“Mindfulness-Based Interventions: What Works Best, For Whom, and Why?”

Day: Wednesday 11th July 2018  
Time: 10.45 – 12.00  
Track: Working Mechanisms

This symposium on mediators, moderators, and biomarkers aims to elucidate who is likely to benefit most from mindfulness training, and why.

The first presenter will describe findings from a systematic review of psychological, neural, and behavioral mechanisms believed to underlie therapeutic change in MBCT. Following PRISMA guidelines, 23 total studies were included. Of those, 12 studies provided support for several theoretically important psychological mechanisms of change in MBCT, including alterations in self-reported measures of mindfulness, rumination, worry, compassion, and meta-awareness. Preliminary support from studies using other methods and measures (e.g., neuroimaging, experimental laboratory tasks, and ecological momentary assessment) was found for several additional candidate mediators, including alterations in attention, memory specificity, self-discrepancy, emotional reactivity, and positive and negative affect sampled during daily life.

The second presenter will describe results from an RCT with 143 participants in an MBSR program, designed to investigate the mediating or moderating effects of two aspects of psychological mindedness: interest and insight in one’s psychological processes.

The third presenter will describe a pilot observational study of MBSR (n=30) designed to evaluate a number of biomarkers, including stress hormones, stress physiology, and stress-related gene expression, that could signify greater levels of mindfulness, when mindfulness is operationalized as a ‘state’, a ‘trait’, and a ‘skill’ (i.e., response to training).

The fourth presenter will present an RCT (n=158) on the effects of MBSR versus music therapy-based stress reduction (MTSR) on psychological symptoms, including depression, stress, and anxiety, as well as leukocyte telomere length (LTL). Taken together, these studies indicate that persons most likely to benefit from MBCT or MBSR experience robust changes in cognitive, emotional, and insight-oriented psychological processes, which may sometimes be marked by objective changes in biological or behavioral measures, from brain activity and cognitive/emotional functioning to gene expression. However, research on LTL may require refinement of methodology before being able to draw strong conclusions.
Symposium overview

Presenter 1  \textbf{Anne Maj van der Velden} - A systematic review of mechanisms of change in mindfulness-based cognitive therapy in the treatment of recurrent major depressive disorder

Presenter 2  \textbf{Ivan Nyklíček} - Psychological effects of Mindfulness Based Stress Reduction: The moderating and mediating roles of psychological interest and insight.

Presenter 3  \textbf{Jeffrey Greeson} - Mindfulomics: Searching for the Molecular “Signature” of Mindfulness

Presenter 4  \textbf{Shian-Ling Keng} - Effects of Mindfulness-based Stress Reduction on Psychological Symptoms and Telomere Length: A Randomized Active-Controlled Trial

Chair:      \textbf{Jeffrey Greeson}
A systematic review of mechanisms of change in mindfulness-based cognitive therapy in the treatment of recurrent major depressive disorder

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Background: The investigation of treatment mechanisms in randomized controlled trials has considerable clinical and theoretical relevance. Despite the empirical support for the effect of mindfulness-based cognitive therapy (MBCT) in the treatment of recurrent major depressive disorder (MDD), the specific mechanisms by which MBCT leads to therapeutic change remain unclear.

Objective: By means of a systematic review we evaluate how the field is progressing in its empirical investigation of mechanisms of change in MBCT for recurrent MDD.

Method: To identify relevant studies, a systematic search was conducted up to March 2014, and studies were coded and ranked for quality. An updated systematic search up to March 2018 will be included.

Results: The first search produced 476 articles, of which 23 were included. 23 studies used self-report measures, two neuroimaging and one study a behavioral paradigm. In line with the theoretical premise, 12 studies found that alterations in mindfulness, rumination, worry, compassion, or meta-awareness were associated with, predicted or mediated MBCT's effect on treatment outcome. In addition, preliminary studies indicated that alterations in attention, memory specificity, self-discrepancy, emotional reactivity and momentary positive and negative affect might play a role in how MBCT exerts its clinical effects. The results of the updated literature search will be included and presented at the symposium.

Conclusion & discussion: The results suggest that MBCT could work through some of the MBCT model's theoretically predicted mechanisms. However, there is a need for 1) more rigorous designs that can assess greater levels of causal specificity, and 2) greater method triangulation across self-report, behavioral and neuroimaging methods. Recommendations for future research on mechanisms for MBCT and other Mindfulness-Based Interventions will be discussed.
Psychological effects of Mindfulness Based Stress Reduction: The moderating and mediating roles of psychological interest and insight

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Background and objectives: Evidence for favorable effects of Mindfulness Based Stress Reduction (MBSR) on mood and psychological well-being is well established. However, the questions for whom MBSR works best and why (moderators and mediators) are far from answered. A concept previously constructed for theory and empirical investigations in other areas of psychotherapy may also have added value in the context of mindfulness: psychological mindedness. This construct may be divided into two main facets: interest and insight in one’s psychological processes. We hypothesized that (i) higher pre-intervention interest would be associated with larger favorable effects of MBSR on mood, distress and quality of life (moderator effect), while (ii) higher increase in insight would mediate these effects, besides the effects of increase in mindfulness skills.

Methods: In a randomized controlled trial, 72 participants followed the 8-week MBSR training, while 71 participants were part of a waiting list control group (mean age 46.1±10.3 years). Before and after the intervention, they completed validated questionnaires on psychological mindedness (BIPM), mindfulness skills, perceived stress, negative and positive affect, and quality of life.

Results: Interest nor insight moderated the favorable effects of MBSR, compared to control, on perceived stress, affect, or quality of life. Bootstrapping procedures for tests of indirect effects (Preacher and Hayes) showed that increase in insight, but not interest, significantly mediated favorable changes on all outcome variables, over and above effects of changes in mindfulness skills. Regarding mindfulness skills, acting with awareness mediated simultaneously the effects on perceived stress, negative affect, and quality of life, while observing simultaneously mediated the effects on positive affect.

Discussion and conclusion: Pre-intervention levels of psychological mindedness could not predict for whom MBSR works best. However, increase in psychological insight during MBSR may form a potentially important mechanism mediating the favorable effects on MBSR on measures of psychological well-being, independently of the mediating effects of mindfulness skills. Future studies may examine if novel techniques to facilitate psychological insight may further boost the effectiveness of MBSR.
Mindfulomics: Searching for the Molecular “Signature” of Mindfulness

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Background & Objectives: Mindfulness can confer resilience to stress, yet the biological mechanisms are unclear. New studies have emerged showing changes in gene expression with mindfulness meditation, a field we term Mindfulomics. Mindfulness, though, is a multifaceted construct; it is at once a state (induced during meditation), a trait (an enduring disposition), and a skill (developed through training). No published studies have examined genomic or other biologic “signatures” of mindfulness to our knowledge.

Methods: Our pilot study on healthy, stressed adults (n=30, F=63%, White=70%, mean age=40) aimed to advance the field by testing the hypothesis that greater mindfulness – operationalized all three ways – is signified by lower levels of stress biomarkers and stress-related/proinflammatory gene expression, using targeted RNA-sequencing (Conserved Transcriptional Response to Adversity [CTRA], 44 genes; NFκB signaling pathway, 105 genes). Biological measures were collected at rest and in response to acute stress in the lab, both before and after an 8-week Mindfulness-Based Stress Reduction (MBSR) program.

Results: Contrary to hypotheses, there were no differences in resting-state blood biomarkers or gene expression post-MBSR, nor any difference in gene expression as a function of either state mindfulness (meditation vs. quiet rest) or trait mindfulness (Cognitive and Affective Mindfulness Scale – Revised [CAMS-R] score; median split). There was a significant decrease in resting-state salivary α-amylase (p<.05) post-MBSR, consistent with lower sympathetic nervous system (SNS) activation. In addition, a trend toward decreased CTRA gene expression was found for MBSR responders who showed a 50% increase in mindfulness (n=14, p=.12). Several changes in stress responsivity were also observed, including decreased emotional reactivity (p<.001), lower BP reactivity (p=.059), and stronger innate immune system reactivity (p=.049 for WBC count; p=.005 for Neutrophils).

Discussion & Conclusion: Collectively, these findings demonstrate evidence for increased resilience to stress after 8-weeks of mindfulness training, using a number of objective biomarkers. Moreover, genomic results suggest that among relatively young, healthy adults, changes in stress-related and proinflammatory gene expression may serve as a molecular “signature” of treatment response for those who experience the greatest change in mindfulness after MBSR training.
Effects of Mindfulness-based Stress Reduction on Psychological Symptoms and Telomere Length: A Randomized Active-Controlled Trial

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Background and Objectives: Mindfulness-based stress reduction (MBSR) has been shown to have a beneficial effect on psychological and physical health. Emerging evidence suggests that interventions adapted from MBSR may buffer against decreases in telomere length, a cellular marker of aging, among breast cancer survivors; but it is not known whether MBSR may impact telomere length in healthy populations. Further, being a multi-component intervention package, MBSR has seldom been evaluated against an active control condition, which precludes strong conclusions regarding the unique effects of mindfulness training on clinical outcomes. The present study evaluated the effects of MBSR versus music therapy-based stress reduction (MTSR) on psychological symptoms, including depression, stress, and anxiety, as well as leukocyte telomere length (LTL). The study also examined the effects of MBSR on several purported mechanisms of change underlying mindfulness training, namely trait mindfulness, self-compassion, and difficulties in emotion regulation.

Methods: 158 Han Chinese adults (mean age: 27.24 years) were recruited from Singapore and randomly assigned to complete an 8-week MBSR or MTSR program. Participants provided blood samples and completed a battery of validated self-report measures assessing the outcome variables pre- and post-intervention.

Results: Analyses using hierarchical multiple regression showed that participants in the MBSR condition demonstrated significantly greater decreases in depression and difficulties with regulating emotions, as well as increases in trait mindfulness and self-compassion compared to MTSR participants. There was a trend for greater decreases in stress in the MBSR condition versus MTSR. There were no between-group differences on changes in anxiety or LTL from pre- to post-intervention.

Discussions and Conclusions: The study showed that MBSR is effective in lowering depressive symptoms and emotion regulation difficulties in a healthy Han Chinese sample. The finding that MBSR resulted in improvements in trait mindfulness and self-compassion corresponds with theorized mechanisms of change underlying mindfulness training. The lack of effect with regards to LTL suggests that a more intensive intervention may be required for mindfulness training to exert noticeable impact on aging at the cellular level, or that the effect may only emerge over a longer time period, reflecting limitations of current methods of telomere length measurements.