Mindfulness Based Relapse Prevention in Jail Drug Treatment

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Introduction

More than half of prisoners in the United States are estimated to suffer from a substance use disorder (National Center on Addiction and Substance Abuse, 2010). In multiple studies, substance use disorder treatment in jail and prison has been shown to reduce post-release substance use and criminal justice involvement (Kelly, Phinney, & Moos, 2005, Ettner et al., 2006). Recently, mindfulness meditation and yoga in incarcerated settings have shown promising results for reducing drug use upon release (Audy, Cope, and Liebling 2017, Lyons and Cantrell 2016). Mindfulness may be defined as intentional regulation of attention to and awareness of the present moment, and nonjudgmental acceptance of the ongoing flow of sensations, thoughts, and emotional states. Prison-based studies of mindfulness have typically been intensive retreats during which participating prisoners are physically separated from the general population (Bowen et al., 2006, Perelman et al., 2012). One promising shorter treatment modality that could be integrated into existing correctional drug treatment programs is Mindfulness Based Relapse Prevention (MBRP). MBRP is structured similarly to Mindfulness Based Stress Reduction (Kabat-Zinn 1982), and includes yoga, sitting, and walking meditation, with additional discussion of applying mindfulness to prevent drug and alcohol relapse (Bowen, Chawla, & Marlatt, 2011). A study of effectiveness of MBRP with women referred by the criminal justice system reported significantly fewer drug use days and fewer legal and medical problems, compared to a relapse prevention protocol (Witkiewitz et al. 2014). In a smaller study of a similar population MBRP led to fewer drug use days and lower addiction severity (Witkiewitz, Brenna, & Bowen, 2013). Two randomized controlled trials of MBRP as aftercare for patients who had completed treatment in the community showed significantly greater reductions in substance use in the MBRP arm compared with treatment as usual (Bowen et al., 2009) and with cognitive behavioral treatment (Bowen et al., 2014). A recent randomized trial compared MBRP to contingency management and showed greater reductions in stimulant use in the MBRP arm, particularly among those with depression and anxiety disorders (Glasner et al., 2017). An abbreviated mindfulness-based intervention with a non-clinical student population demonstrated improvements in mindfulness and positive

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affect compared to a control group, suggesting the utility of a broad application and the feasibility of shortening the intervention (Demarzo et al., 2017).

A recent meta-analysis has suggested that the benefits of MBRP over other treatments in reducing substance use may be limited (Grant et al. 2017). However, to the extent that mindfulness interventions in general may have other beneficial effects for prisoners, MBRP may be particularly useful within a jail. A common problem with many drug treatment programs is that the effects are short-lived; multiple treatment episodes are often needed to achieve lasting recovery, and relapse rates are high (Vaillant, 1995). There is evidence to suggest that the effects of mindfulness meditation training, if a mindfulness practice is established, may last longer than cognitive behavioral treatment (Bowen et al., 2014). MBRP might therefore benefit prisoners released into the community who do not access aftercare. Furthermore, MBRP may have direct benefits on well-being for participants in jails and prisons (Grant et al. 2017, Auty, Cope, & Liebling, 2017). One small study in a prison in Taiwan suggested that MBRP was effective in reducing negative affect compared to treatment as usual (Lee, Bowen, & Bai, 2011). Furthermore, mindfulness training has been shown to reduce trauma symptoms for participants with trauma histories (Goodman, 2012, Vujanovic, 2011), and PTSD symptoms are not a barrier to prisoners' volunteering for and benefiting from meditation (Simpson et al., 2007). One study with an incarcerated population, in the same treatment program as the current study, found a prevalence rate of 21% of probable PTSD (Ruzich, Reichert, & Lurigio, 2014).

Jails in the United States admit almost 20 times as many inmates per year as prisons (Subramanian, Delaney, Roberts, Fishman, & McGarry, 2015). While many jails have substance use disorder treatment programs, these programs could be enriched if there were a body of evidence on programs effective in this setting. However, such research is difficult to conduct for several reasons. First, unpredictability as to length of stay means that it is difficult to give the same dosage of treatment to every research participant. Second, while one pilot study randomized jail inmates into a mindfulness condition vs. treatment as usual (Malouf et al., 2017), no tests of mindfulness interventions in jails or prisons have included an active control group that could account for attention effects, or control for motivation to participate in the treatments. Federal regulations governing research with prisoners discourage treatment as usual as a control, specifying that all prisoner research participants should directly benefit from the study, unless specific permission is granted.[1] However, despite these federal guidelines, there have been few randomized controlled trials involving a comparison condition other than treatment as usual in jails and prisons. In the closed social environment of a jail, two participants receiving different treatments have opportunities to discuss the treatments, leading to contamination between study arms, and jail administration may not allow such an arrangement.

Finally, while mindfulness techniques are universal, the way that they are presented and taught may need to be adapted for men of color from urban communities (Amaro 2014),

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[1]."In cases in which those studies require the assignment of prisoners…to control groups which may not benefit from the research, the study may proceed only after the Secretary has consulted with appropriate experts, including experts in penology, medicine, and ethics, and published notice, in the FEDERAL REGISTER, of the intent to approve such research." 46 *Code of Federal Regulations* 45, section 110(e)(iv).

who are disproportionately represented in the criminal justice system and in jails. A study of application of MBRP to a racially and ethnically diverse population of low-income women reported reduced alcohol and drug use and reduction of perceived stress (Amaro et al., 2014). However, no studies with male substance users in jails that we are aware of have involved a culturally competent trainer of color from a similar background to that of the participants.

Study Design

We sought to design an experimental study of a mindfulness based relapse prevention intervention that addressed these barriers to research in a jail environment. Institutional Review Board approval was obtained from the authors' institution and from the IRB of the jail. In addition, a Certificate of Confidentiality was obtained from the National Institutes of Health. The study was conducted within a drug treatment program at a large urban jail, in which participants were court ordered to specified lengths of treatment. We included an attention control group receiving a communications skills curriculum. Participants were assigned to the treatment vs comparison groups via a novel, cohort based randomization process, described below. In contrast to many research studies, the mindfulness trainings for this mostly African American incarcerated population were conducted by a culturally competent African American male trainer from a socioeconomic background similar to the detainees. To our knowledge, no such individuals have been formally trained in the MBRP program. This trainer has taught stress management via internal self regulation since 1979, including as a therapist for persons with substance use disorders. He also has three decades of experience teaching yoga and meditation to a variety of types of students, including incarcerated juveniles. With the assistance of the Advisory Board, this trainer worked through the MBRP manual and assisted with its extensive adaptation for this population.

Intervention Development

Adaptation of the MBRP curriculum was a multistage process. Using a group of university students and a pre implementation pilot with 11 participants in the jail, we restructured the published MBRP program as a manualized six-week program, in collaboration with the program's author. This length of time is a balance between the dosage necessary to establish a mindfulness practice (Auty, Cope & Liebling, 2017), and the typically short lengths of stay in jail. The published MBRP manual was rewritten and simplified, based on advisory board feedback, and feedback during the training sessions. A seeing meditation exercise and the "Mountain Meditation" were deleted due to the jail setting and poor relatability. The content of some other meditations were changed; for example, the "Walking down the street" exercise, in which participants reflect on their thoughts and feelings toward an ambiguous stimulus, was changed to a "collect call that is dropped" which is a concern of inmates. Each session consisted of a mindfulness meditation exercise and discussion (approx. 40 minutes) and an exercise applying mindfulness to everyday life and high drug relapse risk situations (approx. 30 minutes). Based on input from the focus group and facilitators, each session began with mindful movement/stretching/chair yoga exercises (5 minutes). An outline of the sessions is shown in Figure 1, and the complete revised manual is available from the corresponding author.

The curriculum utilized in the control arm of the study was adapted from Texas Christian University's (TCU) Mapping-Enhanced Counseling Manuals for Adaptive Treatment (Joe et al 2012). Listed in the National Registry of Evidence-based Programs and Practices, TCU's interventions are designed to be administered in substance use disorder treatment programs in a variety of settings including jail-based treatment. TCU curricula are specifically designed to be "mixed and matched" to fit logistical and treatment needs in these settings. This flexibility allowed us to develop a 6 session curriculum matching the mindfulness condition in frequency but 20 minutes shorter. An outline of the comparison arm curriculum is shown in Figure 2.

Study Population

We conducted both the experimental and comparison interventions in a therapeutic community in a separate wing of the jail. Participants are ordered to this program by a judge either pretrial or because of a violation of probation. Because, as noted above, delivery of different interventions at the same time was not feasible, we enrolled participants into the experimental and comparison groups as randomized cohorts over time, of approximately 25 participants per cohort. The planned order of the 6 experimental [E] and 6 control [C] cohorts across the entire study was randomized with the resulting order:

E, C, C, E, E, C, C, E, E, C, E, C.

Eligibility criteria included having been incarcerated for at least two weeks, English speaking, able to understand the consent process, and with at least six weeks remaining on their court ordered stay in the program. After a brief announcement by staff about the study, research staff obtained informed consent from each potential participant. The baseline assessment questions were read aloud to participants and included demographics, drug use behavior prior to incarceration, and psychosocial measures. Within two weeks of the end of the experimental and control intervention sessions (45 days after baseline), participants again completed psychosocial assessments. Participants were paid $15 for each of the two assessments, deposited into their commissary accounts at the jail.

Measures

How to measure change in mindfulness as a result of a mindfulness intervention is a matter of controversy (Grossman, 2008). In line with several other studies, in this study mindfulness was measured by the Five Facets Mindfulness Questionnaire (FFMQ) (short form) (Bohlmeijer, Klooster, Fledderus, Veehof, & Baer, 2011) a 24 item questionnaire that measures five distinct dimensions of mindfulness: observing, describing of emotions, nonjudging, nonreactivity to emotional states, and acting with awareness. In addition, we administered the 14-item Freiburg Mindfulness Inventory (FMI) (Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006), which measures a single construct of mindfulness and whose items may be more appropriate for a low literacy population. Additional psychosocial measures consisted of the Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988), the Penn Alcohol/Drug Craving Scale (Flannery, Volpecelli, & Pettinati, 1999) and the PTSD Symptom Checklist (Blanchard, Jones-Alexander, Buckley,

&Forneris, 1996). The PTSD Symptom Checklist yields both a scale score, and a cutoff for probable PTSD diagnosis. Cronbach's alpha coefficients for the psychological measures at baseline were acceptable, ranging from $\alpha = 0.69$ (the Five-Facets Mindfulness Questionnaire) to $\alpha = 0.92$ (Beck Anxiety Inventory), for the pilot cohort and first experimental cohort combined (n= 34).

In addition, assessment of treatment fidelity with randomly selected treatment and comparison cohorts included whether each task and learning objective outlined in the manual was completed by the facilitator for the given session, and the extent to which recommended interpersonal and group facilitation skills were utilized (i.e. related skills to participants' life, flexibility in responding, reading out loud and explaining all handouts). This measure of treatment integrity was adapted from Lane et al.(2004).

Results

Of 12 planned cohorts, we were able to complete 8 (3 experimental cohorts and 5 comparison cohorts). Due to the trainers' schedules, the final order deviated from the planned randomization in that the eighth cohort was a comparison cohort rather than an experimental cohort. In total, 88 men were enrolled in MBRP training (experimental), and 101 men in the comparison condition. Table 1 shows the characteristics of the study sample at baseline. Fifty- eight percent of the sample were African American men; the average age was 35 years, and most had had 5 or more previous arrests. At baseline, 35% of the sample met criteria for probable PTSD on the PTSD Symptom Scale, in line with the findings of Ruzich et al. (2014). Using independent samples t-tests for continuous variable s and chi-square comparisons for categorical variables at the significance level of p=0.05, there were no statistically significant differences, in demographic or psychosocial characteristics between the treatment and comparison groups at baseline, suggesting that our randomized cohort method was successful in creating equivalent groups.

Table 2 displays correlations between the psychosocial measures of anxiety, drug craving, and PTSD at baseline. These measures were significantly positively correlated with one another and negatively correlated with mindfulness, as measured by the FFMQ and FMI.

Fifty-four (54) MBRP participants and 72 communication skill participants completed both baseline and follow-up measures for an overall follow-up rate of 69%. Independent t-tests were used to assess differential attrition among those who did not complete the intervention (n=65) vs. those who did (n=124). The analyses revealed that their baseline psychosocial characteristics were not statistically different. Tables 3a and 3b show changes in psychological measures among MBRP and comparison group participants, respectively, who completed both the pre- and post-test assessments. In both study arms, PTSD and craving scores declined while mindfulness scores on the Freiburg scale, though not the FFMQ, increased.

Due to attrition between the pre and post tests, the expectation-maximization (EM) method was used to create maximum likelihood estimates and model psychological outcomes (Table 4). The analysis revealed that after controlling for the Freiburg mindfulness pre-test, there

was a small but significant improvement (at $p < 0.05$) in the Freiburg mindfulness score among participants in the mindful meditation condition compared to the communication skills condition.

While the statistical significance of this finding should be qualified in view of multiple comparisons made within these data, it suggests that the Freiberg measure may have been more responsive than the more commonly used FFMQ with this population. There were no significant differences between study arms in improvements in the other psychological outcomes, although the decline in anxiety and PTSD was greater in the experimental condition than the control condition.

Discussion

A six week mindfulness intervention is feasible in a jail setting, and results suggest that it may reduce symptoms of drug craving and PTSD, and result in a small but significant increase in mindfulness as measured by the Freiberg inventory. The current study is the first to our knowledge to involve a culturally competent mindfulness trainer from the same background as many of the participants. This study is also the first to compare MBRP in a jail setting to a manualized attention control condition of equivalent frequency and roughly comparable session length, rather than treatment as usual.

A novel cohort randomization process was used to assign participants to conditions. While this design may be subject to history effects, it permits a more robust comparison than treatment as usual, and is more feasible for a jail setting than randomization by participant. We were unable to adhere completely to the initial randomization plan; however, there were no significant differences on measured variables between the two treatment arms at baseline.

Since mindfulness interventions outside of jail settings have been shown to be efficacious in reducing PTSD symptoms, we may speculate as to why our intervention did not significantly outperform the communications skills condition on this measure. It may be that one session per week for six weeks is inadequate to convey mindfulness concepts and establish a mindfulness practice among participants. It is also likely that participants in both conditions were improving in their PTSD, anxiety, and craving symptoms due to their participation in the jail treatment or positive interactions with the research staff and peers, effects that may have outweighed between-group differences.

Several limitations of the study should be noted. First, we were unable to follow participants in the community to assess substance use after release from jail. To explore the effect of the intervention on recidivism after release from incarceration and with the consent of participants, we plan to compare de-identified arrest information prospectively on the participants enrolled in the experimental vs. comparison arms. This analysis will be ongoing in the future. Second, despite the fact that most participants had a court order to complete a treatment program, our follow up rate of 69% was low, primarily because participants were released or transferred. Third, since both the treatment and comparison interventions took place in a therapeutic jail community, we are unable to distinguish the effects of MBRP from the beneficial effects of other treatment received by participants.

In conclusion, MBRP is a promising intervention as an adjunct to jail substance use disorder treatment. MBRP may be especially beneficial in jail, because it is a very stressful environment and because participants are likely to have abstained from alcohol and drug use for a period of time. More research is needed on mindfulness interventions adapted for disadvantaged populations such as those in jails and prisons.

Acknowledgments:

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Session 1: Introduction and Automatic Pilot
1. Mindful Movement
2. Exercise: Raisin Exercise
3. Meditation: Body Scan
4. Discussion: What is Mindfulness?

Session 2: Awareness of Triggers and Craving
1. Mindful Movement
2. Meditation: Body Scan
3. Exercise: Urge Surfing
4. Discussion: Craving/Common Challenges in Meditation Practice

Session 3: Mindfulness in Daily Life
1. Mindful Movement
2. Meditation: Awareness of Hearing and Breath Meditation
3. Exercise: SOBER Breathing Space
4. Discussion: SOBER Breathing Space

Session 4: Mindfulness in High Risk Situations
1. Mindful Movement
2. Meditation: Seeing Thoughts as Thoughts
3. Exercise: SOBER Breathing Space in Challenging Situation
4. Discussion: Individual and Common Relapse Risks

Session 5: The Relapse Cycle
1. Mindful Movement
2. Meditation: Breath, Sound, Sensation, Thought, Emotion
3. Discussion: The Relapse Cycle

Session 6: Self-care, Social Support, and Continuing Practice
1. Mindful Movement
2. Meditation: Lovingkindness
3. SOBER Breathing
4. Discussion: Continuing Practice
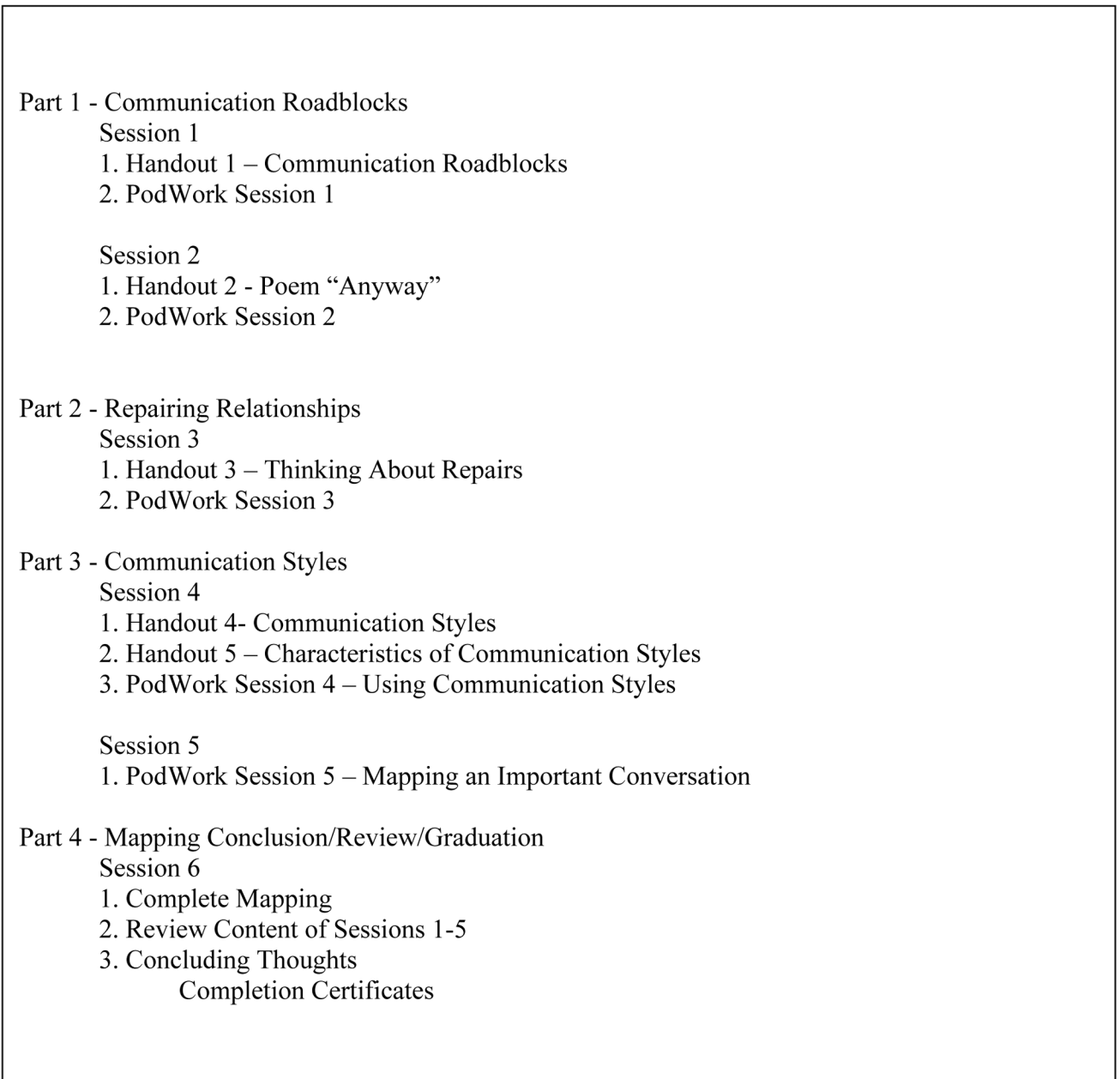
Figure 1:
MBRP Session Outline

Part 1 - Communication Roadblocks
      Session 1
      1. Handout 1 – Communication Roadblocks
      2. PodWork Session 1

      Session 2
      1. Handout 2 - Poem "Anyway"
      2. PodWork Session 2

Part 2 - Repairing Relationships
      Session 3
      1. Handout 3 – Thinking About Repairs
      2. PodWork Session 3

Part 3 - Communication Styles
      Session 4
      1. Handout 4- Communication Styles
      2. Handout 5 – Characteristics of Communication Styles
      3. PodWork Session 4 – Using Communication Styles

      Session 5
      1. PodWork Session 5 – Mapping an Important Conversation

Part 4 - Mapping Conclusion/Review/Graduation
      Session 6
      1. Complete Mapping
      2. Review Content of Sessions 1-5
      3. Concluding Thoughts
          Completion Certificates

Figure 2:
Communications Skills Session Outline

Table 1.

Characteristics of Participants at Baseline

	Total N= 189	Mindfulness Treatment N=88	Comparison Treatment N=101
African American, %	58.9	51.9	64.6
Hispanic/Latino, %	18.6	19.2	18.1
Previously arrested more than 5 times, %	56.1	58.3	54.2
Age, mean (standard deviation)	35.8 (11.3)	35.9 (11.4)	35.7 (11.2)
High school diploma or higher, %	58.5	57.1	59.6
Never participated in yoga or meditation, %	75.0	81.0	70.2
Met criteria for PTSD, %	35.8	46.4	27.4

Table 2.

Correlations between Psychological Characteristics and Mindfulness at Baseline (n=189)

	Anxiety	PTSD	Drug Craving	Mindfulness (FFMQ)
Anxiety	1			
PTSD	.486[**]	1		
Drug Craving	.391[**]	.353[**]	1	
Mindfulness (FFMQ)	−.373[**]	−.483[**]	−.261[**]	1
Mindfulness (Freiburg)	−.156[*]	−.249[**]	−.210[**]	.495[**]

Note:

[*] = p<.05

[**] = p<.01

FFMQ – Five Facets Mindfulness Inventory; PTSD – Post-traumatic stress disorder

Table 3a.

Changes in Psychosocial Outcomes for Mindfulness Treatment Group (n=54)

Measure	Mean (S.D.) T1	Mean (S.D) T2	df	T-Score	P-Value	Effect Size (d)
Anxiety	32.2 (9.2)	29.3 (8.0)	53	2.30	.03	0.32
PTSD	44.1 (15.1)	34.5 (10.4)	53	4.90	.00	0.67
Drug Craving	11.0 (6.4)	8.0 (3.2)	53	3.78	.00	0.52
Mindfulness (FFMQ)	78.1 (9.7)	81.1 (11.0)	53	−2.07	.04	−0.28
Mindfulness (Freiburg)	36.0 (8.1)	40.2 (6.3)	53	−3.88	.00	−0.53

Table 3b.

Changes in Psychosocial Outcomes for Comparison Group (n=71)

Measure	Mean (S.D.) T1	Mean (S.D) T2	df	T-Score	P-Value	Effect Size (d)
Anxiety	29.6 (9.4)	28.0 (8.1)	70	1.51	.14	0.18
PTSD	38.9 (12.2)	33.2 (11.1)	70	4.01	.00	0.48
Drug Craving	11.9 (6.7)	8.9 (4.2)	70	4.00	.00	0.47
Mindfulness (FFMQ)	79.2 (9.1)	81.3 (10.5)	70	−1.93	.06	−0.23
Mindfulness (Freiburg)	34.5 (7.4)	37.3 (6.6)	70	−3.44	.00	−0.41

Table 4:

Hierarchical Regression Analysis Predicting Psychological Outcome Change Scores from Baseline Measures and Condition Type

Step	Predictor Variable	F (df) for Equation	R^2	b	SE	β	t^a
Analysis predicting anxiety change scores from the pre-scores and treatment conditions							
1	Anxiety Pre-Score	160.00 (1, 199)	.45	−.57	.05	−.67	−12.65[**]
2	Treatment vs. Control	79.68 (2, 198)	.45	−.23	.79	−.02	−.29
Analysis predicting PTSD change scores from the pre-scores and treatment conditions							
1	PTSD Pre-Score	273.11 (1, 199)	.58	−.65	.04	−.76	−16.53[**]
2	Treatment vs. Control	135.97 (2, 198)	.58	.33	1.11	.01	.30
Analysis predicting Drug Craving change scores from the pre-scores and treatment conditions							
1	Drug Craving Pre-Score	540.12 (1, 199)	.73	−.77	.03	−.86	−23.24[**]
2	Treatment vs. Control	270.71 (2, 198)	.73	.41	.40	.04	1.04
Analysis predicting mindfulness (FFMQ) change scores from the pre-scores and treatment conditions							
1	Mindfulness (FFMQ) Pre-Score	37.85 (1, 199)	.40	−.33	.05	−.40	−6.15[**]
2	Treatment vs. Control	18.94 (2, 198)	.40	−.47	1.06	−.03	−.44
Analysis predicting mindfulness (Freiburg) change scores from the pre-scores and treatment conditions							
1	Mindfulness (Freiberg) Pre-Score	146.51 (1, 199)	.42	−.52	.04	−.65	−12.10[**]
2	Treatment vs. Control	76.47 (2, 198)	.44	−1.34	0.66	−.11	−2.03[*]

Note: The first block is an analysis of the pre-score psychological outcome change score. The second block is an analysis of the condition type on the psychological outcome change score controlling for the pre-score.

[*] p < .05

[**] p < .01