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## Original Research

# Mindfulness and addictive behaviors

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### Abstract

There has been increasing interest in mindfulness-based treatments for psychological illnesses, including substance abuse. Mindfulness involves intentionally directing attention to experiences in the present moment and observing them with a nonjudgmental attitude. This study examined the relationship between mindfulness and various addictive behaviors (i.e. alcohol abuse, pathological gambling, sex addiction, and compulsive buying) in a community sample. A short but comprehensive composite measure of mindfulness was constructed from previous valid measures, which retained good reliability and a five-factor structure. Two higher-order factors emerged: Attentive Acceptance (Nonjudging, Acting with Awareness) and Descriptive Observation (Describe, Observe, Nonreactivity). Inverse correlations emerged between the nonjudgmental attitude and alcohol abuse, pathological gambling, and sexual addiction, independent of demographic influences. Compulsive buying related inversely to acting with awareness. The findings of this study support the use of mindfulness as a treatment for substance abuse and suggest the possible usefulness for the treatment of other addictive behaviors.

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## INTRODUCTION

In the past few decades there has been increasing interest in the use of mindfulness-based techniques as therapeutic strategies. Prominent in the clinical research literature are studies showing the utility of mindfulness-based stress reduction (MBSR) [1,2]. Subsequently MBSR is being adapted to target more specific problems and populations, including mindfulness-based cognitive therapy for depression and anxiety [3], mindfulness-based relapse prevention for substance dependence [4], and mindfulness-based relationship enhancement [5]. While rooted in Buddhist philosophy and psychology, these techniques are secular and do not require any specific religious beliefs or orientation. Indeed, the foundation of Buddhism is to alleviate suffering, so it is not surprising that some of its techniques have psychotherapeutic value.

There is theoretical interest in the cognitive and emotional components of mindfulness that make it a useful technique. Shapiro and colleagues [6] propose the IAA model, or three axioms of mindfulness:

intention, attention, and attitude. Intention refers to the motivational, deliberate aspect of mindfulness, attention refers to the focusing of awareness to observation of experience in the present moment, and attitude refers to the nonjudgmental, receptive stance of acceptance towards experiences. They posit that this involves a variety of psychological mechanisms which alleviate distress: re-perceiving or reframing experiences from a more metacognitive and thought-distanced perspective, improving self-regulation of emotion, enhancing mental flexibility, and desensitizing to aversive experiences by exposure in the absence of perceived threat. It is likely that these are cognitive and emotional aspects of a coherent neuropsychological framework through which mindfulness may relate to substance abuse. Dysfunction of prefrontal systems of the brain has been associated with impaired self-regulation in substance abuse [7]. In functional neuroimaging studies, activation of the prefrontal cortex during meditation in areas involved in concentration and self-regulation has been documented [8,9]. Meditation practice causes a leftward shift in prefrontal activation that correlates

with positive emotion and enhanced immune response [10]. Long-term meditation practice may increase prefrontal cortical thickness [11]. Particularly relevant to addiction, a form of yoga meditation (yoga nidra) similar to mindfulness meditation (i.e. emphasizing a neutral observer attitude and attention to sensory stimulation) caused release of dopamine in the ventral striatum as measured by 11C-raclopride PET [12].

The effectiveness of mindfulness meditation as a clinical technique is being established through studies that are pertinent to addiction. Stress is a major factor in the development, maintenance, and relapse of addictions [13]. A meta-analysis of 20 controlled studies of MBSR supports its effectiveness in reducing stress with an effect size of 0.5 ( $p < 0.0001$ ) [2]. Depression and anxiety are disproportionately high in substance abuse populations [14, 15]. Mindfulness-based treatments have been found to be useful in treating depression and anxiety [3, 16-19].

Limited research has been done in the area of mindfulness specifically as it relates to addictions and the research that has been done has focused almost exclusively on substance abuse. A study of vipassana or insight meditation in an incarcerated population found that it reduced use of alcohol, cannabis, and crack cocaine after release from jail, as compared to treatment-as-usual [20]. It also decreased alcohol-related problems and psychiatric symptoms in addition to improving psychosocial outcome. Theoretical proposals that mindfulness aids addiction recovery by enhancing acceptance and not suppressing or avoiding unwanted thoughts is supported by a study by Bowen and colleagues [21]. Insight meditation decreased thought suppression, which partially mediated the effects of post-release alcohol use and consequences. The relevance of mindfulness to substance abuse is not limited to clinical treatment samples. Leigh, Bowen, and Marlatt [22] unexpectedly found increased mindfulness in tobacco smokers and binge drinkers. It was hypothesized that people with increased sensitivity to the point of aversiveness may use drugs to manage emotion. The researchers used the Freiburg Mindfulness Inventory, which did not have subscales to tease apart the components of mindfulness in relation to substance abuse. A study of Dialectical Behavior Therapy (DBT), a mindfulness based-treatment, was useful in treating heroin-dependent females diagnosed with borderline personality disorder [23]. Those receiving DBT maintained abstinence over a 12-month period compared to those who received comprehensive validation therapy in conjunction with a 12-step program.

There is evidence that mindfulness will prove useful to other forms of addictive behaviors. For example, Kristeller and Hallett [24] have shown that mindful

eating exercises benefit individuals with Binge Eating Disorder. Anxiety levels were lowered and eating binges were reduced in the treatment group from 4 to 1.6 times/week ( $t(18)=6.37, p<.001$ ). Although this study used a sample size of 27 females diagnosed with BED, it was promising in the significant decrease of not only anxiety and eating binges, but also in the rating of "large" binges by participants.

In addition to studying the outcomes of a controlled trial of mindfulness meditation, the relevance of mindfulness has been investigated using self-rating trait measures. While mindfulness is often cultivated in the context of sitting meditation, the ultimate goal of MM is to generalize the underlying mental skills to everyday experience. Thus, the "trait" approach is a useful strategy even if it is studied in non-meditators. MM is essentially an exercise to enhance qualities that all people possess to varying degrees. While it may be regarded as a trait, research demonstrates that it is greatly malleable by practice and experience.

Several trait measures of mindfulness have been published: Mindfulness Attention Awareness Scale [25] (Brown & Ryan, 2003), Freiburg Mindfulness Inventory [26], Kentucky Inventory of Mindfulness Skills [27], Cognitive Affective Mindfulness Scale [28], and the Mindfulness Questionnaire [29]. Baer and colleagues [30] reviewed these measures and combined them into a single comprehensive measure. Exploratory and confirmatory factor analyses and yielded a five-factor structure: nonreactivity to experience (NR), observing experience (OB), acting with awareness (AA), describing experience with words (DE), and nonjudging of experience (NJ). This combined scale represents the most comprehensive measure of mindfulness, but the 112 items would make it lengthy and cumbersome for future use, particularly with the redundancy of items.

This study was undertaken to further examine the relationships between mindfulness and addiction. We first sought to create an abbreviated and refined composite measure of mindfulness from the combined measure studied by Baer and colleagues, while still utilizing the comprehensive approach of the original scale [30]. The intention is to retain the factor structure so that their relationships with aspects of addiction can be studied with more specificity than before. Further, this study sought to expand the study of mindfulness to addictive behaviors beyond substance abuse (e.g. Witkiowitz, Marlatt, and Walker's study of relapse prevention) by including gambling addiction, sexual addiction and compulsive buying [4]. It was specifically hypothesized that greater severity of addictive behaviors would relate to lower levels of mindfulness.

## METHODS

### Participants

Participants were a convenience sample ( $N = 190$ ; 120 female, 70 male) of individuals recruited by word-of-mouth. Research assistants were instructed to find non-institutionalized adults from the local community. In order to encourage more honest responding, participants filled out the questionnaires in private and sealed them in an envelope before returning them. There was no financial compensation for participating. The study was approved by an institutional review board and all subjects agreed to a consent form in accordance with the Declaration of Helsinki and the ethical principles of the American Psychological Association. Participants ranged in age from 17 to 73 years ( $M = 26.6$ ,  $SD = 11.4$ ), and had completed between 11 and 20 years of formal education ( $M = 14.6$ ,  $SD = 1.8$ ).

### Measures

*Composite Mindfulness Questionnaire (CMQ)*. A composite measure of mindfulness was created from the five measures studied by Baer and colleagues [30]. To construct the present CMQ, three items with the highest loadings were selected from each factor and used to make a 15 item scale (see appendix A). These items were subjected to principal components analysis in order to test whether the five-factor structure was retained. A second-order factor analysis was done to see how the subscales group into higher-order factors. Reliability analyses were also performed for the subscales and total scale.

*Alcohol Use Disorders Identification Test (AUDIT)*. The AUDIT is a 10-item self-rating measure commonly used to screen for alcoholism. It has been demonstrated to be a valid and reliable measure of alcohol abuse [31, 32]. Confirmatory factor analysis supported a 3-factor model: Alcohol Consumption, Alcohol Dependence, and Related Consequences[33].

*Canadian Problem Gaming Index (CPGI)*. The CPGI is a 9-item self-rating scale used to assess problem gaming in the general population [34]. Item content includes betting more than one can afford, tolerance, chasing losses, borrowing money to gamble, concern over gambling, gambling-related health problems, social criticism of gambling, financial problems, and guilt over gambling. The scale shows high correlations with DSM criteria and the South Oaks Gambling Scale (.80 and .81, respectively).

*Compulsive Sexual Behavior Inventory (CSBI)*. The 13-item control subscale of the Compulsive Sexual Behavior Inventory (CSBI) was used for this study [35]. It discriminates nonparaphilic sexual addiction and pedophilia from healthy controls and demonstrates

good reliability. A more recent study further demonstrated validity through relationships with high-risk sexual behaviors (e.g. substance use, negative affect, unprotected sex, and more sexual partners) [36]. Items address a variety of difficulties controlling sexual urges and behavior. They are rated on a Likert-type scale ranging from 1 ("Never") to 5 ("Often").

*Compulsive Buying Scale (CBS)*. The CBS is a 7-item scale that was developed to identify compulsive buying [37]. Items address behaviors specific to compulsive buying rather than normal consumer behavior (e.g. "Others would be horrified if they knew my spending habits" and "I bought things even though I couldn't afford them."). The scale shows good validity and reliability. It also correctly classified 87.5% of the subjects as compulsive buyers or normal consumers.

## RESULTS

### Principal Components Analysis

Items of the CMQ were subjected to principle components analysis using varimax rotation. The number of factors to be extracted was determined by interpretability and parallel analysis. Parallel analysis indicated a 5 factor structure, which also yielded logically interpretable factors [38]. Each factor had 3 items, with eigenvalues of 2.4, 2.1, 2.1, 1.8, and 1.7. Respectively, these accounted for 16.2%, 14.0%, 13.8%, 11.8% and 11.3% of the variance. Cumulatively, they accounted for 67.0% of the variance.

These factors replicated the factors obtained by Baer and colleagues [30], so the original names were retained. Ratings from items were summed to create additive scales.

Cronbach's alpha values for the subscales were .86 (DE), .77 (OB), .76 (NJ), .40 (NR), and .55 (AA). Elimination of one item (#1) from the NR scale increased alpha to .77. Cronbach's alpha for the total CMQ was .64, but eliminating of item #1 raised it to .69. Total scores of the CMQ were normally distributed, as indicated by a Kolmogorov-Smirnov test ( $Z = 1.03$ ,  $p = .235$ , two-tailed significance).

A second-order factor analysis was done using the subscales of the CMQ, again using principal components analysis with varimax rotation. Parallel analysis suggested a two-factor solution. Eigenvalues for these factors were 1.4 and 1.4, which accounted for 27.4% and 27.3% of the variance, and collectively accounted for 54.7% of the total variance (Table 2). These two factors represented were labeled Attentive Acceptance (comprised of Nonjudging and Acting with awareness) and Descriptive Observation (comprised of Describe, Observe, and Nonreactivity).

**Table 1.** Principal components analysis of the Composite Mindfulness Questionnaire items using varimax rotation ( $N = 190$ ). Significant factor loadings are in boldface. Factor labels: 1. Describe, 2. Observe, 3. Nonjudgmental (inverse scoring), 4. Nonreactivity, 5. Acting with awareness (inverse scoring).

1	2	3	4	5	Item
<b>.89</b>	.08	.07	.12	-.08	Easily Put beliefs, opinions, and expectations into words.
<b>.87</b>	.09	.09		.01	Good at finding the words to describe my feelings.
<b>.85</b>	.11	.04	.07	.01	Describe how I feel at the moment in considerable detail.
.17	<b>.83</b>	.02	.14	.08	Pay attention to sensations, such as the wind...
.07	<b>.82</b>	.10	-.01	.02	When I take a shower or bath, I stay alert to sensations...
.04	<b>.80</b>	.01	.09	-.02	Pay attention to sounds, such as clocks ticking...
.02	-.05	<b>.86</b>	-.06	.05	Tell myself that some of my thoughts are abnormal...
.00	.06	<b>.84</b>	-.12	.12	Think some of my emotions are bad...
.23	.17	<b>.68</b>	-.05	.21	Make judgments about whether my thoughts are good bad
.14	.07	.02	<b>.88</b>	-.08	When I have distressing thoughts, I "step back"...
.10	.00	-.06	<b>.85</b>	.00	Notice distressing thoughts without reacting.
.00	.08	-.12	<b>.33</b>	.09	Perceive feelings emotions without having to react
.04	-.01	-.06	-.19	<b>.80</b>	Difficult to stay focused on the present.
-.19	-.07	.25	.12	<b>.73</b>	Rush through activities without being really attentive
.06	.15	.25	.20	<b>.65</b>	Find myself doing things without paying attention.

**Table 2.** Second-Order principal components analysis of the Composite Mindfulness Questionnaire subscales using varimax rotation ( $N = 190$ ). Significant factor loadings are in boldface.

1	2	Subscale
<b>.82</b>	-.11	Nonjudging
.77	.04	Acting with awareness
-.08	<b>.73</b>	Describe
-.19	<b>.67</b>	Observe
.23	<b>.61</b>	Nonreactivity

*Correlations*

Bivariate correlations were calculated for the CMQ, AUDIT, CPGI, CSBI, and CBS ( $N = 190$ , two-tailed significance; see Table 3 for results). Inverse correlations emerged, primarily between the NJ subscale and the AUDIT, CPGI, and CBI. The DE subscale correlated inversely with the AUDITd (dependence) subscale and the AA subscale correlated inversely with the CBI. Partial correlations were then performed are controlling for age, sex, and education ( $df = 181$ ). The correlations remained significant and additionally the CPGI correlated inversely with the CPGI. Overall, correlations were modest in magnitude.

**Table 3.** Correlations between the Composite Mindfulness Questionnaire, Alcohol Use Disorders Identification Test (AUDIT), Canadian Problem Gaming Index (CPGI), Compulsive Sexual Behaviors Questionnaire (CSBI), & Compulsive Buying Inventory (CBI), ( $N = 190$ ; two-tailed significance,  $p < .05$ ,  $^{\dagger}p < .01$ ,  $^{\ddagger}p < .001$ ). CMQ Subscale Abbreviations: NR - Nonreactivity, Ob - Observe, AA - Acting with Awareness, DE - Describing, NJ - Nonjudgmental. Partial correlations are controlling for age, sex, and education ( $df = 181$ ).

		NR	OB	AA	DE	NJ	Total
Bivariate	AUDITac	.05	.09	-.08	.09	-.29 <sup>‡</sup>	-.03
	AUDITd	-.02	-.03	-.07	-.17*	-.22 <sup>†</sup>	-.20 <sup>†</sup>
	AUDITrc	.02	.06	-.12	-.10	-.21 <sup>†</sup>	-.12
	AUDIT total	.03	.06	-.11	-.05	-.28 <sup>‡</sup>	-.13
	CPGI	-.07	.09	-.13	.10	-.29 <sup>‡</sup>	-.10
	CSBI	-.06	-.08	-.02	-.02	-.28 <sup>‡</sup>	-.18
Partial	CBI	-.09	.06	-.26 <sup>‡</sup>	.01	-.09	-.14
	AUDITac	.09	.09	-.11	.11	-.25 <sup>‡</sup>	-.01
	AUDITd	.01	-.01	-.11	-.15*	-.20 <sup>†</sup>	-.18*
	AUDITrc	.04	.06	-.14	-.09	-.19 <sup>†</sup>	-.11
	AUDIT total	.06	.06	-.14	-.04	-.25 <sup>‡</sup>	-.10
	CPGI	-.06	.10	-.16*	.10	-.26 <sup>‡</sup>	-.10
CSBI		-.03	-.06	-.07	-.03	-.25 <sup>‡</sup>	-.17*
	CBI	-.11	.05	-.24 <sup>‡</sup>	.02	-.14	-.15*

Bivariate intercorrelations were obtained between among measures of addictive behaviors ( $N = 190$ , two-tailed significance; see Table 4 for results). All measures showed significant positive correlations with the other measures of addictive behaviors.

**Table 4.** Intercorrelations among measures of addictive behaviors: Alcohol Use Disorders Identification Test (AUDIT total score), Canadian Problem Gaming Index (CPGI), Compulsive Sexual Behaviors Questionnaire (CSB), & Compulsive Buying Inventory (CB), ( $N = 190$ ; two-tailed significance,  $^{\dagger}p < .01$ ,  $^{\ddagger}p < .001$ ).

	AUDIT	CPGI	CSB
CPGI	.31 <sup>‡</sup>		
CSBI	.41 <sup>‡</sup>	.43 <sup>‡</sup>	
CB	.25 <sup>‡</sup>	.34 <sup>‡</sup>	.22 <sup>†</sup>

**DISCUSSION**

This study replicated the five-factor structure of mindfulness measures that was proposed by Baer and colleagues [30]. The factors remain meaningful and interpretable as they correspond to well-established aspects of mindfulness meditation. Despite the short length of the subscales, they retained good reliability. The Acting with Awareness scale intrascale reliability was low (.55), so results with that subscale may be interpreted tentatively. In future use of this scale items can be added to improve that subscale's reliability. It is

worthwhile to note that scores on the CMQ were normally distributed in the community sample used in this study.

Also revealed in this study is a higher-order factor structure. Two second-order factors were derived and labeled Attentive Acceptance (consisting of Nonjudging and Acting with awareness subscales) and Descriptive Observation (consisting of Describe, Observe, and Nonreactivity subscales). These are also meaningful factors since those are identified as core aspects of mindfulness, both in terms of modern research and traditional teaching [6,39].

As hypothesized, only inverse relationships were found between mindfulness and addictive behaviors. This finding extended beyond alcoholism to gambling, sexual behavior, and compulsive buying and was independent of demographic influences. This was found in a community sample, demonstrating that it extends in a graded manner to the entire population rather than strictly applying to treatment samples. This finding is logical since addictions involve maladaptive patterns of cognition and behavior that serve to produce pleasure and to provide escape from internal discomfort in the short-term [40]. While attempts to avoid or suppress unwanted thoughts and emotions only serve to intensify them, greater mindfulness involves a tendency for more acceptance and adaptive self-regulation [41]. This, in turn, reduces the impetus to resort to addictive behaviors as an attempt to cope with negative emotions [21].

An unanticipated finding in this study was the primary and seemingly exclusive role that the nonjudgmental aspect of mindfulness seemed to play in addictive behaviors. It correlated inversely with all of the aspects of addictive behaviors except compulsive buying. A judgmental attitude towards one's own experience has frequently been identified as problematic by modern psychotherapists [42-44]. Indeed, in Buddhist psychology this judgmental attitude, alternately referred to as "attachment," "craving," or "clinging," is considered to be the critical ingredient underlying emotional distress [45-46].

Compulsive buying, on the other hand, seemed to relate inversely to Acting with Awareness. A possible reason for this is that buying is a necessary behavior for any individual living in modern societies and culturally the most encouraged via advertising and mass communication media. Thus, this is not as stigmatized as the other addictive behaviors represented here. So it is fitting that overspending may relate more towards a tendency toward mindless, automatic behaviors.

As anticipated, positive intercorrelations were found between all of the measures of addictive behaviors.

This fits with previous findings of the tendency of addictive and impulse control disorders to co-occur, possibly as manifestations of an underlying spectrum disorder [47-48].

This study adds to a growing body of research linking mindfulness to addiction, reinforcing its utility as a treatment option. This also gives preliminary evidence to suggest that mindfulness may be an applicable treatment for other forms of addiction such as pathological gambling, sex addiction, and compulsive buying. Mindfulness may serve as a widely applicable skill to help an individual gain critical insight into their urges, cravings, and impulses and respond to them in a more deliberate and less automatic manner. Future research will be needed to further elaborate on these possibilities.

## APPENDIX

### A: The Composite Mindfulness Questionnaire

Abbreviations: NR nonreactivity to experience, OB observing experience, AA acting with awareness, DE describing experiences with words, NJ nonjudging of experience. All items are rated on a Likert-type scale (1-5) with the following labels: 1 "Not at all," 3 "Somewhat," 5 "Very much." Items marked with an asterisk are inversely scored.

#### Factor   Item

- NR    1. I perceive my feelings and emotions without having to react to them.
- NR    2. When I have distressing thoughts, I am able to just notice them without reacting.
- NR    3. When I have distressing thoughts, I "step back" and am aware of the thought without getting taken over by it.
- OB    4. I pay attention to sensations, such as the wind in my hair or sun on my face.
- OB    5. When I take a shower or bath, I stay alert to the sensations of water on my body.
- OB    6. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
- AA    7. I find myself doing things without paying attention.\*
- AA    8. I find it difficult to stay focused on what's happening in the present.\*
- AA    9. I rush through activities without being really attentive to them.\*
- DE    10. I'm good at finding the words to describe my feelings.

DE 11. I can easily put my beliefs, opinions, and expectations into words.

DE 12. I can usually describe how I feel at the moment in considerable detail.

NJ 13. I think some of my emotions are bad and I shouldn't feel them\*

NJ 14. I make judgments about whether my thoughts are good or bad.\*

NJ 15. I tell myself that some of my thoughts are abnormal and I shouldn't think that way.\*

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