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


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**ASSOCIATIONS**

Articles examining the correlates and mechanisms of mindfulness


Ju, Y. J., Lien, Y. W. (2018). Who is prone to wander and when? Examining an integrative effect of working memory capacity and...
mindfulness trait on mind wandering under different task loads. Conscious Cognition. [link]


Reed, P. (2018). Mechanisms of mindfulness in those with higher and lower levels of autism traits. Mindfulness. [link]


**METHODS**

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


TRIALS

Research studies newly funded by the National Institutes of Health (JUN 2018)

UC San Francisco (J. Felder, PI). Optimizing a MBI for poor sleep quality during pregnancy.
NIH/NCCIH project #1K23AT009896-01. [link]
Highlights

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

Acute respiratory infections including colds and flu affect over 50% of the population annually. Interestingly, our psychological states and behaviors can affect our susceptibility to these infections. People who are under stress or otherwise unhappy are more likely to catch acute respiratory infections, while people who exercise regularly are less likely to catch them.

Barrett et al. [PLOS One] conducted a randomized controlled study to test the effects of Mindfulness-Based Stress Reduction (MBSR) and moderate intensity sustained exercise on the frequency, duration, and severity of colds and flu compared to a control group.

The researchers recruited 413 volunteers (average age = 50 years, 76% female, 85% white, 77% college educated) and randomly assigned them to a MBSR, exercise, or non-active control group. The MBSR and exercise interventions were matched on group size, program length, session frequency, and the amount of home practice (20-45 minutes).

The interventions were conducted in the fall, and participants were monitored for colds and flu from autumn through spring. During this time, participants completed weekly health reports. If participants developed an infection, they completed daily reports until symptoms abated. Additionally, they provided oral and nasal swabs to assess their immune response and identify viruses. Participants completed a variety of mental health and personality measures at baseline and at various points along the study timeline. Absenteeism, the number of respiratory infection-related medical appointments, and illness related costs were also assessed.

The study found that the MBSR and exercise groups both reduced acute respiratory infection incidence, duration, and severity. Compared to controls, the MBSR group showed a 16%, reduction in incidence, a 14% reduction in duration, and a 21% reduction in severity. Compared to controls, the exercise group showed a 10% reduction in incidence, a 16% reduction in duration, and a 31% reduction in severity. All these reductions were statistically significant at p<.05.

Compared to the control group, MBSR and exercise both resulted in significant improvements in a variety of mental health and personality variables including general mental health, perceived stress, sleep quality, depressive symptoms, and self-efficacy. MBSR and exercise groups both improved mindfulness scores on the Mindful Attention Awareness Scale.

In terms of biological measures, the MBSR and exercise group participants who developed an infection both showed a stronger interferon-gamma-induced protein 10 (IP-10) response to infection than the control group participants. IP-10 is part of the body’s response to viral infection and is correlated with reduced viral load and recovery from infection.

The study shows that MBSR and exercise both significantly reduce cold and flu frequency, length, and severity, along with providing general mental health benefits. The authors suggest that the magnitude of MBSR and exercise benefit may be similar to that of other preventative interventions such as flu vaccination. Depending on the year and the variable under study, the reduction of flu incidence and severity due to vaccination ranges from 13-70%. By way of comparison, MBSR cold and flu incidence, duration, and severity reduction rates in this study and one previous study ranges from 14-60%.
Social rejection can be hurtful, but people differ in how distressed they become following rejection. People also vary in the strategies they use to reduce distress. Some people subdue feelings of distress by employing a “top-down” strategy in which cognitive-related brain centers suppress the activity of emotion-related brain centers. This “top-down” strategy is taxing on cognitive resources, and if those resources become depleted, feelings of distress can re-emerge. Other people employ “bottom-up” strategies such as mindfulness of negative emotions that do not require suppression by cognitive-related brain centers.

Martelli et al. [Social Cognitive and Affective Neuroscience] studied whether highly mindful people feel less distress when socially rejected, and examined whether cognitive- and emotion-related brain responses to rejection varied according to levels of mindfulness.

The researchers assessed dispositional mindfulness levels among 40 participants (54% male, average age = 19 years) using the Mindful Attention Awareness Scale. Participants then played a computerized Cyberball game while undergoing functional magnetic resonance imaging. Cyberball involves a pair of computer-generated characters playing virtual catch with the participant. Participants are misled into believing the computer-generated characters are avatars for real people playing the game. Initially, the computer-generated characters toss the ball between themselves and the participant equally, but in the final minute of play, they toss the ball only between themselves, effectively excluding the participant from the social interaction. Approximately an hour after the game, participants completed a questionnaire measuring their level of social distress. Participants also completed a manipulation check that showed they believed they were playing Cyberball with live co-participants.

The neurobiology of distress and its suppression is complicated. Feelings of distress are associated with increased activity in the dorsal anterior cingulate cortex (dACC), the anterior insula (AI) and the amygdala, while activity in the left ventrolateral prefrontal cortex (VLPFC) down-regulates distress. One might think that the more the VLPFC down-regulates distress, the better we would feel, but things are not that simple. If the VLPFC becomes over-activated, its down-regulatory effect is followed by a refractory period accompanied by rebound distress. This is why top-down VLPFC regulation may not be the best strategy.

The results showed that mindfulness scores were significantly and negatively correlated with distress \( (r=-0.43) \) an hour after rejection, and with VLPFC \( (r=-0.53) \), left amygdala \( (r=-0.44) \) right amygdala \( (r=-0.37) \) and dACC \( (r=-0.34) \) activity during rejection. More mindful participants showed decreased functional connectivity between the VLPFC and the bilateral amygdala and dACC during moments of rejection in the game. The inverse relationship between mindfulness and distress scores was mediated by decreased VLPFC activity during rejection.

The study demonstrates that mindful people are less prone to distress after experiencing social exclusion. Results also show that mindful people are less likely to depend on VLPFC suppression to cope with rejection-related distress. This is important because VLPFC suppression is a “top-down” strategy that taxes adaptive coping resources and, if resources are exhausted, paradoxically leads to increased distress. Higher mindfulness was accompanied by lower levels of amygdala and dACC activity supporting the hypothesis that mindfulness exerts a beneficial effect on lower emotional centers independent of the VLPFC. The study is limited by not adjusting for important covariates of mindfulness such as neuroticism. In addition, the one-hour delay between playing Cyberball and measuring distress limits our understanding of whether VLPFC suppression was initially more successful at reducing distress and only subsequently increased distress, or whether it was an inferior strategy from the start.