as the dorsolateral prefrontal cortex (dPFC) plays an important role in executive control, serving as the hub of an executive control brain network. The dPFC has rich anatomical connections to other brain regions that are also thought to be involved in executive control. Does mindfulness training assist executive control by improving the way the dPFC interrelates with these other brain regions?

One way to test this is by assessing resting state functional connectivity between the dPFC and other brain regions. Resting state functional connectivity is a measure of how much different brain regions work in tandem. For example, when one region increases activity, other brain regions act in sync with it. Taren et al. [Psychosomatic Medicine] tested whether mindfulness training increases the functional connectivity between the dPFC and other executive control brain regions by comparing functional connectivity after either mindfulness training or relaxation training in a randomized, controlled study.

The researchers randomly assigned 35 unemployed, job-seeking adults (average age = 40; 57% male; 66% Caucasian) who reported high levels of stress to either an intensive 3-day residential mindfulness training, or an intensive 3-day residential relaxation training. Mindfulness training was a condensed version of Mindfulness-Based Stress Reduction that included body scanning, sitting, walking, and eating meditations, and mindful yoga. Relaxation training included resting while walking and stretching and didactic presentations, but did not include progressive muscle relaxation. All participants underwent functional magnetic resonance imaging (fMRI) both at baseline and two weeks after training. The fMRI sessions included a five-minute period when participants passively viewed a nearly empty computer screen with just a cross in the center while neither relaxing nor meditating. Resting state functional connectivity was assessed during this period.

The results showed that mindfulness training increased functional connectivity between the dPFC and five different brain regions associated with cognitive control (the left superior parietal lobule, right supplementary eye field, right middle frontal gyrus, right inferior frontal gyrus, and left middle temporal/angular gyrus) significantly more than did relaxation training. Mindfulness participants showed no relative decreases in functional connectivity between the dPFC and any of the brain regions as compared to relaxation training participants.

Findings show that mindfulness training increases functional connectivity between the dPFC and other specific brain regions involved in executive control. This contributes to our knowledge of how mindfulness may enhance attention, working memory and other executive control functions through increasing functional connections between brain regions. Future research can determine whether there is a relationship between these functional changes and the structural differences reported in studies of long-term meditators. The study is limited by its failure to include behavioral measures of executive control to test if they varied with changes in functional connectivity.

People tend to be happiest when their career and relationship goals align with their motivations. The problem is that people often have relatively little awareness of their unconscious motives. We can infer the existence of unconscious motives based on how a person behaves, but people are rarely able to recognize or
describe these motives. Unconscious motives are formed early in life and tend to be poorly integrated with higher mental processes. Prior research suggests, however, that people who are highly aware of their internal body sensations are also more likely to be aware of their unconscious motives. Could then a mindfulness exercise that increases body awareness also increase awareness of unconscious motives?

Strick et al [Personality and Social Psychology Bulletin] tested this possibility by first assessing people’s unconscious motives, and then having them select and rate a set of goals after engaging in either a mindfulness practice called the body scan or a control activity.

Sixty college students (mean age = 22; 75% female) attended a series of three experimental sessions. In the first session, participants made up stories in response to pictures depicting social situations. The content of their stories was then rated by the researchers for the presence of implicit wishes for affiliation (the wish to pursue and maintain relationships) and power (the wish to control and influence others). The participants also rated their conscious desires for affiliation and power using a self-report measure.

In the second session, participants were randomly assigned to either a body scan or control activity. Body scan participants listened to a brief (12–14 minutes) digitally recorded guided body scan in which they were instructed to mindfully attend to body sensations. Control participants read magazines for the same length of time. Participants were then asked to imagine starting a new job and select the goals they would like to pursue from a list of affiliation (e.g., “I would like to work in a team”) and power (e.g., “I would want to act self-confident”) goals. Participants then rated the selected goals for how true they were for them. Following this, participants were asked to choose from another list of affiliation and power goals, but this time to vividly imagine how pursuing those goals might make them feel before selecting and rating them. Finally participants rated how aware they were of their bodily sensations.

Two months later, participants returned for a third session in which those previously assigned to do the body scan now read magazines, and vice versa. During this third session, participants selected and rated their goals in a new scenario involving imagining beginning to attend a new school.

The body scan effectively increased participants’ ratings of bodily awareness. Unconscious affiliation motives significantly predicted participants’ goal selections and ratings after the body scan, but not after reading magazines. In other words, unconscious affiliation motives led to selecting more affiliation goals, but only after the body scan manipulation. On the other hand, when the participants were later asked to vividly imagine their selections, the relationship between their unconscious motives and their goal selections disappeared. In contrast to affiliation motives, unconscious power motives did not affect power goal selection or ratings. Measures of unconscious and conscious motivation did not correlate with each other. Conscious affiliation motives were a better predictor of goal selection in the control condition than in the body scan condition, whereas unconscious affiliation motives were a better predictor of goal selection in the body scan condition than in the controls.

In summary, the findings show that the body scan enhances the influence of unconscious affiliation motives on goal selection, thereby better aligning goals with unconscious motives. However, this effect is either fleeting or easily counteracted because it disappeared when the participants vividly imagined pursuing their goals.

The research adds to our knowledge of whether and under what circumstances a mindfulness practice may increase access to unconscious mental processes. It also suggests a role for mindfulness in improving decision making around personal goals. The study is limited by the brevity of its mindfulness task and the fact that it was offered as a stand-alone task without accompanying mindfulness education.
EVALUATION OF A
MINDFULNESS GAME

AN ONLINE STUDY FROM THE UNIVERSITY OF THE
SUNSHINE COAST, QUEENSLAND, AUSTRALIA.

This research evaluates the efficacy and user experience of a digital game for mindfulness. The mindfulness game was developed using existing research evidence and several new studies conducted by the research team of Jacek Sliwinski, Prof. Christian Jones and Prof. Mary Katsikitis.

In this game, you will control an avatar through a virtual world to collect objects and dodge obstacles. Be the first to play the game and share your opinion on how it can be improved. Furthermore, the player who achieves the highest score in the game wins a surprise gift.

You can play the game on your browser, anywhere that is convenient for you. Currently, only desktop users with Chrome or Firefox are supported. The game takes 15 minutes to complete, excluding pre- and post-test.

To participate visit www.mindfulgaming.org/improve

FOR MORE INFORMATION CONTACT: JACEK.SLIWINSKI@RESEARCH.USC.EDU.AU
**Interventions**

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


MBCT protocol for hospital employees.  
*Mindfulness.* [link]


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**ASSOCIATIONS**

Articles examining the correlates and mechanisms of mindfulness

adherence in a college sample: Comparison of a 10-min versus 20-min 2-week daily practice. *Mindfulness.* [link]


Kiken, L. G., Lundberg, K. B., Fredrickson, B. L. (2017). *Being present and enjoying it: Dispositional mindfulness and savoring the moment are distinct, interactive predictors of positive emotions and psychological health.* *Mindfulness.* [link]


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**METHODS**

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


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### REVIEWS

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


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### TRIALS

Research studies newly funded by the National Institutes of Health (APR 2017)

University of Massachusetts Medical School Worcester (R. Van Lutterveld, PI). Mindfulness meditation and real-time brain activity in schizophrenia. NIH/NIMH project # 1R03MH112040-01. [link]
**Highlights**

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

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**Being diagnosed and treated for cancer can be highly stressful, and prolonged stress often alters the body’s normal stress response. For example, the amount of cortisol (a stress hormone) secreted by the adrenal gland typically varies over the course of the day, peaking upon morning awakening and gradually diminishing throughout the day. Prolonged stress blunts this biological response so that the difference between morning and afternoon cortisol levels is much smaller.**

Cancer survivors often show this kind of blunted cortisol response—reduced daily variation and reduced reactivity to stress. This blunting of stress reactivity is associated with greater disease progression and shorter survival times for many types of cancers. It’s possible that somehow preventing this blunting may improve patient outcomes. Prior research shows that mindfulness-based interventions (MBIs) can limit cortisol blunting across the day in breast and prostate cancer patients. Black et al. [Cancer](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5491542/) conducted a randomized, controlled test of whether a brief mindfulness activity could reduce the blunting of acute cortisol reactivity in colorectal cancer patients undergoing chemotherapy infusion.

The researchers randomly assigned 57 adults with colorectal cancer (average age = 54 years; 51% Male; 66% non-Hispanic, 33% Hispanic/Latino) who were undergoing chemotherapy infusion to one of three conditions: 1) a standard chemotherapy control group, 2) a chemotherapy + cancer education attention control group, and 3) a mindfulness meditation + cancer education group. Saliva samples (to assess cortisol levels) were drawn four times during the hour-long chemotherapy infusion: at the start of infusion and at three 20-minute intervals thereafter. The patients also completed self-report measures of stress, anxiety, depression, and fatigue during the past week, as well as general levels of mindfulness (using a short form of the Mindfulness Attention Awareness Scale) after the saliva collections.

The patients in the attention control group read a cancer education module during the first 20 minutes of their hour-long infusion, then rested for the remaining 40 minutes. The patients in the mindfulness group viewed a guided mindfulness meditation video during the first 12 minutes of their infusion, rested for the next 8 minutes, then read the 20-minute cancer education module, and finally rested for the last 20 minutes. The mindfulness video utilized the body scan, a meditation that emphasizes non-judgmental attention to physical sensations occurring in various areas of the body. After ascertaining that there were no significant differences between the two control groups, the data from the control groups were combined for statistical analysis.

The mindfulness group showed a significantly greater cortisol response (a greater cortisol increase from baseline) than the combined control groups. At 20 minutes into the infusion, 69% of the mindfulness group showed increased cortisol levels, whereas only 34% of the controls did. Mindfulness for all three groups combined showed a significant negative correlation with self-report measures of fatigue ($r = -0.46$) and depression, stress, and anxiety ($r = -0.54$), but cortisol levels did not correlate with the self-report measures, and there was no difference in the mental state ratings between groups.

This study demonstrates that the body scan can effectively increase cortisol reactivity during the acute stress of chemotherapy infusion. This is important because it represents a brief intervention that can be easily integrated into cancer care that might possibly prevent or reduce the negative cancer outcomes associated with long-term stress response blunting. The lack of correlation between cortisol levels and self-report measures is unsurprising given that the self-report measures...
assessed the patients' mental states over an extended period of time, and not just their acute mental states during the infusion. While it's possible that the mindfulness intervention successfully reversed cancer-induced stress-response blunting during the infusion, the study cannot definitely prove this due to the absence of pre-intervention measures of cortisol response.

When people aren't focused on what they're currently doing, but are instead thinking about the past, or future, or lost in fantasy, they're said to be "mind wandering." Psychologists estimate that people spend almost half their waking hours mind wandering, and that they are less happy when doing so. Can on-line programs intending to support attentional capacities help people decrease mind wandering? In a randomized, controlled study, Bennike et al. [Journal of Cognitive Enhancement] compared the ability of an online mindfulness training program and an online cognitive training program to improve a behavioral measure of sustained attention.

The researchers randomly assigned 137 healthy adult volunteers (average age = 42 years) to either a 4-week mindfulness training using the Headspace application, or a 4-week cognitive training using the Lumosity application. Headspace participants used the online application to practice daily guided meditations that increased in duration over time, starting at 10 minutes daily and ending at 20 minutes daily. Luminosity participants played online games designed to improve memory, attention, cognitive flexibility, processing speed, and problem solving. Lumosity users were instructed to engage in cognitive training for the same durations that Headspace users meditated. Twenty-one participants in each group were excluded from final data analysis either because they failed to show up for post-testing, or because they were discovered to have had prior mindfulness training.

All participants engaged in a Sustained Attention to Response Task (SART) before and after training. Participants were shown a series of digits on a computer screen, and told to quickly press the space bar whenever they saw a number, except for the number 3. The number 3 was presented only 10% of the time, so that participants had to press the space bar 90% of the time and refrain from pressing it 10% of the time. Success at this task requires sustained attention, and mind wandering interferes with performance outcome. All participants also completed a measure of dispositional mindfulness (the Mindfulness Attention Awareness Scale) both before and after intervention.

There was no difference between the groups before training. After training, the mindfulness group showed a significantly greater improvement in SART performance than the cognitive training group. Following training, mindfulness participants correctly refrained from pressing the space bar 68% of the time, while cognitive training participants did so only 56% of the time. Time spent in mindfulness practice correlated (r = .60) significantly with correctly refraining from pressing the space bar, but time spent in cognitive training didn’t correlate with successful performance. Mindfulness scores increased significantly for the mindfulness training group, but not for the cognitive training group. The time spent in mindfulness practice correlated with post-intervention mindfulness scores (r = .32), and post-intervention mindfulness scores correlated with SART performance (r = .39).

The study shows that online mindfulness training can improve mindfulness and sustained attention, whereas the online cognitive training program used in this study did not. Furthermore, it shows that improved mindfulness and improved sustained attention are positively correlated with each other and that both improve with increased mindfulness practice. The study is limited by the fact that SART performance is only an indirect measure of mind wandering, as it may also reflect factors such as impulse control. It is also unclear, given the limited published research to date, whether Lumosity should be considered a valid and effective cognitive training application, or whether it served more as a placebo comparison in this study.
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Conference outline
July, 10th 2018
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July, 11th-13th 2018
Conference

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Mark Williams, Ruth Baer, Ron Epstein, Stephen and Martine Batchelor, Judson Brewer and others

Scientific Chairs
Prof.dr. Anne Speckens
Radboud University

Prof.dr. Susan Bögels
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### Interventions

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

- **Alhusen, J. L., Norris-Shortle, C., Cosgrove, K., Marks, L. (2017).** "I’m opening my arms rather than pushing away:" Perceived benefits of a mindfulness-based intervention among homeless women and young children. *Infant Mental Health Journal.* [link]

- **Ardito, R. B., Pirro, P. S., Re, T. S.,...Gianotti, L. (2017).** *MBSR program on chronic low-back pain: A study investigating the impact on endocrine, physical, and psychologic functioning.* *Journal of Alternative and Complementary Medicine.* [link]


- **Duncan, L. G., Cohn, M. A., Chao, M. T.,...Bardacke, N. (2017).** *Benefits of preparing for childbirth with mindfulness training: A RCT with active comparison.* *BMC Pregnancy and Childbirth.* [link]


- **Gotink, R. A., Younge, J. O., Wery, M. F.,...Hunink, M. M. (2017).** *Online mindfulness as a promising method to improve exercise capacity in heart disease: 12-month follow-up of a RCT.* *PLoS ONE.* [link]

- **Grazzini, L., D’Amico, D., Raggi, A.,...Sansone, E. (2017).** *Mindfulness and pharmacological prophylaxis have comparable effect on biomarkers of inflammation and clinical indexes in chronic migraine with medication overuse: Results at 12 months after withdrawal.* *Neurological Sciences.* [link]


Johannsen, M., Sørensen, J., O’Connor, M.,...Zachariae, R. (2017). MBCT is cost-effective compared to a wait-list control for persistent pain in women treated for primary breast cancer-results from a RCT. *Psycho-Oncology*. [link]


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**ASSOCIATIONS**

*Articles examining the correlates and mechanisms of mindfulness*

performance monitoring in meditators. *Mindfulness.* [link]


Pickard, J. A., Townsend, M., Caputi, P., Grenyer, B. F. (2017). Observing the influence of mindfulness and attachment styles through...
mother and infant interaction: A longitudinal study. Infant Mental Health Journal. [link]


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Methods

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


intervention for persons with sickle cell disease: Study protocol for a RCT. *Trials*. [link]


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**REVIEWS**

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


Chiesa, A., Fazia, T., Bernardinelli, L., Morandi, G. (2017). *Citation patterns and trends of systematic reviews about mindfulness. Complementary Therapies in Clinical Practice*. [link]


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**TRIALS**

*Research studies newly funded by the National Institutes of Health (MAY 2017)*

Johns Hopkins University (E. Reider, PI). *Mindfulness training with HIV-positive youth and adult family members to improve treatment adherence. NIH/NCCIH project #5K01AT009049-02*. [link]
The social pain associated with rejection or embarrassment activates some of the same brain structures that are activated during the experience of physical pain. These brain structures are also activated when we witness someone else’s embarrassment. Feeling distressed over someone else’s embarrassment can cause us to focus on reducing our own distress rather than on responding compassionately to the other person. In this way, excessive empathic distress paradoxically decreases our ability to relate compassionately.

Can mindfulness reduce the magnitude of empathic distress caused by another’s social pain, thereby facilitating increased compassion? Laneri et al. [Human Brain Mapping] explored how both mindfulness meditation and long-term meditation practice affect the brain mechanisms associated with empathic distress in long-term meditators and matched controls.

The researchers recruited 32 long-term meditators (average age = 51 years, 63% male, average length of meditation practice = 17 years, meditation practice = Zen, Vipassana, or Mindfulness Meditation) and 19 matched meditation-naïve control participants. All of the participants underwent functional magnetic resonance imaging (fMRI) while engaging in a task designed to elicit empathic distress at someone else’s embarrassment.

Half of the long-term meditators were randomly assigned to engage in mindfulness meditation for eight minutes immediately before participating in the fMRI-monitored task, while the other half were instructed to merely rest prior to the task. The meditation-naïve controls also merely rested prior to the task.

The empathy-for-embarrassment task involved viewing a set of embarrassing and neutral social situations presented on a computer screen in the form of drawings accompanied by brief descriptions. As an example, one of the embarrassing situations included the description, “You are at a post-office; you observe a woman’s trouser ripping while she bends down to lift a package.” Participants were asked to vividly imagine the situations while undergoing fMRI scanning and rate how embarrassed they thought the person in the drawing might be. Afterwards participants completed self-report measures of their own emotional reactivity to the situations and their level of compassion.

Participants in all groups reported a significantly greater degree of vicarious embarrassment for the embarrassing drawings as compared to the neutral drawings. Long-term meditators reported significantly higher levels of compassion than did controls (Cohen’s d = 1.2). There was significantly greater activation in several brain regions for all groups of participants while viewing the embarrassing pictures including regions involved in the experience of pain (the anterior insula and anterior cingulate cortex) and a region involved in imagining situations from another’s perspective (the medial prefrontal cortex).

Long-term meditators who meditated prior to viewing the drawings showed significantly less activation of the anterior insula than did long-term meditators who rested before viewing the drawings. For long-term meditators, the less their anterior insula activation, the greater their self-rated compassion (r=-.36). For the long-term meditators who engaged in mindfulness before viewing the situations, the longer they meditated in their regular daily practice, the less their anterior insula activation while viewing the drawings (r=-.42).
The study shows that while a history of long-term meditation practice doesn't alter activity in the brain regions responsible for empathic distress, meditating immediately before viewing another's embarrassment does. Decreased anterior insula activation was associated with greater self-ratings of compassion in long-term meditators.

These results support the idea that if people can use mindfulness to control their level of empathic distress, they can rely on their ability to see things from another's perspective to generate increased compassion. This study also replicates earlier research regarding the brain structures involved in processing social embarrassment. The study lacked a comparison group of meditation-naive participants who engaged in mindfulness practice just prior to viewing the embarrassing situations. This makes it harder to disentangle the effects of long-term practice from the short-term effects of meditating during the experiment.

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One in five breast cancer survivors report significant pain that persists years after the conclusion of medical treatment. Persistent post-treatment pain reduces cancer survivors’ quality of life and contributes to greater health care costs due to increased medical visits and medication usage. While mindfulness-based interventions have been shown to reduce pain in cancer survivors, little is known about the overall cost effectiveness of these interventions.

Johannsen et al. [Psycho-Oncology] analyzed data from a previously published randomized, controlled trial of Mindfulness-Based Cognitive Therapy (MBCT) to reduce pain in breast cancer survivors, in order to explore its cost effectiveness.

The researchers randomly assigned 129 Danish female breast cancer patients who had completed treatment and reported persistent pain to either an 8-week trial of MBCT or a wait-list control group. Health care utilization and cost analyses were performed only for a subset of 84 patients for whom there was no missing data. The MBCT intervention followed the standard weekly two-hour group protocol.

Subjective pain ratings were collected from the patients at baseline, immediately at the end of the intervention, and at 3 and 6-month follow-up. The treatment was deemed a success if a patient decreased her pain by at least two points on a 10-point rating scale, which was deemed to be the minimal clinically meaningful difference. A Danish national health registry was the source of information about healthcare utilization and prescription medication usage and costs during the 6-month follow-up period.

As previously reported, 53% of the MBCT patients reduced their pain by at least two points, whereas only 29% of the wait list controls did. MBCT patients made significantly fewer visits to general practitioners, medical specialists, physical therapists and psychologists. They also had fewer hospital visits and shorter hospital stays during the six-month follow-up period than did controls. MBCT patients filled significantly more prescriptions for tricyclic antidepressants (an average of 1.84 vs. 1.03 prescriptions per patient) than controls.

Total average health care utilization costs for the 6-month follow-up period (all medical visits, hospital stays, and medication) came to $1,911 per MBCT patient and $2,728 per control, an average cost saving of $817 for MBCT patients.

The study demonstrates that MBCT resulted in reduced pain, medical utilization, and medical costs compared to a wait-list control for breast cancer survivors with persistent post-treatment pain. Study limitations include the absence of an active control or an analysis to the degree to which greater tricyclic antidepressant use might have contributed to reduced pain and medical utilization.
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Judith Simmer-Brown Naropa University
Éliane Ubalijoro McGill University

Additional speakers to be announced

Rhonda Magee
University of San Francisco

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How do mindfulness and compassion practices support us in the work of educating for not merely radical but revolutionary social change? In this presentation, Prof. Magee identifies research and practices that support the communion of inner work, interpersonal work, and systemic change. She challenges contemplative educators, administrators and leaders to make revolutionary mindfulness the foundation of our work.

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**Interventions**

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American Mindfulness Research Association

feeding study. European Journal of Cardiovascular Nursing. [link]


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Articles examining the correlates and mechanisms of mindfulness


**METHODS**

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


Alzheimer’s disease is a progressive brain disease affecting some five million older Americans. Given the profound personal, social, and economic costs of this disease, scientists are seeking ways to prevent its occurrence and progression. One avenue of investigation involves a protein called Repressor Element 1-Silencing Transcription Factor or REST. REST plays an important role in helping developing cells differentiate as neurons and protects aging brain cells from stress and toxicity. People with Alzheimer’s have low REST levels, while older adults who retain their cognitive function well into their 90s and 100s have high REST levels. Also, older adults who show neurological changes typical of Alzheimer’s do not progress to show behavioral signs of the disease if their REST levels remain high.

Can raising REST levels reduce the risk for Alzheimer’s? Ashton et al. [Translational Psychiatry] explored this question using a new method for measuring REST in blood plasma. First they investigated whether this new REST measure in blood could discriminate between different levels of Alzheimer’s risk. Second, they studied whether Mindfulness-Based Stress Reduction (MBSR) improved REST levels in a population at risk for potentially developing Alzheimer’s.

The first study compared plasma REST levels in three groups of older (65 years or older) adults: 65 adults with Alzheimer’s, 65 adults with mild cognitive impairment, and 65 healthy adults. There was a significant difference between the Alzheimer’s group and both the healthy and mildly cognitively impaired groups. Mean REST levels were lowest for Alzheimer’s patients (112 pg mL⁻¹) and highest for healthy controls (199 pg mL⁻¹), with mildly cognitive impaired patients measuring in between (194 pg mL⁻¹). Those mildly cognitive impaired who remained stable over time had higher REST levels (208 pg mL⁻¹) than those who eventually progressed to Alzheimer’s diagnosis (180 pg mL⁻¹).

The group with Alzheimer’s underwent magnetic resonance imaging (MRI) as well as testing for levels of 25 different plasma proteins known to be associated with cognitive decline and progression to Alzheimer’s. Higher REST levels were significantly correlated with increased hippocampal (r = .24), entorhinal cortex (r = .30), and whole brain (r = .21) volume as well as with four of the plasma markers (BDNF, NSE, PAI-1, and RANTES) associated with cognitive decline. BDNF plays a neuroprotective role and RANTES is involved in the immune response, whereas NSE is associated with neuronal injury and PAI-1 with aging, anxiety, and depression.

The second study included 81 older adults (65 years or older) who were either depressed or anxious and who reported subjective symptoms of cognitive impairment and were thus considered to be at risk for Alzheimer’s. They were randomly assigned to either an 8-week MBSR program, or an 8-week health education control group emphasizing factors such as healthy eating and medication management. All participants were assessed at baseline and after intervention for plasma REST levels, plasma markers associated with cognitive decline, measures of short-term and delayed memory and executive function, and measures of anxiety, depression, and worry.

MBSR and control participants had significantly different REST levels at baseline, but not after the intervention. This was due to a 39 pg mL⁻¹ REST increase in MBSR participants which was not matched by a similar rise in control participants. Increased REST levels in MBSR and controls were significantly correlated with decreased depression and anxiety, but not with changes in cognitive functions or worry. REST levels at baseline were significantly positively correlated with three of the plasma proteins associated with cognitive decline (BDNF, RANTES, and PAI-1), but none of these markers changed significantly from baseline to post-intervention.
The study shows that plasma REST levels are associated with Alzheimer’s and mild cognitive impairment, and that REST levels can be increased through mindfulness training with concomitant improvements in depression and anxiety. Longer-term studies are needed to discover the degree to which MBSR-increased REST levels persist over time, and whether they can play a role in the prevention of Alzheimer’s.

Waiting to learn the outcome of an important event can be quite stressful. People employ a variety of strategies to cope with waiting. These may include, “bracing for the worst” or trying to maintain a positive attitude, but the employed strategies are often ineffective and sometimes counterproductive. For example, “bracing for the worst” can help when deployed at the very end of a waiting period but make things worse if engaged right from the outset. In two related studies, Sweeney et al. [Personality & Social Psychology Bulletin] first explored how mindfulness disposition affects coping when people wait for their performance results. They then tested whether mindfulness meditation outperforms loving-kindness meditation in helping people cope with this stressful waiting period.

In the first study, 150 law school graduates (61% female; 61% Caucasian) completed questionnaires at five different times during the 4-month period of waiting for their bar exam results. The first questionnaire was completed three days after taking the bar exam, the last within a day of getting their results. The questionnaires assessed mindfulness disposition (using the Freiburg Mindfulness Inventory), “bracing for the worst,” “hoping for the best,” and self-rated coping and worry. The results showed that more mindful graduates used “bracing for the worst” significantly less, and reserved it only for the end of the waiting period when it was likely to be of actual benefit. More mindful graduates were also significantly more likely to maintain an optimistic mindset, worry less, and report better coping.

In the second study, 90 law school graduates (56% female; 61% Caucasian) completed a questionnaire assessing dispositional optimism and intolerance for uncertainty one week before taking their bar exam. Participants were then randomly assigned to receive either a 15-minute Mindfulness Meditation (MM) video or a 15-minute Loving-kindness Meditation (LKM) video, with instructions to practice the meditations twice weekly while awaiting their exam results. The participants completed six more questionnaires over the 4-month study, the last one within one day of receiving their exam results. The questionnaires measured the same variables (coping mechanisms, coping, and worry) as the first study. Participants also rated how much they practiced and how they felt about meditating. The participants tended to practice the 15-minute meditations only once a week on average; only 41% practiced twice weekly as instructed.

Results showed that participants who tended to be pessimistic and intolerant of uncertainty at baseline coped significantly better with waiting for their results if they practiced MM than if they practiced LKM. On the other hand, the type of meditation practiced made no difference for those who tended to be optimistic and tolerant of uncertainty. Similarly, the participants who were most intolerant for uncertainty were significantly more likely to reserve that coping mechanism for the end of the waiting period if they engaged in MM, but not if they engaged in LKM. The meditations did not significantly impact worry or maintaining an optimistic attitude.

The findings suggest that a mindful disposition enhances coping during a stressful waiting period. Further, practicing mindfulness meditation has a beneficial effect on those who need it the most: people who are pessimistic and have trouble tolerating uncertainty. Mindfulness meditation did not reduce worry or increase optimism, but instead, helped participants to use “bracing for the worst” more strategically. The study is limited by the low intensity of its mindfulness intervention and low level of meditative practice by participants.
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MINDFULNESS RESEARCH MONTHLY

Interventions
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Panno, A., Giacomantonio, M., Carrus, G.,...Mannetti, L. (2017). Mindfulness, pro-

environmental behavior, and belief in climate change: The mediating role of social dominance. Environment and Behavior. [link]


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mindfulness and compassion in Latin countries? *Frontiers in Psychology.* [link]


TRIALS

*Research studies newly funded by the National Institutes of Health (JUL 2017)*

Columbia University Health Sciences (C.E. Monk, PI). Preventing postpartum depression: A dyadic approach adjunctive to obstetric care. NIH/NIHCCH project #1R01HD092062-01. [link]

Northwestern University at Chicago (D. Victorson, PI). Creating and optimizing mindfulness measures to enhance and normalize clinical evaluation (COMMENCE). NIH/NCCIH project #1R01AT00939-01. [link]

Ohio State University (R.S. Prakash, PI). Mindfulness-based intervention and transcranial direct current brain stimulation to reduce heavy drinking. NIH/NIAAA project #5R21AA024926-02. [link]

University of New Mexico (K. Witkiewitz, PI). Mindfulness-based intervention and transcranial direct current brain stimulation to reduce heavy drinking. NIH/NIAAA project #5R21AA024926-02. [link]

University of Washington (M.P. Jensen, PI). Hypnosis and meditation for pain management in veterans. NIH/NCCIH project #5R01AT008336-04. [link]
A summary of select studies from the issue, providing a snapshot of some of the latest research

Being a good preschool teacher is no easy matter. Good teachers are both self-aware and socially aware. They are sensitive to children's developmental levels, learning styles, familial and cultural contexts, and social and emotional competencies. Good teachers must simultaneously self-regulate their inner emotional states and vigilantly monitor the complexities of classroom process while maintaining a focus on educational goals.

All of this is important because teacher's social and emotional competencies play a crucial role in facilitating preschoolers’ personal and academic growth. This raises the question of how to help teachers develop the personal qualities they need to foster optimum teacher-pupil relationships.

One way might be to help teachers develop higher levels of dispositional mindfulness, or nonjudgmental moment-by-moment attentiveness. This may be especially important when workplace stress—the combined effect of high job difficulty, low perceived support, and low sense of control—makes preschool teaching even harder.

Becker et al. [Journal of School Psychology] analyzed data from an online survey of preschool teachers to test the relationships between teachers’ dispositional mindfulness, their perception of their degree of closeness and conflict with their pupils, and their levels of depression and perceived workplace stress.

The researchers explored data from an online staff wellness survey of 1,001 preschool teachers (98% female; 89% Caucasian; 51% college graduates) working for Head Start in Pennsylvania. The teachers completed self-report measures of the perceived quality of their relationships with their students (closeness vs. conflict), dispositional mindfulness (as measured by the Cognitive and Affective Mindfulness Scale-Revised), depressive symptoms, and perceived workplace stress.

Results showed that higher levels of dispositional mindfulness were significantly associated with higher levels of perceived closeness with students ($r = .20$) and negatively associated with perceived conflict with students ($r = -.28$), depressive symptoms ($r = -.55$), and workplace stress ($r = -.25$).

A path analysis showed that mindfulness’s positive association with student closeness was an entirely direct one, and not indirectly due to mindfulness’s relationships with depressive symptoms or workplace stress. Mindfulness’s negative association with student conflict was primarily direct but there was also an indirect pathway mediated by mindfulness’s association with fewer depressive symptoms.

The study shows that preschool teachers who report being more mindful also report having closer, less conflictual relationships with students, and feeling less stressed and depressed. It adds support to the hypothesis that improving teacher’s mindfulness may improve teacher morale and mental health, as well as teacher-pupil relations.

The study is limited by the absence of a measure of social desirability bias. Additionally, its measure of student-teacher relationships only ascertains teacher perceptions of those relationships. The fact that teachers rated their relationships with students “in general,” makes the results especially vulnerable to reporting bias.
Elderly anxiety and depression sufferers often report subjective problems with memory and cognition. They also perform more poorly on objective measures of short-term memory, verbal fluency, and the ability to ignore irrelevant cues while focusing on a task. Stress can play an important role in worsening anxiety and depression and also in degrading cognitive function. There is evidence that cortisol, a hormone secreted during stress, can have a harmful effect on brain cells in the hippocampus, which may in turn negatively affect memory and cognition. Reducing stress may therefore yield a double benefit: reducing anxiety and depression, and improving memory and cognition.

Wetherell et al. [Journal of Clinical Psychiatry] explored whether Mindfulness-Based Stress Reduction (MBSR) could improve clinical symptoms and cognitive functioning better than a control group in elderly people suffering from anxiety and/or depression who also experience subjective cognitive difficulties.

The researchers randomly assigned 103 elderly patients (average age = 72 years; 75% Female; 83% Caucasian) with clinical diagnoses of anxiety and/or depressive disorders and with subjective cognitive complaints to either an 8-week group MBSR intervention or an 8-week Health Education control intervention. The Health Education groups met for the same frequency and duration as the MBSR groups, but focused on understanding and managing anxiety and depression, eating well, managing medications, and communicating with one’s health care providers.

Patients were assessed at baseline, at the end of the intervention, and at 3-and-6-month follow-ups. Outcomes were assessed on measures of psychiatric symptoms, verbal memory, verbal fluency, the ability to ignore distracting cues and stay focused on a task, mindfulness (as measured by the Cognitive and Affective Mindfulness Scale-Revised), and average peak salivary cortisol. Despite randomization, the health education controls were, on the average, two years older than the MBSR participants, had a higher burden of illness, and were twice as likely to be prescribed antidepressants.

Results showed that MBSR participants had a significantly greater improvement in their immediate verbal recall of words on a list (effect size = 0.28) and information contained in stories (effect size = 0.42) than controls. They also showed significantly greater improvements in depression (effect size = 0.46), worry (effect size = 0.42), and mindfulness (effect size = 0.57).

Blinded raters rated 47% of the MBSR participants as either “much” or “very much clinically improved,” compared to 27% of the health education participants. This greater clinical improvement for MBSR patients was maintained at 3-and-6-month follow-up, when a significant improvement in anxiety also emerged for MBSR participants.

No group differences were found for either verbal fluency or the ability to ignore distracting irrelevant cues. There was no overall group difference in peak cortisol level, but a group difference emerged when only the data from participants with baseline cortisol levels above the median were analyzed. MBSR participants above the median significantly reduced their cortisol levels, while control participants above the median trended towards even higher levels.

The study demonstrates that MBSR significantly improves psychiatric symptoms and immediate verbal recall in elderly patients with depression and anxiety, and lowers peak cortisol levels for patients with high baseline peaks. The failure to document improvement on the other cognitive measures may reflect the insensitivity of the paper-and-pencil measures used. Computer administered tests might have proved more sensitive to change. The study is also limited by baseline differences between the treatment groups. The fact that health education participants were somewhat older, sicker, and more likely to be on medication may account for some of the differences in group improvement.
**Interventions**

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


Kerrigan, D., Chau, V., King, M.,...Sibinga, E. (2017). There is no performance, there is just this moment: The role of mindfulness instruction in promoting health and well-being among students at a highly-ranked university in the united states. Journal of Evidence-Based Complementary & Alternative Medicine. [link]

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Seth Segall, PhD

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METHODS

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Feng, X. J., Krägeloh, C. U., Billington, D. R., Siegert, R. J. (2017). To what extent is mindfulness as presented in commonly used mindfulness questionnaires different from how it is conceptualized by senior ordained Buddhists? Mindfulness. [link]


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David S. Black, PhD, MPH

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TRIALS
Research studies newly funded by the National Institutes of Health (AUG 2017)

Brown University (E. Loucks, PI). Mindfulness influences on self-regulation: mental and physical health implications. NIH/NCCIH project #3UH2AT009145-03S1. [link]

Colorado State University (R. Lucas-Thompson, PI). Decreasing stress and anxiety in adolescents from high conflict homes: Testing a mindfulness group + ecological momentary intervention. NIH/NCCIH project #1K01AT009592-01. [link]

Georgia State University (A. Owen-Smith, PI). Trauma informed mindfulness based yoga intervention for juvenile justice involved youth. NIH/NCCIH project #1R34AT009538-01. [link]

Johns Hopkins University (T. Mendelson, PI). Promoting maternal health and wellbeing in neonatal intensive care through mindfulness. NIH/NCCIH project #1R34AT009615-01. [link]

New York University (A. Shallcross, PI). A telephone delivered mindfulness intervention for patients with comorbid depression and chronic disease. NIH/NCCIH project #5K23AT009208-02. [link]

University of California, Los Angeles (M. Banks, PI). Promoting adherence to anti-hypertensive medications and lifestyle guidelines through mindfulness practice. NIH/NIH project #1F31NR017350-01. [link]

University of California, Los Angeles (M. Irwin, PI). Mindfulness meditation and insomnia in Alzheimer disease caregivers: Inflammatory and biological aging mechanisms. NIH/NIA project #1R01AG056424-01. [link]

University of North Carolina Chapel Hill (S. Gaylord, PI). Making friends with yourself - a depression prevention program for adolescent girls. NIH/NCCIH project #5R34AT008822-02. [link]

University of North Carolina Chapel Hill (M. Schultz, PI). Mindfulness, interoception and stress in type 1 diabetes mellitus self-management among college students. NIH/NINR project #1F31NR017108-01A1. [link]

University of Toronto (Z. Segal, PI). Reducing residual depressive symptoms with web-based mindful mood balance. NIH/NIMH project #5R01MH102229-04. [link]

University of Washington (M. Jensen, PI). Mechanisms of psychosocial treatments for chronic low back pain. NIH/NCCIH project #1R01AT008559-01A1. [link]

Yale University (H. Kober, PI). Regulation of craving: Brief neurocognitive training and neural mechanisms. NIH/NIDA project #5P50DA009241-24. [link]
Highlights

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

Mindfulness-based interventions (MBIs) are founded on the assumption that meditative practice increases mindfulness and that mindfulness, in turn, enhances psychological wellbeing. The evidence supporting this assumption is somewhat mixed. While some studies find that the extent and quality of a meditation practice is positively associated with improvement in mindfulness and wellbeing, others have not. The methodology by which some studies measure a meditation practice may be one reason for these diverse findings.

Some studies do not measure practice on a daily basis, but instead ask participants to estimate the quantity and quality of their practice over a period of weeks or months, increasing the likelihood of measurement error. Lacaille et al. [Journal of Clinical Psychology] investigated the relationship between meditative practice, mindfulness, and wellbeing by having MBI (Mindfulness-Based Stress Reduction or MBSR) participants complete daily diaries that rated these three variables.

The researchers studied the daily diaries of 117 MBSR participants (80% female, 86% Caucasian, 64% between 30-50 years of age) collected over a 49-day period. The MBSR program differed from the standard MBSR protocol by shortening at-home and in-class mindfulness meditation practice periods from 45-60 minutes to 20-30 minutes. Participants were sent daily text messages reminding them to complete online diaries. If participants failed to complete a diary entry that night, they were text messaged again the following morning. If they failed to respond to the second message within 8 hours, they could no longer make an entry for that day. In their diaries, participants indicated whether or not they had practiced, how long they had practiced, and the degree to which they had adhered to the practice instructions. They also responded to questions designed to rate how mindful they had been during the day and their degree of perceived stress, and positive and negative emotions.

The average participant completed 33 daily diary entries, practiced meditation for 29 minutes on 28 of those days, and rated their adherence to instructions as a “6.8” on a ten-point scale. Participants reported significantly greater mindfulness, less perceived stress, and more positive affect on days when they practiced meditation as compared to days when they did not. On any given day, practicing the meditation, longer practice duration, and better practice adherence were significantly associated with greater mindfulness, less perceived stress, greater positive affect, and less negative affect. Analyses of the intercorrelations between variables showed that the effect of the practice was indirect: meditation was mostly associated with increased mindfulness, and increased mindfulness was mostly associated with decreased stress and improved affect. Those participants who practiced meditation for longer periods over the course of the 49-day period reported being significantly more mindful and having significantly less negative affect than those who practiced for shorter periods.

These results support the hypothesis that meditation practice is an active ingredient of conventional MBI programs, providing evidence that the longer and more consistently participants practice meditation, the more mindful they become, and the better they feel. It also shows the importance of daily practice in MBIs since participants felt more mindful and felt better on days when they actually practiced meditation. This study is limited by its correlational as opposed to experimental design. It can prove association between meditative practice and mindfulness and wellbeing, but not causation.
Many forms of meditation, including mindfulness meditation, make use of the breath as a point of attentional focus. Research has shown that meditation on the breath reduces respiration rate, heart rate and blood pressure, and increases heart rate variability. Are these physiological changes the result of the cognitive and affective aspects of maintaining a meditative focus, or are they simply the consequences of breathing more slowly? Bernardi et al. [Psychophysiology] investigated the long- and short-term respiratory and cardiovascular effects of meditation in experienced meditators and controls. In so doing, the researchers hoped to disentangle the physiological effects of slowed breathing from those of a maintained meditative focus.

The researchers recruited 41 participants (22% male, average age = 34 years) with prior meditation experience and 39 meditation-naive (54% male, average age = 25 years) controls. All of the meditators were beginning-to-intermediate yoga practitioners, although some had additional experience with vipassana, mindfulness, transcendental, or mantra meditation. The researchers instructed participants to lie down quietly on their backs with eyes closed while their heart rate, respiration, blood pressure, and arterial, tissue, and brain oxygen levels were monitored under a series of different conditions. The conditions were: 1) baseline measures of normal respiration, 2) two different periods of “paced breathing” during which participants synchronized their breathing to the beats of a metronome to achieve rates of 15 and 6 breaths per minute, 3) two different periods of metronome-paced breathing while silently reciting a mantra, known as “mantra meditation” (also at 15 and 6 breaths per minute), and 4) a five-minute body scan meditation.

The meditators differed from the controls on a variety of measures across all conditions: They tended to have significantly higher levels of blood oxygen saturation (partial $\eta^2=0.19$), brain oxygenation (partial $\eta^2=0.19$), finger tissue oxygenation (partial $\eta^2=0.21$), lower systolic blood pressure (partial $\eta^2=0.07$), and slower baseline respiration levels (partial $\eta^2=0.28$). The body scan significantly decreased blood oxygen saturation in meditators and controls (partial $\eta^2=0.36$), while paced breathing without mantra significantly increased blood oxygen saturation for both groups. Paced breathing with mantra lessened the extent to which blood oxygen saturation increased. Paced breathing by itself, and mantra and body scan meditations by themselves, all significantly lowered brain oxygenation. Adding a mantra to paced breathing lowered brain oxygenation more than paced breathing alone. A similar pattern was observed for finger oxygenation, although it failed to reach significance.

Controls automatically took deeper breaths when breathing at 15 breaths per minute, but meditators did not. Adding a mantra lessened this deepening effect for controls. Both meditators and controls took deeper breaths while breathing at 6 breaths per minute, but adding a mantra lessened this effect for both groups. Breathing tended to be shallower during the body scan meditation, especially for control participants.

While paced breathing without mantra did not affect heart rate, the body scan and paced breathing with mantra slowed the heart rate (partial $\eta^2=0.32$). This effect carried over into a final “at rest” recording period after all interventions were completed. Only paced breathing without mantra increased heart rate variability (partial $\eta^2=0.42$), and none of the conditions acutely affected blood pressure.

The results indicate that meditation induces a hypometabolic state characterized by decreased blood oxygenation, reduced ventilatory stimulus, and reduced heart rate. None of these changes are attributable to changes in respiration rate. On the other hand, the increased heart rate variability sometimes observed in meditation may simply be the result of slowed breathing. The results also show that long-term meditation (at least in the context of yoga practice) helps optimize cardiovascular function as evidenced by increased blood oxygenation, slowed respiration rate, and lower systolic blood pressure.

The fact that all of the meditators were yoga practitioners limits generalization about the long-term cardiovascular benefits of meditation for other types of meditation practitioners.
**INTERVENTIONS**

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


mindfulness research in youth. *International Journal of Applied Positive Psychology.* [link]


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**METHODS**

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

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


Ball, E. F., Nur Shafina, E., Franklin, G., Rogozińska, E. (2017). Does mindfulness meditation improve...
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OCT 2017

MINDFULNESS RESEARCH MONTHLY

American Mindfulness Research Association

TRIALS

Research studies newly funded by the National Institutes of Health (SEP 2017)

Delaware State University (M. Gawrysiak, PI). MBRP for opiate use disorders: Brain and behavioral changes associated with treatment response. NIH/NIGMS project #2P20GM103653-06. [link]

University of Utah (E. Garland, PI). Effects of a mindfulness-oriented intervention on endogenous opioid mechanisms of hedonic regulation in chronic pain. NIH/NCCIH project #5R61AT009296-02. [link]

University of Wisconsin-Madison (R. Davidson, PI). Wisconsin center for the neuroscience and psychophysiology of meditation. NIH/NCCIH project #5P01AT004952-10. [link]

Iris Media, Inc. (A. Wendt, PI). Culturally responsive stress reduction: Mobile mindfulness app to support health promotion for African Americans. NIH/NIMHHD project #1R43MD012284-01. [link]

Johns Hopkins University (T. Mendelson, PI). A trauma intervention to improve mental health and school success for urban eighth graders. NIH/NICHD project #1R01HD090022-01. [link]

Kent State University (D. Fresco, PI). MBSR for high blood pressure: A two-site RCT. NIH/NHLBI project #3R01HL119977-04S1. [link]

Oregon Health and Science University (J. Proulx, PI). Exploring the adoption of mindfulness in Native American communities to address diabetes. NIH/NCCIH project #1K99AT009570-01. [link]

Photozig, Inc. (B. Kajiyama, PI). Mindfulness based cognitive coping mobile app intervention for caregivers of individuals with Alzheimer’s disease. NIH/NIA project #1R43AG058277-01. [link]

Ralph Johnson VA Medical Center (K. Brady, PI). Mindfulness-based recovery in veterans with substance use disorders. VA project #5I01RX001292. [link]

University of Massachusetts Medical School (J. Brewer, PI). Mechanisms of mindfulness for smoking cessation. NIH/NCCIH project #5R61AT009337-02. [link]

University of Pittsburgh (J. Jakicic, PI). Integration of yoga and mindfulness for the treatment of obesity in adults. NIH/NCCIH project #1R34AT009361-01. [link]

University of Utah (J. Fritz, PI). Smart stepped care management for low back pain in military health system. NIH/NCCIH project #1UG3AT009763-01. [link]

University of Utah (E. Garland, PI). Effects of a mindfulness-oriented intervention on endogenous opioid mechanisms of hedonic regulation in chronic pain. NIH/NCCIH project #5R61AT009296-02. [link]

Chronic pain? A systematic review. Current Opinion in Obstetrics and Gynecology. [link]


**Highlights**

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

Roughly half of all substance use program graduates relapse within six months. This has led researchers to seek better ways of reducing the frequency and severity of relapses after treatment. Mindfulness-Based Relapse Prevention (MBRP) is a program offered after residential or intensive outpatient treatment to prevent relapse. It teaches mindfulness skills to help substance users cope more effectively with their cravings. Rather than treating cravings as a danger to be avoided, MBRP approaches cravings as transient mental states that can be investigated and tolerated without triggering relapse.

Using data from a previously published MBRP trial, *Enkema & Bowen [Drug and Alcohol Dependence]* investigated whether MBRP actually weakened the association between craving and substance use. They reasoned that if it did, the link between craving and subsequent use would be weakest for those who practiced mindfulness meditation the most.

The 57 study participants (77% male, 63% Caucasian, average age = 38 years) had been randomly assigned to the MBRP arm of a parent study comparing MBRP to other aftercare programs. The participants had completed either an inpatient or intensive outpatient substance use program before starting MBRP. In the previously published parent study, MBRP participants showed a 54% reduced risk of drug use and a 59% decreased risk of heavy drinking compared with the participants in comparison treatments.

The present study made use of MBRP participants’ reports of the quantity and frequency of their substance use (if any) during the six-month period following completion of the program. The participants also indicated the intensity of their cravings and the extent of their formal (e.g., seated meditation) and informal (e.g., using mindfulness to “urge surf” cravings) mindfulness practice within the week of completing the 8-week MBRP program. The study used the cravings and mindfulness practice data at post-intervention to predict substance use during the six months following MBRP completion.

The intensity of craving at post-intervention was significantly related to the extent of substance use during the six months following program completion. For every single point increase in craving (on a 30-point craving scale), participants used substances an additional 13 days during six-month follow-up.

More frequent and longer periods of formal mindfulness practice significantly weakened the degree of association between cravings and substance use. In other words, for those who practiced more, levels of craving at post-intervention were less predictive of the extent of substance use during follow-up. Informal practice, on the other hand, did nothing to weaken the relationship between cravings and use.

The results are consistent with the theory that mindfulness practice helps substance users maintain their sobriety by weakening the automatic connection between craving and subsequent use. This conclusion is subject to the limitation that the relationship between formal practice and resistance to craving may be due to factors other than mindfulness. For example, participants who are more motivated to practice may also be more motivated to resist relapse.

*Meditation involves the processes of focusing attention, recognizing when the mind has wandered off, and re-establishing focus.*

Neuropsychologists tell us these processes are associated with three large-scale brain networks: a Default Mode Network (DMN) associated with mind-wandering, a Salience and Emotion Network
(SEN) associated with present-centered awareness, and a Central Executive Network (CEN) that helps shift, restore, and maintain focus. When two or more networks change activity in a coordinated manner, they are said to be functionally connected.

Positive functional connectivity occurs when two networks increase or decrease activity in tandem. Negative functional connectivity occurs when increased activity in one network is matched by decreased activity in the other. The degree of functional connectivity between networks is usually averaged over time to yield a single measure. The problem with averaged measures is that they give the illusion that the functional connectivity between networks is static, when in fact, it is ever-changing and dynamic.

**Marusak et al. [Behavioral Brain Research]** studied both the average and the dynamic functional connectivity between these brain networks in children, as well as how these networks are related to children’s self-reported levels of mindfulness and mental health symptoms.

The researchers recruited an economically and racially diverse cohort of 42 children and adolescents (55% female, average age =10 years, age range = 6-17 years). Many of the children were at economic disadvantage and/or at risk for exposure to violence, abuse, and intensive medical treatment. The participants completed self-report measures of mindfulness (using the Child and Adolescent Mindfulness Measure), anxiety and depression. The majority of participants (65%) exceeded the thresholds on these measures for pathological levels of anxiety and/or depression.

All participants underwent functional magnetic resonance imaging (fMRI) while in a resting state. After imaging, the children were questioned about their present, past, and future-centered thinking as well as self-centered and body-centered thinking while undergoing imaging.

The researchers identified five separate states of dynamic functional connectivity between networks. For example, State 2 was characterized by positive connectivity between the DMN and the CEN, negative connectivity between the SEN and the CEN, and negative connectivity between the DMN and the SEN. In comparison, State 4 was characterized by positive connectivity between all networks, while State 5 was characterized by weak connectivity between all networks.

Higher levels of dispositional mindfulness were significantly associated with lower levels of anxiety (r = -.49) and higher levels of present-centered thinking (r = .36) during imaging. More mindful children spent significantly less time in State 2 (r = -.36) and made a significantly greater number of transitions (r = .34) back-and-forth between the five states. More anxious children, on the other hand, made significantly fewer state transitions (r = -.54) and spent a significantly greater time in State 2 (r = .34).

Higher levels of present-centered thought were significantly associated with dispositional mindfulness (r = .36) and with spending less time in State 2 (r = -.35), while past-centered thinking was associated with State 3 (r = .34), and self-centered thinking with State 5 (r = .34).

These results are consistent with mindful children being better able to redirect attention from mind-wandering and self-referential states to present-centered and/or body-centered states. This increased flexibility in transitioning between states may reduce anxiety by preventing children from “getting stuck” in rumination. The fact that mindful children spend less time in State 2 makes sense given that State 2 has high levels of Default Mode Network connectivity, a neurological correlate of mind-wandering. This study is important because it is the first study of mindfulness and dynamic functional connectivity, as well as the first study exploring the neural correlates and mental health benefits of mindfulness disposition in children.
INTERVENTIONS

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


practice in MBCT for perinatal women. *Mindfulness.* [link]


**ASSOCIATIONS**

Articles examining the correlates and mechanisms of mindfulness


Johnson, C., Wade, T. (2017). Which aspects of mindfulness are important to include in adolescent interventions? *Early Intervention in Psychiatry.* [link]


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**METHODS**

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


Kimes, J. G., Jaurequi, M. E., May, R. W., ... Fincham, F. D. (2017). Mindfulness in the context of...
romantic relationships: Initial development and validation of the relationship mindfulness measure. *Journal of Marital Family Therapy.* [link]


**REVIEWS**

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


**TRIALS**

Research studies newly funded by the National Institutes of Health (OCT 2017)

None reported.
Youth living with HIV have to cope not only with the psychological stress of having a chronic disease, but also with the challenges of taking medications regularly and following through with scheduled medical appointments. Successful coping may be particularly difficult for HIV-infected adolescents and young adults who are still developing their self-regulation skills and working through developmental issues regarding identity formation.

Webb et al. [AIDS Care] conducted a randomized, controlled study of Mindfulness-Based Stress Reduction (MBSR) to see if it could enhance psychological wellbeing, self-regulation, and disease management in youth with HIV.

The researchers randomly assigned 72 youth with HIV (age range = 14-22 years; 53% male) to either MBSR or a health education course. The MBSR intervention adapted its vocabulary (but not its content or structure) to better suit the needs of urban youth. The health education course was structured to match MBSR in terms of the number and length of its sessions, as well as its group structure and size. The course was designed to cover topics such as nutrition, exercise and puberty.

Participants completed self-report measures of mindfulness (the Mindful Attention and Awareness Scale), perceived stress, coping styles, aggression, quality of life, and medication adherence at baseline, post-intervention, and 3-month follow-up. They also completed Stroop-like tasks to assess their ability to regulate attention in the presence of interfering emotionally positive, negative, or neutral stimuli.

HIV viral loads (measures of the severity of HIV infection) and CD4 counts (measures of immune system functioning) were obtained from participants' medical records. Participants were categorized as having either low viral loads (under 100 viral copies per mL) or higher viral loads (over 100 viral copies per mL). Low HIV viral loads and higher CD4 counts are markers of more successful disease management. They indicate that an HIV-infected person isn’t progressing towards more advanced stages of the disease and is less likely to spread the infection through bodily fluids.

Of the total sample, 72% of the participants completed their interventions and 55% were available for 3-month follow-up. Attrition rates did not differ between groups. At 3-month follow-up, MBSR participants were significantly more likely to report higher levels of mindfulness, higher levels of problem solving as a coping strategy, and higher levels of life satisfaction. Additionally, these participants were significantly less likely to report being aggressive. MBSR participants also gave significantly more correct Stroop responses when confronted with interference from words with a negative emotional valence at post-intervention. There were no significant between-group differences in perceived stress, tendencies toward rumination and distraction, illness-related anxiety, disease burden, self-reported medication of missed medication doses, or CD4 counts.

MBSR participants were significantly more likely to change their HIV viral loads over the course of the study from high to low (44%) than from low to high (14%). Control group participants, on the other hand, were equally likely to switch viral load categorizations from high to low (27%) and low to high (27%).

The results suggest that MBSR may help reduce high viral loads and maintain low viral loads in HIV-infected youth. This is important because lower viral loads prevent disease progression and lower the risk of transmission. The results also support a role for MBSR in enhancing problem solving, life-satisfaction, and emotional regulation in youth with HIV-infection.

The study is limited by its relatively small sample size and relatively high attrition rate. None of the variables that were significant at 3-month follow up were also significant at immediate post-intervention testing and vice versa, raising concerns about the robustness of the findings.
Are there biological markers for depression that continue to exist even when the depressive symptoms go away? One possible candidate for such a marker is an electroencephalographic (EEG) waveform called error related negativity (ERN). ERN is a sharp negative wave that occurs whenever people make a mistake while performing a task. The waveform begins at the start of the error and peaks shortly thereafter. ERNs occur even when people are not consciously aware of having made a mistake.

In healthy individuals, larger ERNs are associated with better executive and attentional control and enhanced self-regulation. People with depression, however, typically have smaller ERNs. When their depressive symptoms improve with treatment, their ERNs continue to be smaller than those of healthy individuals. This raises the possibility that smaller ERNs reflect an underlying biological vulnerability to depression.

Fissler et al. [Cognitive and Affective Behavioral Neuroscience] sought to discover whether brief mindfulness training could help improve ERNs in people with chronic depression.

The researchers recruited a sample of 68 patients (average age = 39 years; 61% female) with histories of chronic or recurring major depression who were currently depressed. They also recruited a comparison sample of 25 healthy controls. Participants had their EEGs recorded while performing a sustained attention task. A series of digits were displayed individually on a computer screen and participants were told to push the keyboard space bar whenever they saw the digits “0” through “2” and “4” through “9,” but to withhold responding whenever they saw a “3.” The researchers then recorded the total number of errors made to the number “3” and the average ERN magnitude when those errors were made.

Following the initial assessment, members of the depressed sample were randomly assigned to either two weeks of mindfulness training or resting control training. Both trainings were delivered in a series of three 1.5-hour individual sessions accompanied by daily home practice. The mindfulness training required 25 minutes of formal guided home meditation practice twice a day. The meditative practices followed the sequence typically used in Mindfulness-Based Cognitive Therapy. Control group participants engaged in two 25-minute rest periods a day. They were told that the rest would reduce stress and help them to disengage from their negative thinking. Mindfulness participants believed their intervention to be significantly more plausible than control group participants ($\eta^2 = .23$) Both groups of participants with depression repeated the EEG-monitored sustained attention task following their respective interventions.

The researchers analyzed data for 59 depressed participants and 18 healthy controls who made multiple mistakes on the sustained attention task. Depressed patients made significantly ($\eta^2 = .12$) more mistakes (mean = 26) than healthy controls (mean = 16). Depressed patients also had significantly smaller baseline ERNs than healthy controls. The magnitude of depressed patients' ERNs were uncorrelated with the severity of their psychiatric symptoms.

Participants with depression in the mindfulness group showed both greater psychiatric symptom improvement ($\eta^2 = .23$) and greater ERN improvement in their frontal brain regions than did participants with depression in the control group ($\eta^2 = .08$). ERN improvement was uncorrelated with improvements in psychiatric symptoms.

The results show that a brief mindfulness intervention can improve ERN in people with depression. This is important because a larger ERN is associated with better cognitive control and self-regulation, whereas a smaller ERN may indicate a vulnerability to depression. It’s possible that enhancing ERN may lower the risk of future depressive recurrence. The fact that participants found the mindfulness group more creditable than the control group raises the possibility of different group motivation levels.
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van der Zwan, J. E., de Vente, W., Huizink, A. C., de Bruin, E. I. (2017). The effects of physical activity, mindfulness meditation, or heart rate variability biofeedback on executive functioning, worrying, and mindfulness. *Biological Psychology.* [link]


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**ASSOCIATIONS**

*Articles examining the correlates and mechanisms of mindfulness*

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Banerjee, M., Cavanagh, K., Strauss, C. (2017). **Barriers to mindfulness: A path analytic model exploring the role of rumination and worry in predicting psychological and physical engagement in an online MBI.** *Mindfulness.* [link]


Kumar, M., Kalakbandi, V., Prashar, S.,...Parashar, A. (2017). **Overcoming the effect of low self-esteem on public speaking anxiety with MBIs.** *Decision.* [link]


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**METHODS**

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


management among cancer patients: A study protocol. Research in Nursing & Health. [link]

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**REVIEWS**

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


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**TRIALS**

Research studies newly funded by the National Institutes of Health (NOV 2017)

Northwestern University (D. Victorson, PI). Reducing the effects of surveillance stress, uncertainty and rumination thru engagement in mindfulness education. NIH/NCI project# 5R01CA193331-03. [link]

University of Wisconsin-Madison (R. Davidson, PI). Wisconsin center for the neuroscience of psychophysiology of meditation. NIH/NCCIH project# P01AT004952-10S1. [link]
Highlights

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

Mindfulness may improve not only the way we feel inside, but also the way we behave towards others. Researchers are interested in whether mindfulness can decrease aggression either by transforming hostile feelings, or altering the way people respond to them. Desteno et al. [Mindfulness] conducted a randomized controlled study of whether mindfulness training can reduce feelings of anger and/or overt aggression better than a control intervention.

The researchers randomly assigned 77 meditation-naive college students (age range =18-24 years) to either a mindfulness meditation training or a control intervention. Each intervention consisted of twenty-one brief (approximately 15 minutes long) practice sessions over the course of 3 weeks.

Meditation participants engaged in guided breath, body, and mind-focused meditations that included monitoring mind-wandering and adopting a non-judgmental attitude. Training sessions were delivered via the Headspace smartphone app. Control participants logged onto a website each day to solve word and geometric puzzles, analogies, and similar problems. Attrition was equally high in both groups, and only data from 46 participants were included in the analyses.

Following training, participants were invited into the laboratory for “cognitive” testing. After completing a Stroop task measuring cognitive executive function, participants were introduced via videoconferencing to a person they thought was a fellow research participant. They were then asked to compose a two-minute speech on their life goals and deliver it to their video-conferenced peer. Afterwards, they were presented with what was said to be their peer’s written evaluation of their performance.

Their “peer” was not a fellow participant, but a previously videotaped research confederate, and the “feedback” they received evaluated their speeches as “boring” and “a complete waste.” Participants then rated their emotions and were offered an opportunity to aggress against the research confederate. They were told to prepare a “taste test” for the confederate who “hated spicy food.” They could fill a cup up with as much hot sauce as they wanted for the confederate to drink. The amount of hot sauce poured was the measure of aggression.

Meditators and controls rated themselves as equally angry after the negative feedback. Meditators, however, added significantly less hot sauce to the cups they were preparing to give to the confederate (Cohen’s d = 0.84). Meditators added 3 grams, while controls added 7 grams. Meditator’s lower level of aggression couldn't be attributed to improved executive function as there was no difference between meditators and controls on the Stroop task.

The results show that young adults who participated in an app-based meditation training were less aggressive after receiving critical feedback, but not less angry. It suggests that being mindful doesn't interfere with experiencing emotions, but changes how one responds to them.

When workplace conflicts boil over into outright expressions of hostility, employees may feel harmed and mistreated and workplace functioning is disrupted. Liang et al. [Journal of Applied Psychology] conducted a series of four studies to test if mindfulness plays a role in decreasing hostile and aggressive behavior in places of employment.

The first three studies examined whether mindful awareness and acceptance can weaken the link between feelings of hostility and the overt expression of those feelings. The fourth study explored the ways in which mindfulness might accomplish this.
The first three studies used employees from Amazon MTurk (average age = 36-39 years; 44%-48% male), a crowdsourcing Internet marketplace, as participants. The fourth study drew employees (average age = 37 years; 49% male) from a larger employee database.

In the first study, 101 employees visualized and described a past negative incident with their supervisor. Participants were then randomly assigned to either a mindful awareness, mindful acceptance, or mind wandering condition. In each condition, participants read flashcard statements designed to elicit one of these mental states. The cards included statements like “consciously attend to your breath for a few seconds” or “let your mind wander to whichever thought it wants.”

Afterwards, participants were presented with a voodoo doll representing their supervisor and asked how many pins they would like to stick in it. The flashcards participants read affected how many pins they chose to use (partial $\eta^2=.07$). The mindful awareness group used significantly fewer (6 pins) than the mind-wandering group (15 pins). The mindful acceptance group (8 pins), however, didn't differ significantly from the mind-wandering group.

In the second study, 342 employees completed the Mindful Attention and Awareness Scale (MAAS), the Acceptance sub-scale of the Philadelphia Mindfulness Scale (PMS), and a self-report measure of feelings of hostility towards their supervisors. They also rated how often they acted hostilely towards their supervisors by being rude, making fun of them, etc. The results showed that when mindful awareness was low, the positive relationship between hostile feelings and hostile actions was significantly stronger than when mindful awareness was high. Mindful acceptance had no significant effect.

In the third study, 82 employees completed daily surveys measuring their hostile feelings and actions towards their supervisors over the course of a workweek. They also completed measures of daily mindful awareness (adopted from the MAAS) and daily mindful acceptance (from the PMS). Hostile feelings and actions were significantly positively correlated when mindful awareness was low, but not when it was high. Mindful acceptance did not have a similar effect.

The fourth study explored whether mindful awareness weakens the link between hostile feelings and aggressive actions by decreasing either “surface acting” or rumination. “Surface acting” is pretending to be friendly while hiding one’s true negative feelings.

A total of 204 employees completed 3 online surveys spaced one week apart. The first survey assessed hostile feelings towards supervisors; the second assessed surface acting and rumination; the third assessed mindful awareness and expression of hostility toward supervisors. Mindful awareness, anger, and expressed hostility were measured as in the second study. Surface acting was assessed by self-ratings of how often employees hid their true feelings or pretended to feelings they didn’t have. Rumination was measured by self-ratings of the frequency of intrusive supervisor-related thoughts.

Once again, higher levels of mindful awareness significantly weakened the link between angry feelings and hostile actions. Higher levels of mindfulness were significantly associated with lower levels of surface acting and rumination. When surface acting was high, there was a significant association between feeling angry and expressing hostility, but not when surface acting was low. Levels of rumination, however, didn’t affect the strength anger-expressed hostility link.

Altogether, these results show that mindful awareness weakens the link between experiencing anger and expressing hostility in the workplace. Mindful awareness promotes self-control without resorting to the faking of positive emotion. Employers wanting to reduce workplace aggression might consider either hiring employees who are higher in trait mindfulness, or offering mindfulness training as part of a conflict-management intervention in the workplace.