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**INTERVENTIONS**

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


Chin, B., Lindsay, E. K., Greco, C. M.,...Creswell, J. D. (2019). *Psychological mechanisms driving stress resilience in mindfulness training: A RCT.* *Health Psychology.* [link]


Karaca, A., Sisman, N. (2019). *Effects of a stress management training program with MBSR.* *Journal of Nursing Education.* [link]


D’Errico, L., Call, M., Blanck, P.,...Mander, J. (2019). Associations between mindfulness and general change mechanisms in individual therapy: Secondary results of a RCT. *Counsel Psychotherapy Research*. [link]


**METHODS**

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


cancer recovery for the prevention of fatigue and other common side effects during chemotherapy. *European Journal of Cancer Care.* [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 (MAY 2019)*

Medical University of South Carolina (B. Froeliger, PI). *Neural mechanisms mediating appetitive regulation and smoking in nicotine addiction.* NIH/NIDA project #1R01DA048094-01. [link]

University of California, Irvine (D. Garfin, PI). *Mindfulness intervention to address PTSD in trauma exposed homeless women.* NIH/NIMHH project #1K01MD013910-01. [link]

Yale University (K Garrison, PI). *Smartband/Smartphone-based automatic smoking detection and real time mindfulness intervention.* NIH/NCCIH project #1R34AT010365-01. [link]
Highlights

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

Telomeres are repetitive nucleotide sequences at the end of chromosomes that protect coding regions of DNA from deteriorating during cell division. Telomeres shorten not only as we age, but also when we are under stress. Shorter telomeres are linked to an increased incidence of age-related diseases such as cardiovascular disease, and to an increased risk of death. The enzyme telomerase lengthens telomeres through the addition of nucleotide repeats.

Preliminary studies show that meditation can have a protective effect on telomeres, most likely by increasing telomerase activity. Specific types of meditation may be more effective than others in maintaining telomere length. Nuygen et al. [Psychoneuroimmunology] tested whether specific types of meditation practice have a protective effect on telomere length.

The researchers randomly assigned recruits to mindfulness meditation (MM), loving-kindness meditation (LKM), or a wait-list control. Their final sample (excluding dropouts and participants with inadequate DNA samples) consisted of 142 meditation-naïve recruits (average age = 49; 70% female; 81% Caucasian). MM and LKM participants attended six, hour-long, group meditation training workshops held once per week. They also received 20-minute audio-recorded guided meditations to assist in daily home practice.

MM training focused on developing open, non-judgmental attention towards breath, bodily sensations, thoughts, and feelings, as well as choiceless awareness. LKM training focused on cultivating warm feelings towards oneself, a loved one, an acquaintance, a difficult person, and all beings. Two weeks prior to the workshops (and three weeks after) participants donated a blood sample that was used to assess white blood cell (monocyte and lymphocyte) telomere length. Participant moods and extent of meditation practice were assessed by daily diary.

All groups showed a decrease in telomere length over the course of the study. The mean decrease in telomere length was significantly less for LKM (-0.03) than for the control group (-0.08). The MM group decrease (-0.06) was midway between the other two groups, and not significantly different from either. The average telomere length decrease for all participants combined was equivalent to a loss of 115 DNA base pairs, which is larger than one might expect over a 12-week period. Other studies suggest white blood cell telomeres shorten by an average of 15-50 base pairs per year. Changes in telomere length were unrelated to participants’ moods or home practice.

This study provides evidence that, in a sample of middle-aged adults, only loving-kindness meditation significantly decreased the degree of telomere shortening over time compared to a control group. The positive emotions associated with loving-kindness meditation may have a protective function in reducing cellular aging and maintaining wellness. Other factors, however, cannot be ruled out. The fact that this effect was unrelated to mood or home meditation practice makes it hard to specify what it is about LKM training that helped.

The study could not rule out changes in the relative proportion of different white blood cell types present in the blood samples over time that could potentially lead to spurious measures of telomere change. The unexpectedly large magnitude of overall telomere shortening over a relatively brief time span also raises the possibility of unknown collection or assay discrepancies between this study and prior studies.
Although most cigarette smokers want to quit, only 5% succeed in doing so each year. One reason for this low success rate is that smoking-related cues stimulate strong urges to smoke. Cues include observing someone else smoking, or engaging in activities previously associated with smoking (e.g., work breaks, meals, a cup of coffee, sex). Finding ways to reduce cue-induced urges may help more people quit.

Research shows that a brain area called the posterior cingulate cortex (PCC) becomes activated whenever cigarette smokers are exposed to smoking-related cues. Research also indicates that mindfulness meditation as an intervention reduces PCC activity. Janes et al. [Neuropsychopharmacology] tested whether a smartphone mindfulness app reduced smokers’ PCC reactivity to smoking-related cues and their smoking behavior.

The researchers recruited 83 adult smokers who were interested in quitting, 67 of whom completed the study and were included in the final data analysis (average age = 44; 67% female; 91% Caucasian). PCC-reactivity to smoking cues was assessed by functional magnetic resonance imaging (fMRI) and participants were then randomly assigned to either mindfulness training or a control condition. Both conditions used smartphone apps for 4 weeks to help quit smoking. Participants’ PCC reactivity to smoking-related cues was re-assessed via fMRI after the intervention.

The mindfulness app consisted of 22 modules that offered daily training videos and on-demand exercises to teach the core elements of mindfulness. The app also helped participants identity triggers, monitor smoking habits, increase awareness of urges, and use mindfulness as a coping mechanism. The control group used the National Cancer Institute’s QuitGuide App to help monitor motivation and triggers, as well as offer inspirational messages and tips for dealing with cravings and moods without mindfulness training.

PCC reactivity was measured by having participants view smoking-related and neutral images while undergoing fMRI scanning. The fMRI scans were analyzed for differences in average PCC activation between smoking-related and neutral images.

Results showed that the mindfulness training group decreased average cigarette use by 11 cigarettes \( (d = 2.5) \) per day, and the control group decreased average use by 9 cigarettes \( (d = 1.28) \) per day. There was no significant difference in the amount of between-group change on this measure. The mindfulness app group showed a significant correlation \( (r = .49) \) between cigarette reduction and the number of app modules completed, but the control group \( (r = .20) \) did not.

Both groups showed high levels of PCC reactivity to smoking-related cues on the fMRI scans at baseline. There were no significant group differences in PCC reactivity change scores over time. Within the mindfulness app group, there was a significant association between decreased PCC cue-related activation \( (r = .39) \) and decreased smoking. There was no such association between changes in PCC activation and smoking in the control group \( (r = .08) \).

On further examination, the correlation between PCC change scores and smoking change was significant for females in the mindfulness app group \( (r = .49) \) but not males \( (r = .08) \). Not all participants showed heightened PCC activation in response to smoking-related cues. Mindfulness participants who showed the greatest reduction in cue-related PCC activity also showed the greatest reduction in smoking \( (d = 0.79) \), yet there was no such association in the control group. At the end of the study, participants in the mindfulness app group were more likely to recommend their app to a friend \( (d = 1.5) \) as compared to those in the control group.

This study suggests that a mindfulness app can reduce smoking through decreased cue sensitivity and decreased PCC reactivity. However, this effect was dependent on the number of app modules completed, and only significant for female smokers. While the National Cancer Institute’s QuitGuide App also reduced smoking, its effect wasn’t associated with changes in PCC reactivity. Some smokers may benefit more from a mindfulness app than others; specifically, women who show strong PCC activation in response to smoking-related cues.