



“Breaking the cycle of desire: The role of mindfulness in craving for alcohol, drugs and food”

Day: Friday 13th July 2018 **Time:** 9:00 – 10:15 am **Track:** Working Mechanisms

General background: The Buddha’s observation that craving contributes to suffering converges with modern perspectives of psychopathology. Overpowering urges play a powerful role in clinical disorders related to eating and addiction. Given that mindfulness meditation was developed to counteract craving, mindfulness may be well suited as a countermeasure for the dyscontrolled urges found in the clinic. This symposium examines the relation between mindfulness and appetitive responses to cues of alcohol, drugs, and food.

Symposium summary: A strength of the symposium is that the research uses multiple methods to operationalize both mindfulness and craving-related outcome variables. B. Ostafin presents research with inpatient addicts that examines the effects of a brief mindfulness induction on automatic and deliberative appetitive response to alcohol assessed with cognitive tasks. P. Engelen presents research examining whether trait mindfulness can de-link the relation between problematic cannabis use and explicit and implicit measures of appetitive response toward cannabis. E. Aarts presents findings from a study that examines the effects of an 8-week mindful eating intervention on appetitive responses to food assessed with functional Magnetic Resonance Imaging. M. Keesman presents three studies using self-report and brief mindfulness induction methods to examine the role of decentering in food cravings assessed with self-report and a salivation measure.



Symposium overview

Presenter 1 **Brian Ostafin** - Getting unhooked: Mindfulness decouples the relation between an implicit measure of alcohol motivation and downstream alcohol-related behaviors

Presenter 2 **Brian Ostafin** - Surfing the urge: Mindfulness moderates the relation between hazardous cannabis use and implicit and explicit measures of cannabis attitudes

Presenter 3 **Esther Aarts** - The effect of mindful eating training on anticipatory reward responses in the midbrain

Presenter 4 **Mike Keesman** - The decentering component of mindfulness plays a key role in reducing cravings

Chair: *Brian Ostafin*



Getting unhooked: Mindfulness decouples the relation between an implicit measure of alcohol motivation and downstream alcohol-related behaviors

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Background and objectives: Craving is a powerful motivational factor in addiction. There is increasing evidence that difficulty in controlling substance use is predicted by the extent to which appetitive responses to alcohol (and drug) cues have become automatized (i.e., spontaneous). Recent research suggests that mindfulness training may be useful in addiction either by (i) weakening automatic appetitive responses or (ii) decoupling the relation between automatic responses and downstream effects such as alcohol rumination or actual consumption. This study examined whether a mindfulness intervention would show weakening or decoupling effects in a sample of addicts.

Methods: A sample of 98 patients receiving inpatient treatment for alcohol dependence was randomly assigned to either a 30 minute mindfulness intervention or active control, after which they completed a measure of state mindfulness. Participants next completed two evaluative priming tasks to assess appetitive response to alcohol cues. One task assessed automatic responses (i.e., short [250ms] duration between alcohol primes and evaluative targets) and one task assessed more deliberative responses (i.e., long [2000ms] duration between primes and targets). After the priming tasks, participants rated their ability to resist various alcoholic beverages.

Results: Regarding the mindfulness-as-weakening hypotheses, the mindfulness intervention did not lead to weaker automatic or deliberative appetitive response to alcohol on the priming tasks. The mindfulness group did report greater ability to resist alcohol beverages ($F=4.7$). Further, the main effect of mindfulness on ability to resist alcohol was mediated by state mindfulness. Regarding the mindfulness-as-decoupling hypotheses, the intervention condition moderated the relation between automatic appetitive responses to alcohol both with (1) the deliberative appetitive responses ($F=11.1$) and with (2) ability to resist alcoholic beverages ($F=4.1$). Specifically, automatic appetitive responses predicted deliberative appetitive response and difficulty in resisting alcohol in the control group but not in the mindfulness group.

Discussion and conclusions: The results suggest that although a brief mindfulness intervention in addicts does not reduce the strength of automatic appetitive responses to alcohol, it does weaken the link between such automatic responses and the downstream evaluation of alcohol and ability to resist alcoholic beverages.



Surfing the urge: Mindfulness moderates the relation between hazardous cannabis use and implicit and explicit measures of cannabis attitudes

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Background and objectives: There is increasing evidence for the efficacy of mindfulness interventions for addiction. However, relatively little is known about how mindfulness helps the individual to control substance use behavior. One possibility suggested by previous research is that mindfulness works by decoupling the relation between appetitive responses and actual behavior. Evidence for this decoupling effect has been found with both implicit and explicit measures of appetitive response to alcohol and smoking cues. No research has examined the decoupling effect between appetitive response to cannabis and cannabis use. The current study was designed to examine this question. We hypothesized that trait mindful acceptance would moderate the relation between cannabis use and both implicit and explicit measures of appetitive response to cannabis.

Methods: Participants were 89 undergraduate students who completed measures of trait mindful acceptance, hazardous cannabis use, and positive attitudes toward cannabis via implicit (Implicit Attitude Test) and explicit (self-report) measures.

Results: Bivariate correlations showed that hazardous cannabis use was inversely related to trait mindful acceptance ($r = -.25$) and positively related to the implicit ($r = .29$) and explicit ($r = .51$) measures of positive attitude toward cannabis. Mindful acceptance was not significantly related to either the implicit or explicit measure of cannabis attitude. Regarding the interaction hypothesis, mindful acceptance moderated the relation between hazardous cannabis use and the implicit ($F = 4.8, p = .03$) and explicit ($F = 13.3, p = .0005$) measures of cannabis attitude. That is, both implicit and explicit measures of appetitive response to cannabis were more strongly related to hazardous cannabis use in individuals with low trait mindfulness compared to individuals with high trait mindfulness.

Discussion and conclusion: These results support the idea that one way through which mindfulness may be useful as an addiction treatment is through decoupling the relation between appetitive responses and consumption.



The effect of mindful eating training on anticipatory reward responses in the midbrain

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Background and objectives: Obesity is a highly prevalent disease, usually resulting from chronic overeating. Accumulating evidence suggests that increased neural responses during the anticipation of high caloric food play an important role in overeating. A promising method to counteract enhanced food anticipation in overeating might be mindfulness-based interventions (MBIs). However, how MBIs can affect food reward anticipation neurally has never been studied. We aimed to investigate whether mindful eating training decreases reward anticipation in striatal and midbrain reward regions.

Methods: In this randomized, actively controlled study, we tested 58 healthy subjects with a wide body mass index range (BMI: 19-35 kg/m²) using functional Magnetic Resonance Imaging. All participants were motivated to change their eating behavior. During scanning they performed an incentive delay task, measuring neural reward anticipation responses to caloric and monetary cues before and after an 8-week mindful eating intervention or an 8-week educational cooking intervention (active control).

Results: Relative to educational cooking (active control), mindful eating decreased reward anticipation responses to food, but not to monetary reward cues, in the midbrain (i.e. Reward (high, low) x Domain (caloric, monetary) x Time (pre, post) x Intervention (mindful eating, educational cooking) interaction on $p_{FWE} < .05$, small-volume correction), but not in the striatum. The effects were specific to reward anticipation and did not extend to reward receipt.

Discussion and Conclusion: These results show that an 8-week mindful eating intervention may decrease the salience of food cues specifically, which could result in decreased food-cue triggered overeating on the long term.



The decentering component of mindfulness plays a key role in reducing cravings

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Background and objectives. Mindfulness-based interventions are increasingly popular as a means to reduce craving, but there is only limited understanding of the underlying psychological mechanism. Here, we report three studies among participants with and without experience in mindfulness and meditation to systematically examine the role of the decentering component of mindfulness for reducing craving. Decentering can be defined as the insight that thoughts and experiences are impermanent events that do not necessarily accurately reflect reality.

Methods. In Study 1 we conducted a survey study among meditators (N=86). We followed up on these results using two experiments with non-meditators. There, we induced a decentering or control perspective using a 3-minute audio-instruction. Power analyses based on a pilot study determined the sample sizes. In Study 2 (N=30; within-design), participants imagined an attractive yet unhealthy snack and adopted a decentering or control perspective. Afterwards, they reported their cravings for the snack. After a brief filler task, this procedure was repeated for the other perspective. In Study 3 (N=60; between-design), participants received a decentering instruction, or no specific control instruction. Then, they were exposed to a tempting snack, and we assessed their salivary response.

Results. In our Study 1 among meditators, we found that the decentering component of mindfulness, but not awareness, was correlated with reduced food cravings (Pearson's $r = -.24$). In Study 2, the imagined snack elicited stronger cravings during the control compared to decentering perspective (Cohen's $d = .79$). In Study 3, the attractive snack induced stronger salivation in control than in decentering participants (Cohen's $d = .78$).

Discussion and conclusion. Overall, our work offers a window into the psychological mechanism of mindfulness, suggesting that decentering plays a key role in reducing reactivity to rewarding stimuli, such as cravings and salivation. This research thereby supports the application of mindfulness in interventions to reduce cravings.