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intervention for adolescent insulin resistance. *Frontiers in Psychology.* [link]


**METHODS**

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


Environmental Research and Public Health. [link]


**REVIEWS**

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


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potential. Current Opinion in Supportive and Palliative Care. [link]


Rockwell, D. (2019). Mindfulness in psychotherapy and love as the healing balm. The Humanistic Psychologist. [link]


TRIALS

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

Pennsylvania State University (N. Raja-Khan, P1). RCT of a six-month mindfulness-based intervention for type 2 diabetes. NIH/NIDDKD project #1R01DK119379-01. [link]
Highlights

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

There are certain similarities between the increased awareness associated with the practice of mindfulness and the expanded consciousness associated with the use of psychedelic substances. Both are capable of promoting states of self-transcendence in which the boundary between one’s self and the world is erased, leading to a boundless sense of connection with the universe.

Smigielski et al. [Neuroimage] experimentally tested the effects of psilocybin, a psychedelic mushroom plant derivative, on self-reported, neurological, and behavioral outcomes among experienced meditators attending a meditation retreat.

The researchers randomly assigned 38 experienced meditators (average meditation experience = 5,000 hours; 61% male; average age = 52 years) on a five-day Zen meditation retreat to a psilocybin or placebo control condition. On the morning of the fourth retreat day, participants were administered either psilocybin (315 μg/kg) or a placebo (lactose), and continued on with the regular retreat schedule. The research participants and assessors were blinded to the study group assignment. Six hours after psilocybin or placebo administration, participants completed a questionnaire measuring psychological factors such as “oceanic self-boundlessness,” “dread of ego dissolution,” visual and auditory hallucinations, synesthesia, and “vigilance reduction.”

On the day before and after the retreat, participants underwent brain imaging (fMRI) to measure functional connectivity in the Default Mode Network (DMN) while resting, while engaging in focused attention meditation, and while engaging in open awareness meditation. The DMN is a network of brain regions that operates collectively when a person is simply resting and “doing nothing.” DMN activity has been implicated in self-referential thinking, maintaining a unitary sense of identity, and maintaining the self-other boundary. Functional connectivity is a measure of the degree to which different brain regions are operationally integrated and display similar patterns of activation. Four months after the retreat, participants completed a self-report measure of changes in attitudes towards self and the world, as well as changes in mood, social functioning, behavior, and spirituality.

The fMRI results showed that the psilocybin group displayed a significantly greater decrease in functional connectivity between two parts of the DMN—the medial prefrontal cortex (mPFC) and the posterior cingulate cortex (PCC)—from pre- to post-test while engaging in open awareness meditation than did the placebo group. Greater decreases in functional connectivity between these brain structures were strongly associated with more profound experiences of oceanic self-boundlessness during drug administration (r = -.60).

Four months later, the psilocybin group reported significantly more positive changes in attitude, mood, and behavior (2.58 points on a 6-point global positive effects scale) than did controls (0.65 points). These persisting positive effects correlated with the magnitude of oceanic self-boundlessness experienced during drug administration (r = .66). Positive changes in attitude, mood, social functioning, behavior, and spirituality were associated with pre-to-post increases in connectivity between the mPFC and PCC while at rest, as well as with decreases between the mPFC and the right angular gyrus during focused attention. There were no adverse effects reported in either group.

This study shows that experienced meditators’ psilocybin-induced self-transcendent experiences are associated with a persistent improvement in their psychological sense of well-being. These self-transcendent experiences are also associated with
functionally changes in the brain which point to the DMN’s critical role in both self-reference and self-transcendence. The study is limited by its small sample size. The researchers caution that the results may only apply to experienced meditators, a cohort that has engaged in extensive mental training. The study did not track the persistence of DMN functional connectivity changes in the follow-up period.

Newly diagnosed breast cancer patients often experience significant psychological distress including symptoms of depression, sleep disturbance, and fatigue. They can also exhibit stress-induced immune system compromises that have the potential to accelerate tumor growth and metastasis. Interventions that restore psycho-immunological balance may also help improve cancer treatment outcomes.

Janusek et al. [Brain, Behavior, and Immunity] tested the effect of Mindfulness-Based Stress Reduction (MBSR) on psychological and immunological functioning in newly diagnosed breast cancer patients in an experimental trial.

The researchers randomly assigned 164 women (average age = 55 years; 77% Caucasian) recently diagnosed with early stage breast cancer who had undergone surgery to either a standard MBSR or an active control condition. The active control consisted of eight 2.5 hour group sessions providing information on breast cancer, cancer treatment, communication with health providers, and other health-related topics. Attendance in both programs was fairly good, with 68% of MBSR and 78% of control participants attending at least 7 of the group sessions. Each participant’s psychological status was assessed pre-intervention, mid-intervention, post-intervention, and at 1- and 6-month follow-ups for perceived stress, depression, sleep quality, fatigue, and mindfulness (Five Facet Mindfulness Questionnaire).

The researchers also measured natural killer cell anti-tumor activity (NKCA), monocyte production of Interleukin-6 (IL-6) and Interferon-gamma (INF-γ), and the amount of IL-6 and Tumor Necrosis Factor-alpha (TNF-α) present in blood plasma. NKCA prevents tumor growth and metastasis, and is thus associated with longer cancer-free periods. NK cells produce INF-γ, an anti-tumor cytokine which is a key immune system activator. IL-6 and TNF-α are pro-inflammatory cytokines that promote tumor progression and aggressiveness.

The results showed that the MBSR group had significantly greater increases in two protective immunological factors (NKCA and INF-γ) and significantly lower levels of two pro-inflammatory factors (IL-6 production and TNF-α plasma levels) than the control group. These differences remained significant at the 6-month follow-up. For example, MBSR INF-γ levels increased by 2,547 pg/ml from pretesting to 6-month follow-up, while control group INF-γ levels increased 973 pg/ml. Similarly, MBSR NKCA increased by 30 lytic units over the same time period, while the control group increased by 0.17 lytic units.

The MBSR group showed significantly more rapid improvements in perceived stress, fatigue, and sleep disturbance. Correspondingly, mindfulness was associated with significantly lower levels of stress, fatigue, and sleep disturbance. Greater improvements in sleep disturbance and fatigue were in turn significantly associated with faster increases in NKCA.

This study shows that MBSR is more useful in improving psychological and immune function in newly diagnosed breast cancer patients than an active control focused on cancer survivor education. It is possible that this experimental intervention may lead to longer cancer-free periods for these patients, although this end outcome was not evaluated. The study also suggests a crucial link between improved sleep and immune system recovery. The study is important because it focuses on recently diagnosed patients who are at a vulnerable point when psychological distress has a significant impact on immune function and the possible progression of disease.
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