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# Integrating mindfulness skills training into a brief outpatient treatment for substance abusing youth

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## Abstract

Mindfulness training has increasingly been implemented in substance abuse treatment regimes with the goal of relapse prevention. Among the available treatments, Motivational Interviewing (MI) is reported to be the most effective form of treatment for transitional-age youths. However, there is a paucity of research investigating the effects of mindfulness skills training on sobriety maintenance in this population. **Objectives:** The goal of the current study was to assess the effects of MI with the addition of mindfulness skills training on substance use behaviours and clinical outcomes in outpatient youths between the ages of 16 and 24. **Methods:** Sixty-six eligible participants were randomly assigned to a Treatment-as-usual (TAU) group or a TAU plus mindfulness training (TAU+M) group. Substance use days, impulse/addictive behaviors, confidence to resist urges, emotion regulation, psychiatric symptom severity, and mindfulness was assessed at baseline, post-treatment and at 3-month follow-up. **Results:** Days of substance-use did not change across group; however, both treatment groups reported decreased severity of psychiatric symptoms at 3-month follow-up. Participants in the TAU+M group further displayed decreased impulsive/addictive behaviors and increased confidence to resist urges at follow-up compared to the TAU group. Interestingly, the TAU group displayed greater changes in mindfulness than the TAU+M group. **Conclusions and Implications:** Overall, adding mindfulness to MI seems to provide benefits in the treatment of substance abusing youths.

## Keywords:

Mindfulness, transition-age youth, substance abuse

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## Introduction

Brief intervention methods for substance-abusing youth are valuable and cost-effective (Barnett, Colby, Monti, Neighbors, & Rohsenow, 2010; Breslin, Li, Sdao-Jarvie, Tupker, & Ittig-Deland, 2002; Mason & Posner, 2009). In particular, motivational interviewing (MI) has proven to be a relatively effective approach in treating substance abusing transition-age youth (Mason & Posner, 2009). Transition-age youth are defined as youth between 16 and 24 years of age, characterized as an age group at heightened risk for the development of addiction and mental health problems (Beitchman et al., 2001). MI is a person-centered counselling method that guides the client in addressing their ambivalence towards change. In the field of addictions, MI is goal-directed and is specifically designed to guide clients in strengthening their motivation and willingness to reduce or abstain from substance use.

The integration of mindfulness-based training into clinical treatment has yielded positive outcomes for a wide range of clinical conditions including depression, anxiety, chronic pain, and stress-related health problems (Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2002). Mindfulness is a "moment-to-moment awareness" that is cultivated by purposefully becoming aware of one's thoughts and feelings in the present moment without judgment, regardless of whether those thoughts and feeling are positive or negative (Kabat-Zinn, 1990). Mindfulness-Based Relapse Prevention teaches patients to become aware of thoughts and cravings that lead to substance abuse, and to observe those experiences rather than react to them or ignore them (Bowen et al., 2006; Bowen et al., 2009; Witkiewitz, Bowen, Douglas, & Hsu, 2013; Zgierska et al., 2009). As drug abuse is commonly associated with thought suppression or avoidance and reactivity to negative life events, mindfulness training may provide a valuable tool as it enhances one's tolerance to unwanted negative thoughts and emotions and diminishes stress reactivity to unpleasant events (Brewer et al., 2009). Indeed, researchers using the mindfulness paradigm have proposed that one of the key beneficial mechanisms produced by mindfulness is emotion regulation (Linehan, 1993). In assessing mindfulness training for smoking cessation, Davis, Fleming, Bonus & Baker (2007) found that active engagement in meditation was associated with a significant decrease in affective distress, with 56% of the group reporting abstinence from smoking within seven days of beginning the program.

Given the developmental patterns of impulsivity and emotion dysregulation that frequently characterize transitioning youth, the integration of mindfulness into a youth substance abuse treatment program would be expected to yield beneficial effects above that found for usual treatment (Dakwarm Mariani, & Levine, 2011; Winters, Latimer, Stunchfield & Henly, 2000). By increasing mindfulness, and thereby improving emotion regulation, transition-age youth undergoing mindfulness-based training would be expected to experience an enhanced capacity to resist impulses and substance-use urges (Breslin et al., 2002). Thus, when integrated into treatment as usual, mindfulness training would be expected to have positive, incremental effects on clients' abilities to reduce their level of substance use over the course of treatment.

Efforts to integrate mindfulness-based training into brief addiction treatments have yielded positive results in adults (Appel & Kim-Appel, 2009; Bowen et al., 2009; Dimeff, Rizvi, Brown & Linehan, 2000; Singh et al., 2003). Although researchers recommend that mindfulness-based training be implemented as an adjunctive treatment for addictions (Breslin, et al., 2002; Marcus et al., 2009; Vidrine et al., 2009), only one study to date (de Dios et al., 2012) has explored the relative benefits of incorporating mindfulness-based training into the treatment of problematic substance use among transition-age youth (Beitchman et al., 2001). de Dios and colleagues (2012) randomized 34 female marijuana users to a 2-day MI plus mindfulness meditation group or an assessment-only control group and prospectively analyzed outcomes at one, two and three months following baseline assessment. Although marijuana abstinence was not achieved in either group, participants randomized to the experimental group reported lower daily use of marijuana at all follow-up testing sessions compared with control participants. The authors concluded that the integration of mindfulness training provides young substance abusing women with an alternative to cope with anxiety (de

Dios et al., 2012). While these preliminary findings suggest a beneficial effect of integrating mindfulness into standard treatment, this study was limited to young females and did not include an active control group to control for non-specific effects associated with the experimental condition.

To this end, the goal of the current study was to evaluate the effects of integrating mindfulness-based skills training into a brief standardized substance abuse treatment as usual (TAU) for youth between the ages of 16 and 24 years. The TAU employed in the present study was MI as this has been found to be an effective short-term treatment for transition-aged youth (Mason & Posner 2009). Compared to TAU, it was hypothesized that the integration of mindfulness training into TAU would: (1) Improve substance use behaviours as evidenced by lower number of substance use days, increased confidence to resist urges to use, and decreased addictive/impulsive behaviours; (2) Increase mindfulness skills as evidenced by increased reports of total mindfulness, ability to act with awareness, acceptance without judgement, and the ability to describe and observe; and (3) Improve psychological wellbeing, evidenced by improvement on the psychiatric symptom scale and improved emotion regulation. Further, secondary analyses explored the extent to which change in mindfulness is associated with change in clinical functioning and the directionality of this association.

## Method

### *Participants*

Participants were referred to the study by the Centre of Addiction and Mental Health in Toronto, Ontario. Inclusion criteria for eligibility included transition-age youth between the ages of 16 and 24 years reporting subjective distress or impairment related to problematic substance use, as assessed by the Drug Abuse Screening Test (DAST) (Skinner, 1982) and the Alcohol Use Disorder Identification Test (AUDIT) (Santis, Garmendia, Acuña, Alvarado, & Arteaga, 2009).

Potential participants were excluded from the study if they were: 1) Not fluent in English, 2) Currently suffering from a chronic or serious physical health problem that may require hospitalization within the next 6 months (e.g., cancer), 3) Received a current diagnosis of active schizophrenia and/or bipolar disorder, 4) Display suicidal thinking or self-harm behaviors, 5) Unconcerned about use or overuse of alcohol or drugs, 6) Unwilling to participate in the study or be randomized to treatment group. If the individual did not meet exclusionary criteria for any of the areas mentioned, then he/she was able to participate in the study.

Among the 81 identified eligible participants between 16 and 24 years of age who reported abusing 2-3 problem substances, 66 agreed to be randomized to treatment group. Results are based on the 66 participants who were randomized to one of two treatment groups.

### *Measures*

Mindfulness was assessed using the Kentucky Inventory of Mindfulness Skills (KIMS) questionnaire. This 39-item questionnaire assesses an individual's ability to observe, describe, act with awareness and accept without judgement (Baer, Smith & Allen, 2004). The KIMS asks questions related to awareness and attention to determine level of mastery. Items such as "I criticize myself for having irrational or inappropriate emotions" can clearly be linked to non-judgemental acceptance, a key mindfulness-related skill that fosters emotion regulation in adolescent drug addicts. The KIMS has been reported to have high internal consistency, with alpha coefficients ranging between .76 and .91, and is sensitive to change in participants taking part in mindfulness-training (Baum et al., 2010).

Severity of psychiatric symptoms was assessed by the Brief Symptom Inventory (BSI), a 53-item self-report scale that measures the presence of psychiatric symptoms on nine primary dimensions and three global indices of stress in the last 7 days (Derogatis & Melisaratos, 1983). The General Severity Index (GSI) was used in the present study to indicate the degree of overall distress of the individual. The BSI has been widely validated and is a reliable measure, with an alpha coefficient between .90 and .97 (Pereda, Forns, & Pero, 2007).

Emotion regulation was assessed using the Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). This

self-report measure utilizing a 5-point Likert scale (1-5) to assess six dimensions of emotion dyregulation: non-acceptance of emotional responses (e.g., "When I'm upset, I feel guilty for feeling that way"), difficulties engaging in goal-directed behavior (e.g., "When I'm upset, I have difficulty focusing on other things"), impulse control difficulties (e.g., "When I'm upset, I lose control over my behaviors"), lack of emotional awareness (e.g., "I pay attention to how I feel"), limited access to emotion regulation strategies (e.g. "When I'm upset, I believe that I will remain that way for a long time"), and lack of emotional clarity (e.g. "I am confused about how I feel"). This is a reliable scale with high internal consistency (.93) and test-retest reliability (.88) (Gratz & Roemer, 2004).

Impulsive/addictive behaviour was measured using the Behavior and Symptom Identification Scale (BASIS-32; Eisen, Dill, & Grob, 1994). This 32-item scale likert-type scale assesses mental health status from the patient's perspective over the last seven days. For the purpose of the present study, only the Impulsive/Addictive Behavior subscale was used, which reportedly has satisfactory internal consistency (.73) and test-retest reliability (.65).

Confidence to resist substance urges was measured using the Drug-Taking Confidence Questionnaire-8 (DTCQ; Sklar, Annis, & Turner, 1997). The DTCQ consisted of 8 items pertaining to risk situations for drug users. Respondents are asked to report how confident they are to resist a primary substance at that very moment from 0 (Not at all confident) to 100% (very confident). Higher scores reflect higher self-efficacy and greater likelihood to avoid substance and other substance-related consequences.

Substance use days were assessed using the Timeline Follow-Back (TLFB) method, a validated and reliable retrospective procedure (Lewis-Esquerre et al., 2005) that requires participants to provide best-recall estimates of their drinking habits over the past 30 days. Using a blank calendar, the client is asked to recall information on the major features of drinking: amount, frequency, pattern, and degree of variability (Sobell & Sobell, 1995). Assessors can also provide memory aids to help the clients recall their drinking habits. Clients can mark days on the calendar for idiosyncratic events, such as a birthday, and generic events, such as sports events. Times when the participant abstained from drinking, drank in a particular pattern, or drank heavily can also be memory aids for the participant (Sobell & Sobell, 1995).

### *Procedures*

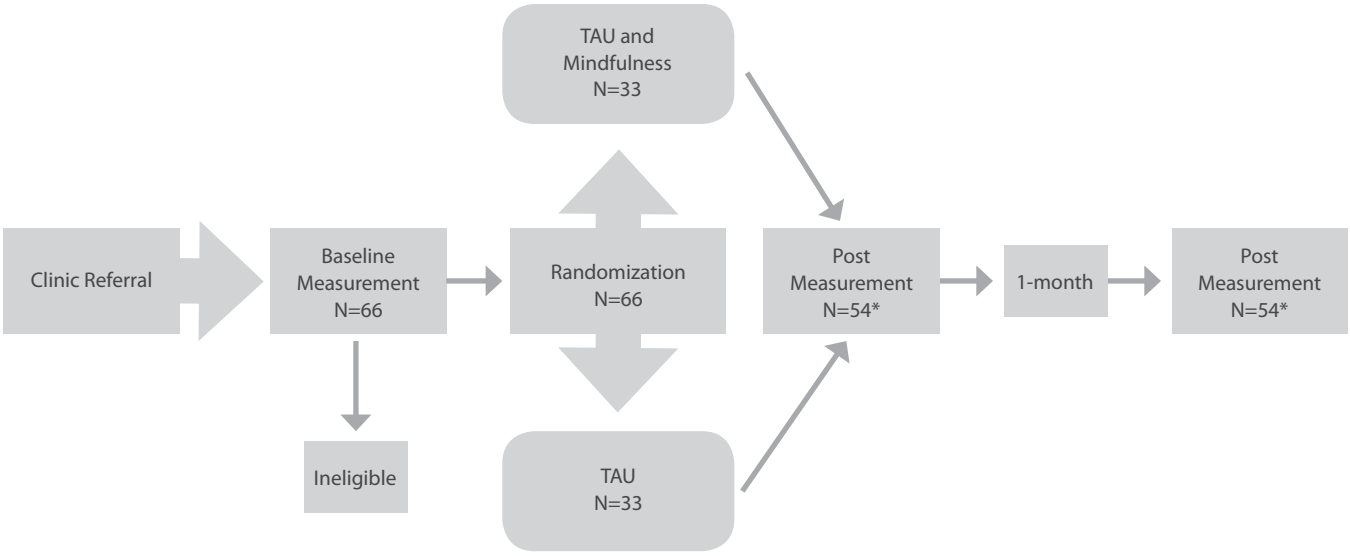
Sixty-six youths attending an outpatient treatment program were randomly assigned to either a Treatment as Usual (TAU) group (N=33) or a TAU plus Mindfulness (TAU+M) group (N=33). Participants in the TAU group attended four standardized 1.5 hour-long MI sessions over three weeks (Breslin et al., 2002). Each session focussed on discussing the following topics: 1) Pros and cons of substance use, 2) The Antecedents/ Behaviour/ Consequence (ABC) Model, and alternatives, 3) Values, and 4) Stages of change. Participants in the TAU+M group attended four 1.5 hour-long MI with integrated mindfulness sessions over three weeks. In addition to the standard treatment above, the first three sessions also included modules on: 1) Path to a wise/clear mind, 2) Non-judgemental acceptance, and 3) Urge-surfing. The mindfulness skills training component was based primarily on the mindfulness module described by Linehan (1993), and recent adaptations of these skills for substance use problems and youth populations (Miller, Rathus, DuBose, Dexter-Mazza, & Goldklang, 2007). Both TAU and TAU+M sessions were lead by three trained facilitators, thus minimizing therapist effects on outcome.

At the end of the three-week TAU and TAU+M program, 54 participants completed the KIMS, BASIS, BSI, DERS, DTCQ, and TLFB questionnaire at post-treatment and 37 participants completed the three-month follow-up (see Figure 1).

### *Statistical Analysis*

Post-treatment data was imputed for 12 participants on KIMS, and for 10 participants on all other measures using the Last Observation Carried Forward (LOCF) procedure. Three-month follow-up data was imputed for 17 additional participants who did not attend the follow-up assessment. Change scores were computed for pre- to post-treatment values and for pre-treatment to 3-month follow-up

**Figure 1:** Study procedure




values on mindfulness, substance use behaviours, and psychological well-being.

Analyses of variance (ANOVA) and Chi-Square analyses were conducted to determine whether treatment groups significantly differed on baseline and demographic factors. Bivariate correlations were conducted to determine the association between baseline mindfulness and clinical functioning, as well as the association between change in mindfulness and clinical functioning through treatment period. To assess change in mindfulness, substance use behaviours and psychological well-being following treatment, change scores were created from baseline (pre-treatment) to post-treatment and from baseline (pre-treatment) to 3-month follow-up. Paired-sample t-tests were conducted to determine the effects of TAU and TAU+M on change in mindfulness and clinical functioning. Finally, to assess/reveal directionality of change, correlations were first conducted between change in mindfulness from pre-to post-treatment and subsequent changes in clinical functioning at 3-month follow-up; a second set of correlations were then conducted between changes in clinical functioning from pre- to post-treatment and subsequent changes in mindfulness at 3-month follow-up.

## Results

### *Participant Characteristics*

The majority of participants were Caucasian (73%) and over half of the sample was male (65%). Thirty percent of the sample was on parole or awaiting a trial/sentence. In terms of seeking treatment, 31% were self-referred, 21% were referred by family or friends, and 17% were mandated to seek treatment.

At baseline, participants reported an average of 20.64 (SD =10.25) substance use days over the past 30 days. Mean reported addictive and impulsive severity on the BASIS was 1.24 (SD = 9.0) and mean confidence to resist urges as measured by the DTCQ was 44.69 (SD = 25.14). Mean score on the BASI was 48.57 (SD = 10.33) for overall psychological symptoms severity, 46.53 (SD = 9.39) for depression and 43.17 (SD = 8.77) for anxiety. Mean score on the DERS for emotion dysregulation was 96.78 (SD = 20.98).

Participants assigned to the TAU and TAU+M program did not significantly differ on demographic or baseline characteristics. Over the course of the study, 12% of participants were lost to follow-up for the post-treatment testing session (n=29) and a total of 39% were lost to follow-up by the 3-month

**Table 1:** Mean (standard deviation) baseline demographics and pre-treatment levels of mindfulness and clinical functioning

| Variable | Overall (N=66) | TAU (N=33) | TAU+M (N=33) | *p* |
|---|---|---|---|---|
| Demographics | | | | |
| Age | 19.50(2.32) | 19.18(2.17) | 19.67(2.51) | .40 |
| Male | 66% | 66% | 66% | .89 |
| Caucasian | 73% | 72% | 74% | .50 |
| Mindfulness | 117.17(15.40) | 115.42(13.40) | 118.91(17.19) | .36 |
| Act | 27.38 (5.15) | 26.75 (5.45) | 28.00 (4.82) | .33 |
| Accept | 29.86 (8.36) | 30.09 (8.60) | 29.63 (8.24) | .83 |
| Describe | 26.48 (6.59) | 26.30 (6.78) | 26.66 (6.490) | .82 |
| Observe | 33.42 (9.72) | 32.24 (9.58) | 34.61 (9.85) | .33 |
| Impulse/Addictive Behaviour | 1.22 (.85) | 1.27(.89) | 1.18 (.81) | .65 |
| Global Psychiatric Severity Index | 48.45 (10.83) | 47.03 (9.73) | 49.88 (10.57) | .26 |
| Depression | 46.70 (9.36) | 44.69 (8.54) | 48.70 (9.83) | .08 |
| Anxiety | 43.09 (8.70) | 41.67 (7.86) | 44.51 (9.37) | .19 |
| Substance Days | 20.18 (10.23) | 20.76 (10.18) | 19.60 (10.41) | .63 |
| Resist Urges | 44.10 (23.13) | 43.37 (25.656) | 44.81 (20.77) | .88 |
| Emotion Regulation | 97.14 (19.96) | 96.63 (20.19) | 97.64 (20.09) | .84 |

**Table 2:** Correlations among pre-treatment mindfulness and clinical functioning

| Clinical Function | Mindfulness Total and Subscales | | | | |
|---|---|---|---|---|---|
| | Total | Act | Accept | Describe | Observe |
| Impulsive/Addictive Behaviours | -.33** | -.31** | -.51*** | -.21* | .22* |
| Severity of Psychiatric Symptom | -.40*** | -.43*** | -.71*** | -.29** | .39*** |
| Substance Days | -.08 | -.04 | .14 | -.09 | -.16 |
| Confidence to Resist | .24* | .25* | .37** | .11 | -.14 |
| Emotion Regulation | -.50*** | -.35** | -.56*** | -.31** | .09 |

Note. ***p <.001, **p <.01, *p <.05.

testing session (n=20) in the TAU+M group. In the TAU group, 24% were lost to follow-up by the second testing session (n=25) and 48% were lost to follow-up by the 3-month testing session (n=17). Overall, drop-out rates were 18% and 44% respectively. Participants who dropped out of the study at follow-up reported significantly more days of substance use at baseline compared with participants who remained in the study at follow-up; mean number of days 26.25 (SD = 5.51) versus 18.83(SD = 10.58), respectively (p=.002). No other differences were found between those who dropped out and completers at follow-up or at the 3-month testing session.

### *Association Between Pre-treatment Mindfulness and Clinical Functioning*

Bivariate correlation analyses in 66 randomized youth showed that greater self-report mindfulness was significantly associated with fewer psychiatric symptoms (r = -.33, p<.01), lower addictive severity (r

= -0.40, p<.001), difficulties with emotion regulation (r = -.50, p<.001), and increased confidence to resist urges (r =.24, p<0.05). However, mindfulness was not associated with number of substance days (r = -0.08, p>.05). Individual subcomponent of mindfulness, including Act, Acceptance without judgement and Describe were similarly correlated with clinical features. In contrast, Observe was significantly and positively associated with pre-treatment psychiatric symptoms (r =.39, p<.001) and addictive severity (r =.22, p<.05) (see Table 2). This correlation may reflect observing with judgement (see Table 2).

### *The Effects of Integrating Mindfulness Skills Training on Substance use Behaviours at Post-treatment and 3-month Follow-up*

Paired-sample t-test showed that neither TAU nor TAU+M resulted in decreased number of substance use days at post-treatment or at 3-month follow-up. However, compared to TAU, TAU+M resulted in increased confidence to resist urges, both at post-treatment, t(32) = -2.78, p<0.01, and 3-month follow-up, t(32) =-2.39, p<.05, and further reported decreased impulsive/addictive behaviours at 3-month follow-up, t(32)= 2.73, p<.05 (see Table 3). Thus, incorporating

**Table 3:** Changes in Mindfulness and Clinical Functioning at Post-Treatment and 3-month Follow-Up

| | TAU Group (Pre, Post, F/U) | | | | |
|---|---|---|---|---|---|
| | Pre Mean (SD) | Post Mean (SD) | F/U Mean (SD) | Pre vs Post t(df =32) | Pre vs. F/U t(df =32) |
| Mindfulness | 115.42 (13.40) | 116.52 (13.38) | 117.48 (13.43) | -0.52 | -0.98 |
| Act | 26.76 (5.45) | 28.88 (5.53) | 29.39 (5.78) | -2.30* | -2.92* |
| Accept | 30.09 (8.60) | 32.18 (8.18) | 33.09 (8.73) | -1.51 | -2.65* |
| Describe | 26.30 (6.78) | 25.55 (6.87) | 25.79 (7.24) | 0.88 | 0.48 |
| Observe | 32.24 (9.59) | 29.94 (8.80) | 29.36 (10.01) | 1.80 | 2.14* |
| Impulsive/Addictive Behaviors | 1.27 (.89) | 1.45 (.96) | 1.16 (0.86) | -1.43 | 0.75 |
| Severity of Psychiatric Symptoms | 47.03 (9.73) | 47.06 (10.82) | 44.55 (9.48) | -0.02 | 2.07* |
| Substance Days | 20.76 (10.18) | 21.82 (9.68) | 19.82 (11.20) | -0.73 | 0.57 |
| Confidence to Resist | 43.37 (25.65) | 44.14 (26.66) | 48.93 (29.32) | -0.24 | 1.28 |
| Emotion Regulation | 96.64 (20.19) | 98.18 (24.28) | 94.15 (19.25) | -0.56 | 0.93 |
| | TAU+M Group (Pre, Post, F/U) | | | | |
| | Pre Mean (SD) | Post Mean (SD) | F/U Mean (SD) | Pre vs Post t (df = 32) | Pre vs F/U t (df = 32) |
| Mindfulness | 118.91 (17.19) | 117.39 (14.43) | 121.27 (17.86) | 0.65 | -0.61 |
| Act | 28.00 (4.83) | 28.42 (5.20) | 28.88 (5.64) | -0.44 | -0.77 |
| Accept | 29.64 (8.25) | 30.33 (6.82) | 32.12 (7.24) | -0.63 | -2.30* |
| Describe | 26.67 (6.49) | 25.94 (6.09) | 26.97 (5.62) | 0.93 | -0.27 |
| Observe | 34.61 (9.85) | 32.70 (10.37) | 33.30 (12.17) | 1.42 | 0.81 |
| Impulsive/Addictive Behaviors | 1.18 (0.81) | 1.26 (.88) | 0.81 (0.80) | -0.64 | 2.73* |
| Severity of Psychiatric Symptoms | 49.88 (10.57) | 48.15 (11.83) | 42.97 (13.24) | 1.34 | 3.86*** |
| Substance Days | 19.61 (10.41) | 18.24 (10.86) | 17.12 (10.44) | 1.16 | 1.48 |
| Confidence to Resist | 44.81 (20.77) | 54.31 (25.59) | 54.79 (27.07) | -2.78** | -2.39* |
| Emotion Regulation | 97.64 (20.02) | 100.24 (21.12) | 90.09 (22.03) | -1.08 | 1.79 |

Note: ***p <.001, **p <.01, *p <.05. Post-treatment data was imputed for 12 participants on Mindfulness scale, and for 10 participants on all other measures using the Last Observation Carried Forward (LOCF) procedure. Three-month follow-up data was imputed for 17 additional participants who did not attend the follow-up assessment.

**Table 4:** Association between change in mindfulness and change in clinical change pre-treatment to 3-month follow-up

| Across Both Treatment Groups (N=37) a | | | | | |
|---|---|---|---|---|---|
| Change Scores | Mindfulness | Act | Accept | Describe | Observe |
| Impulsive/Addictive Behaviors | -.36* | -.48*** | -.29* | -.29* | -0.05 |
| Severity of Psychiatric Symptoms | -.59*** | -.59*** | -.57*** | -.30* | -.30* |
| Substance Days | -.22 | -.14 | -.07 | -.27 | -.15 |
| Confidence to Resist | .22 | .04 | .21 | .10 | .15 |
| Emotion Regulation | -.58*** | -.36* | -.47** | -.40*** | -.44*** |
| Within the TAU Group (N=17) | | | | | |
| Change Scores | Mindfulness | Act | Accept | Describe | Observe |
| Impulsive/Addictive Behaviors | -.40 | -.54* | -.23 | -.26 | .12 |
| Severity of Psychiatric Symptom | -.18 | -.54* | -.43* | -.03 | .46* |
| Substance Day | .31 | .19 | .24 | .12 | .10 |
| Confidence to Resist | .17 | .03 | .20 | -.09 | .20 |
| Emotion Regulation | -.10 | .09 | -.45* | -.01 | .12 |
| Within the TAU+M group (N=20) | | | | | |
| Change Scores | Mindfulness | Act | Accept | Describe | Observe |
| Impulsive/Addictive Behaviors | -.38* | -.49* | -.36 | -.32 | -.17 |
| Psychiatric Symptom Severity | -.73*** | -.75*** | -.74*** | -.43* | -.54** |
| Substance Days | .13 | -.29 | .13 | .07 | .28 |
| Confidence to Resist | -.49* | -.40* | -.42* | -.44* | -.37 |
| Emotion Regulation | -.74*** | -.64** | -.53** | -.61** | -.64** |

Note: [a] Sample completing 3-month follow-up. ***p <.001, **p <.01, *p <.05,

**Table 5:** Correlations Among Change Scores: Examining Directionality (N = 37)a

5a. Mindfulness Change (Pre to Post)b Correlated With Later Clinical Change at Follow-Upc

| Change Scores | Mindfulness | Act | Accept | Describe | Observe |
|---|---|---|---|---|---|
| Psychiatric Symptoms | -.39* | -.31* | -.24 | -.18 | -.06 |
| Psychiatric Symptom Severity | -.45** | -.28 | -.14 | -.17 | -.28* |
| Substance Days | -.31 | .19 | .04 | -.38* | -.42** |
| Confidence to Resist | .12 | -.05 | .43** | .07 | -.23 |
| Emotion Regulation | -.39** | -.25 | -.04 | -.20 | -.28* |

Note: [a]Sample completing 3-month follow-up. [b]Pre-treatment to post-treatment. [c]Pre-treatment to follow-up. ***p <.001, **p <.01, *p <.05.

5.b. Clinical Change (Pre to Post) Correlated With Later Mindfulness Change at Follow-Up

| Change Scores | Mindfulness | Act | Accept | Describe | Observe |
|---|---|---|---|---|---|
| Psychiatric Symptoms | .06 | -.12 | -.15 | .15 | .20 |
| Psychiatric Symptom Severity | .08 | -.08 | -.39** | .25 | .32 |
| Substance Days | -.15 | -.03 | -.22 | -.09 | -.10 |
| Confidence to Resist | .08 | -.20 | .22 | .04 | .08 |
| Emotion Regulation | -.02 | -.07 | -.18 | .12 | .04 |

Note: [a]Sample completing 3-month follow-up. [b]Pre-treatment to post-treatment. [c]Pre-treatment to follow-up. ***p <.001, **p <.01, *p <.05.

mindfulness skills into TAU had more positive effects on substance use behaviours.

### *The Effects of Integrating Mindfulness Skills Training on Trait Mindfulness at Post-treatment and 3-month Follow-up*

Paired-sample t-test showed that neither TAU nor TAU+M resulted in change in overall trait mindfulness. With respect to mindfulness subscales, Acceptance without Judgement did not increase at post-treatment, but did significantly increase at 3-month follow-up for both the TAU, $t(32)=-2.65$, $p<.05$, and TAU+M group, $t(32)=-2.30$, $p<.05$. Increase in Act with Awareness was significant at post-treatment, $t(32)=-2.30$, $p<.05$, and 3-month follow-up, $t(3)=-2.92$, $p<.05$, and reductions on the Observe scale were found at 3-month follow-up, $t(32)=2.14$, $p<.05$; however, these changes were only found for the TAU group (see Table 3).

### *The Effects of Integrating Mindfulness Skills Training on Psychological Wellbeing at Post-treatment and 3-month Follow-up*

Paired-sample t-test showed that both TAU and TAU+M resulted in improved psychiatric function at 3-month follow-up, $t(32)=2.07$, $p<.05$ and $t(32)=3.86$, $p<.001$ , respectively. However, emotion regulation did not change for either treatment group (see Table 3).

### *Exploring the Association Between Change in Mindfulness and Change in Clinical Functioning Following Treatment*

Change in mindfulness was not correlated with change in outcomes measures in the TAU group; however, change in total mindfulness was significantly associated with impulse and addictive behavior, $r=-.38$, $p<.05$; psychiatric symptom severity, $r= -.73$, $p<0.001$; confidence to resist urges, $r=-.79$, $p<.05$; and emotion regulation, $r=-.74$, $p<.001$ (See Table 4).

In exploring directionality of the association between change in mindfulness and change in clinical scores, analyses showed that changes in mindfulness from pre- to post-treatment significantly correlated more often with later clinical changes at follow-up rather than the reverse. Specifically, an increase in overall trait mindfulness from pre- to post-treatment correlated with greater reductions in impulsive/addictive behaviors, $r=-.39$, $p<.05$; severity of psychiatric symptoms, $r=-.45$, $p<0.01$; and emotion regulation difficulties form pre-test to post-test, $r=-.39$, $p<.01$. Analyzing individual mindfulness subscales, change in Act with Awareness was inversely correlated with change in impulsive/addictive behaviors, $r=-.31$, $p<.05$; change in Accept without Judgment was inversely associated with confidence to resist urges, $r=.43$, $p<.01$; and change in Describe and Observe was inversely associated with number of substance use days, $r=-.38$, $p<.05$ and $r=-.42$, $p<.01$, respectively. Only one finding emerged in support of the opposing hypothesis, suggesting that increasing reductions on impulsive/addictive behaviors from pre- to post-treatment were correlated with increasing positive change on the Accept without Judgment subscale, $r=-.39$, $p<.01$ (see Table 5).

## Discussion

Over the last decade, mindfulness-based training has gained considerable attention as a potential technique in the treatment of substance-related abuse and relapse prevention. Mindfulness is described as the ability to direct one's attention to the present moment, attending to thoughts and sensations in an accepting and non-judgemental way. It is proposed that mindfulness-training may attenuate substance abuse and future relapse by encouraging clients to acknowledge the experience of unpleasant thoughts and "triggers" as they arise and to detach from these thoughts, rather than turning to automatic avoidance behaviours, namely substance use (Bowen et al., 2009). The development of these mindfulness skills are important in the context of substance abusing youth, who are generally characterized as poor emotion regulators.

While MI is reportedly the most efficient treatment for this population, it is proposed that the integration of mindfulness skills may enhance efficacy of treatment and long-term sobriety. The goal of the present study was to determine whether integrating mindfulness skills training into MI leads to greater improvements in clinical functioning compared to MI alone at post-treatment assessment and 3-month follow-up.

In the current study, similar significant gains were found for both standard MI and MI with mindfulness

training for psychiatric symptom severity at 3-month follow-up. Not only do these findings support MI as an effective treatment for decreasing psychological symptoms in youth, but further speak to the issue of the timeline for healing and the importance of follow-up assessments. Further, these findings are in line with previous research on the effects of mindfulness training on psychological health. Although baseline symptoms of global psychological heath, depression and anxiety were not statistically different, the integrated mindfulness group tended to score higher on psychological distress (and a trend was found for greater report of depressive symptoms). Thus, it may be suggested that greater gains were experienced through the integration of mindfulness. However, this is completely speculative.

In line with the study hypothesis, integrating mindfulness skills training into a standard MI treatment program significantly improved participants' addictive/impulsive behaviours and confidence to resist urges to use. Despite improvements in substance-use behaviours within the integrated mindfulness group, number of substance use days did not change following treatment or at 3-month follow-up. Notably, neither treatment group resulted in a decrease in reported substance use days, which was surprising given that MI is reportedly an effective treatment approach for substance abusing transition-age youth (Mason & Posner, 2009). It is also unclear as to why the effects of mindfulness training were not extended to daily substance use. One potential explanation may be length of follow-up assessment; perhaps more than three months is required for diminished substance abuse behaviours, such as addictive and impulsive behaviours, to culminate in decreased daily substance use and sobriety. Overall, the present findings align with previous research that has examined the impact of integrating mindfulness training in the treatment for substance abuse and further aligns with the de Dois and colleagues study, who assessed the impact of mindfulness training in age transition-youth (2012).

While the addition of a mindfulness module showed beneficial results above and beyond treatment-as-usual on various outcomes, it is important to note that reports of mindfulness did not significantly change in this group. Further, changes on the mindfulness subscales were found more frequently in the standard MI group than the MI plus mindfulness training group. While the MI group reported a significant increase in ability to act with awareness and accept without judgement, the mindfulness group only reported a significant increase in acceptance without judgement. Thus, one may question the true underlying mechanism of adding mindfulness training to MI; is it an increase in trait mindfulness that leads to better treatment results, or is it the act of physically engaging in mindfulness meditation and non-judgemental awareness that drives treatment outcomes. It may simply be that learning and practicing mindfulness skills help produce positive outcomes. Further, one may also question the face validity of the mindfulness scale and whether it truly reflects what is learned and experienced through mindfulness practice. Nonetheless, self-reported trait mindfulness did associate with psychological outcomes in the present study. At baseline, total trait mindfulness and mindfulness subscales consistently associated with psychiatric symptom severity, emotion regulation, and impulsive/addictive behaviours. Further, changes in mindfulness were consistently associated with improvements in psychiatric symptom severity, emotion regulation, and impulsive/addictive behaviours. It is also important to mention that these associations were greater and more consistent among the integrated mindfulness-training group compared with the standard MI group. Additional research is needed to explore these questions further and to better understand the mechanisms that underlie the effectiveness of mindfulness-based training in substance abuse treatments for transition-age youth.

Although the present findings are novel and important, the study is not without limitations. Apart from a relatively small sample size, the largest limitation was length of treatment, which entailed 4 sessions over the course of 3 weeks. Given the nature and severity of substance abuse among transition-age youth, one may regard the treatment protocol as minimal. Further, due to time restrictions, only three mindfulness modules were selected: path to clear/wise mind, non-judgmental acceptance and urge surfing. It is possible that different modules and/or additional training skills could have been more beneficial. For

example, greater cultivation of "describing" which entails labelling a present emotion without getting involved with that emotion (i.e. describing rather than reacting) may be more effective in improving emotion regulation in this population.

To address these limitations, future studies should assess a similar treatment protocol over a longer time period in a larger sample of substance abusing youth. Further, research should explore whether other mindfulness skills can produce similar or superior results. Although preliminary, these results suggest that incorporating mindfulness skills training into a standard treatment protocol for substance abusing youth may support clinical well-being and short-term relapse prevention.

## Conclusion

This study provides preliminary evidence for the benefits of integrating mindfulness training into standard treatment for substance abuse among transition-age youths. In addition to enhancing psychological well-being, mindfulness skills training can improve behaviours associated with substance abuse, including impulsive/additive behaviours and the urge to use. Continued assessment and modification of standard treatment programs that integrate mindfulness skills training may enhance treatment efficacy and relapse prevention in substance abusing youth.

## References


Appel, J., & Kim-Appel, D. (2009). Mindfulness: Implications for substance abuse and addiction. *International Journal of Mental Health and Addiction, 7*, 506-512.

Baer, R., Smith, G., & Allen, K. (2004). Assessment of mindfulness by self-report. *Assessment, 11*, 191-206.

Barnett, N. R., Colby, S. M., Monti, P. M., Neighbors, C. J., & Rohsenow, D. J. (2010). Cost-effectiveness of a motivational intervention for alcohol-involved youth in a hospital emergency department. *Journal of Studies on Alcohol and Drugs, 71*, 384-394.

Baum, C., Kuyken, W., Bohus, M., Heidenreich, T., Michalak, J., Steil, R. (2010). The psychometric properties of the Kentucky Inventory of Mindfulness Skills in clinical populations. *Assessment, 17*, 220-229.

Beitchman, J., Beitchman, J. H., Adlaf, E. M., Douglas, L., Atkinson, L., Young, A., . . . Wilson, B. (2001). Comorbidity of psychiatric and substance use disorders in late adolescence: A cluster analytic approach. *The American Journal of Drug and Alcohol Abuse, 27*, 421-440.

v Bowen, S., Chawla, N., Collins, S.E., Witkiewitz, K., Hsu, S., Grow, J., Clifasefi, S., … Marlatt, A. (2009). Mindfulness-based relapse precention for substance use disorders: A pilot study. *Substance Abuse, 30*, 295-305.

Bowen, S., Witkiewitz, K., Dillworth, T.M., Chawla, N., Simpson, T.L., Ostafin, B.D., Larimer, M.E., Blume, A.W., & Marlatt, G.A. (2006). Mindfulness mediation and substance use in an incarcerated population. *Psychology of Addictive Behaviors, 20*, 343-347.

Breslin, C., Li, S., Sdao-Jarvie, K., Tupker, E., & Ittig-Deland, V. (2002). Brief treatment for young substance abusers. *Psychology of Addictive Behaviors, 16*, 10.

Brewer, J.A., Sinha, R., Chen, J.A., Michalsen, RN., Babuscio, T.A., Nich, C., Grier, A., Bergquist, K.L., Reis, D.L., Potenza, M.N., Carroll, K., Rounsaville, B.J. (2009). Mindfulness training and stress reactivity in substance abuse: Results from a randomized, controlled stage I pilot study. *Substance Abuse, 30*, 306-317.

Dakwar, E., Mariani, J. P., & Levin, F. R. (2011). Mindfulness impairments in individuals seeking treatment for substance use disorders. *The American Journal of Drug and Alcohol Abuse, 37*, 165-169.

Davis, J., Fleming, M., Bonus, K., & Baker, T. (2007). A pilot study on mindfulness based stress reduction for smokers. *BMC Complementary and Alternative Medicine, 7*, 2.

de Dios, M. A., Herman, D. S., Britton, W. B., Hagerty, C. E., Anderson, B. J., & Stein, M. D. 2012). Motivational and mindfulness intervention for young adult female marijuana users. *Journal of Substance Abuse Treatment, 42*, 56-64.

Derogatis, L.R., & Melisaratos, N. (1983). The brief symptom inventory: An introductory report. *Psychological Medicine, 13*, 595-605.

Dimeff, L., Rizvi, S. L., Brown, M., & Linehan, M. M. (2000). Dialectical behavior therapy for substance abuse: A pilot application to methamphetamine-dependent women with borderline personality disorder. *Cognitive and Behavioral Practice, 7*, 457-468.

Eisen, S.V., Dill, D.L., & Grob, M.C. (1994). Reliability and validity of a brief patient-report instrument for psychiatric outcome evaluation. *Hospital and Community Psychiatry, 45*, 242-247.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 36*, 41-54.

Kabat-Zinn, J. (1990). Full Catastrophe Living. New York, NY: Random House, Inc.

Lewis-Esquerre, J.M., Colby, S.M., Tevyaw, T.O., Eaton, C.A., Kahler, C.W., & Monti, P.M. (2005). Validation of the timeline follow-back in the assessment of adolescent smoking. *Drug and Alcohol Dependence, 79*, 33-43.

Linehan, M.M. (1993). Dialectical behavior therapy for treatment of borderline personalty disorder: Implications for the treatment of substance abuse. *NIDA Research Monograph, 137*, 201-216.

Marcus, M.T., Schmitz, J., Moeller, G., Liehr, P., Cron, S.G., Swank, …Granmayeh, L.K. (2009). Mindfulness-based stress reduction in therapeutic community treatment: A stage 1 trial. *American Journal of Drug and Alcohol Abuse, 35*, 103-108.

Mason, M. J., & Posner, M. A. (2009). Brief substance abuse treatment with urban adolescents: A translational research study. *Journal of Child & Adolescent Substance Abuse, 18*, 193- 206.

Miller, A.L., Rathus, J.H., DuBose, A.P., Dexter-Mazza, E.T., & Goldklang, A.R. (2007). Dialectical behavior therapy for adolescents. In Linda A. Dimeff, & Kelly Koerner (Ed.). *Dialectical Behavior Therapy in Clinical Practice Applications Across Disorders and Setting*s. New York, NY: Guilford Press.

Pereda, N., Forns, M., Pero, M. (2007). Dimensional structure of the Brief Symptom Inventory with Spanish college students. *Psicothema, 19*, 634-639.

Santis, R., Garmendia, M. L., Acuña, G., Alvarado, M. E., & Arteaga, O. (2009). The alcohol use disorders identification test (AUDIT) as a screening instrument for adolescents. *Drug and Alcohol Dependence, 103*, 155-158.

Skinner, H. A. (1982). The drug abuse screening test. *Addictive Behaviors, 7*, 363-371.

Segal Z. V., Williams J. M. G., & Teasdale J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. New York, NY: Guilford.

Vidrine, J. I., Businelle, M. S., Cinciripini, P., Li, Y., Marcus, M. T., Waters, A. J., . . . Wetter, D. W. (2009). Associations of mindfulness with nicotine dependence, withdrawal, and agency. *Substance Abuse, 30*, 318-327.

Sklar, S.M., Annis, H.M., & Turner, N.E. (1997). Development and validation of the drug-taking confidence questionnaire: A measure of coping self-efficacy. *Addictive Behaviors, 22*, 655-670.

Singh, N.N., Wahler, R.G., Adkins, A.D., Myers, R.E., & The Mindfulness Research Group. (2003). Soles of the feel: A mindfulness-based self-control intervention for aggression by an individual with mild mental retardation and mental illness. *Research in Developmental Disabilities, 24*, 158-169.

Sobell, L., & Sobell, M.B. (1995). Alcohol consumption measures. In J.P. Allen & M. Columbus (Ed.), *Assessing alcohol problems: A guideline for clinicians and researchers* (pp. 55-73). Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

Winters, K. C., Latimer, W. W., Stinchfield, R. D., & Henly, G. A. (2000). Examining psychosocial correlates of drug involvement among drug clinic-referred youth. *Journal of Child & Adolescent Substance Abuse,* 9, 1-17.

Witkiewitz, K., Bowen, S., Douglas, H., & Hsu, S. H. (2013). Mindfulness-based relapse prevention for substance craving. Addictive Behaviors, 38, 1563-1571.

Zgierska A, Rabago D, Chawla N, Kushner K, Koehler R, Marlatt A. (2009). Mindfulness meditation for substance use disorders: a systematic review. *Substance Abuse, 30*, 266-294.