

Freedom from Within: A Meta-Analytic Review of Mindfulness Meditation-Based Interventions in Prisons

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ABSTRACT

Mindfulness meditation-based interventions (MMBIs) are progressively being integrated into the correctional space. The current study investigated behavioral-specific MMBI trends amongst incarcerated populations, focusing on substance use and recidivism. A meta-analytic review of quantitative research explored whether prison MMBIs significantly influence criminogenic behavior. The seventeen studies included in the meta-analytic review were explicitly selected for substance use and recidivism outcomes in prison MMBI research over the past 50 years. Statistical trends in MMBIs were identified and interpreted. Substance use data demonstrated a standardized mean difference of -0.94 with a 95% confidence interval [-1.98 to -0.09]. Recidivism data showed an odds ratio of 1.34 with a 95% confidence interval [1.17 to 1.49]. The pooled effect sizes from both variables were meaningful, demonstrating both tests of overall effect as statistically significant in reducing substance use ($p < 0.05$) and recidivism ($p < 0.01$). The evidence from this research suggested that MMBIs within prisons serve as a valuable program to be incorporated alongside rehabilitation protocols.

1. Introduction

Research has frequently indicated the counterproductive nature of incarceration to serve as a rehabilitation space with high recidivism rates highlighting insufficiencies in correctional institutions and the difficulties prisoners face circumventing re-incarceration (Day, 2020; Pratt, 2019). Prison imposes severe deprivations on incarcerated individuals who often already possess psychological disturbances. Two-thirds of those incarcerated report the use of illicit drugs and/or alcohol directly prior to their incarceration (De Andrade et al., 2018; Lyons & Cantrell 2015). Correspondingly, recidivism rates for parolees combined with relapse rates for substance use in incarcerated people are greater than 50%, with illegal drug-seeking behaviour and participation in unlawful activities leading to repeated involvement in the criminal justice system (Hamilton & Belenko, 2019). Amidst the prison environment, correctional policies assume rehabilitation can occur through educational programs, behavioral interventions and socialization improvements. Granados et al. (2023) argue that programs that exclude

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psychological development, physical wellness, mental balance, and empathy call into question the efficacy of such initiatives, whereby the separation of these qualities falls short of deeply rehabilitating the offender.

Over the past several decades, the increasing popularity of mindfulness has been incorporated into Western practices as a fundamental technique for introspection and a noted therapeutic tool (Spina, 2023). This increased awareness of mindfulness has contributed towards a progression in attitudes regarding institutional reform and the rehabilitation of incarcerated people (Hunnicuttt & Rhodes, 2015). Differential procedures have been used in prisons, commonly in the form of transcendental meditation, mindfulness-based interventions (mindfulness-based stress reduction, mindfulness-based cognitive therapy) and Vipassana meditation. Although these techniques vary in delivery, all are aimed towards the individual acquiring life-long inner resources in self-awareness, self-regulation and healthy coping strategies (Davies et al. 2021; Spina, 2023). For the current study, the name Mindfulness Meditation-Based Interventions (MMBIs) was composed to encompass the variety of structured prison meditation programs aimed at generating awareness of moment-to-moment understanding encountered by the mind to reduce reactivity to acute experiences, whether positive, negative, or neutral, in an unfiltered manner, thus increasing well-being (West, 2016).

Although there is a growing body of meta-analytic investigations on meditation practices within clinical populations, previous reviews within prisons are limited. These have usually examined a broad range of undefined dependent outcomes (such as psychological well-being and behavioral functioning) rather than specific components of criminogenic behavior (such as substance use and recidivism) (see Auty et al., 2017; Derlic, 2020). This paper addresses the gap in the literature by conducting a meta-analytic review of MMBI impact of behavioral-specific evidence of substance use and recidivism.

2. Literature Review

2.1. The Ideology of Mindfulness Meditation and Application for Incarcerated Offenders

Mindfulness meditation diverges from other rehabilitative initiatives as an individual learns to understand their mental life by observing the interaction of the body and the mind (Hunnicuttt & Rhodes, 2015). The aim is to develop non-judgmental relationships to thoughts as they occur through an objective, detached form of self-observation without reaction (West, 2016). Accordingly, Roos et al. (2020) posit that meditation-based programs may promote awareness of internal and external contextual circumstances and a greater nonreactivity toward negative thoughts stemming from distressing events. Further, Garland et al. (2009) contend that mindfulness reinforces meaning-focused coping by facilitating positive reappraisals. Known as decentering, increases in mindfulness shift cognitive sets, enabling the realization that emotions are separate from facts, resulting in alternative appraisals (Grecucci et al., 2015). Sears and Kraus (2019) found that those who practiced meditation had significant anxiety and negative affect reductions, exhibiting a meaningful driving mechanism in reducing cognitive distortions. Similarly, Jones et al. (2019) further examined the effects of mindfulness meditation on coping flexibility, which continued weeks post-intervention. This 'mindful reappraisal' increased attentional flexibility and broadened awareness, increasing psychological and behavioral functioning that self-perpetuates in an upward spiral over time, thus reducing maladaptive coping strategies (Garland et al., 2009).

Respectively, the evolving role of MMBIs in prison settings has demonstrated promise for incarcerated populations to transform negative thought patterns and decrease the likelihood of

impulsive criminal habits such as substance use and cycles of recidivism. Findings from Davies et al. (2021) demonstrate the mechanism of MMBIs as a tool that reinforces the ability of individuals to engage in healthy connections, releasing the built-up self-protective stance constructed in prisons, with Bouw et al. (2019) reporting an increase in a willingness to participate in prison-offered treatment programs and cooperation with prison authorities. Accordingly, MMBIs reflect a transition from the ‘problem-and-treatment only’ prison paradigm to a holistic model that promotes prison safety, mental health, and positive re-entry outcomes.

Therefore, the central aim of the present study is to understand to what extent MMBIs impact incarcerated populations systematically. Based on the appraised literature and the knowledge gap, the following study represents the first meta-analytic review of prison MMBIs focusing on defined covariates - substance use and recidivism - and their specific contributions, quantifying the effect size of MMBIs. Specifically, the research examines whether prison programs that utilize MMBIs improve behavior compared to pre-test measures and active controls of incarcerated populations. Based on these aims, the following research has been guided by the question: *To what extent do mindfulness meditation-based interventions influence behavioral changes in incarcerated populations regarding substance use and recidivism?*

3. Method

3.1. Theoretical Framework

The underpinnings this research was approached through the positivist paradigm. In accordance with Khanna (2019), the essence of positivism is one of a scientific method, combining mainly deductive logic and employing predominantly quantitative methods to seek an explanation and prediction of the phenomena observed. Within such a paradigm, knowledge is obtained from a factual and impartial source through an objective lens (Hasan, 2016). The researchers believe that it is appropriate to examine the effectiveness of prison MMBIs using a positivist approach as data will be data gathered and aggregated from pre-existing statistical explorations of prison MMBI research (Quick & Hall, 2015). Hence, observable, quantifiable numerical data will be examined to summarize information regarding the extent this intervention impacts behaviour.

3.2. Systematic Review & Meta-Analysis

This research is based on a quantitative methodology, employing a systematic review and meta-analysis to produce an unbiased summary, drawing a robust conclusion of the aggregate evidence regarding prison MMBIs and their effect on behavioral changes within incarcerated individuals (Gough et al., 2017). Additionally, a meta-analysis was performed to observe the strength of the relationship between the two variables, providing a more accurate interpretation of the intervention’s effectiveness (Siddaway et al., 2019). The objective was to calculate the standardized effect on various prison MMBIs and whether they impact incarcerated individuals with regard to the specified behavioral covariates, substance use and recidivism. These behavioral changes have been analyzed through official records pertaining to substance and alcohol use, prison rule infractions, re-arrests, re-incarceration, parole outcomes and self-reports.

3.3. Defining Inclusion & Exclusion Criteria

Studies were eligible for inclusion if they satisfied the following criteria: (1) the research focused on an MMBI; (2) populations were incarcerated adults in a jail, prison or correctional facility; (3) participants were incarcerated at the initial time of the study; (4) the research study included an active control; (5) the research contained the dependent behavioral variable changes substance use and recidivism; (6) the research comprised of pre- and post-data; (7) data was obtained from multiple measurement points; (8) only quantitative research was accepted; (9) studies could include randomized controlled trials (RCT), cross-sectional, longitudinal, quasi-experimental, cohort; (10) studies were conducted in the last fifty years; (11) the research was conducted in any country; and (12) the research was presented in English. Exclusion criteria applied if: (1) MMBIs were not the primary treatment; (2) the intervention was evaluated using only qualitative designs; (3) the study only had one point of measurement; (4) the study only looked at psychological changes; or (5) anecdotal or preliminary reports.

3.4. Search Strategy

The literature search was conducted through Google Scholar, PubMed, Scopus, Science Direct, Research Gate, SpringerLink, ProQuest, APA PsycNet, Elsevier, Semantic Scholar and JSTOR. The researcher used the following search terms (with synonyms and closely related words: (mindfulness* or meditation*) AND (prison* or incarceration* or offender*) combined with (behavioral functioning* or substance use* or criminal behavior* or recidivism*). Searches were not limited by study design or sample size. Other potential sources beyond the databases included citations and references from significant peer-reviewed articles from existing research.

3.5. Risk of Bias within Individual Studies

The risk of bias within individual studies was assessed using the Cochrane Collaboration tool (Higgins et al., 2011). This consisted of items pertaining to research design, method group allocation, concealment, details of the intervention, MMBI facilitators, explanations of attrition, and an overall summary assessment of the risk of bias within the individual studies.

3.6. Approach to Data Synthesis and Analysis

A random-effects model analysis was employed to account for between-study variance, allowing for real differences in the treatment effect (Nagashima et al., 2019). The meta-analysis of the research contained three mandatory phases: (1) measures of effect size with its 95% confidence intervals and summary of the individual studies; (2) measures of heterogeneity; and; (3) integration of the studies statistically (Gough et al., 2017). The analysis aimed to identify trends across the studies and assess whether the strength of the MMBI effect exists in a positive or negative direction. All means, standard deviations and percentages found within the selected studies were then calculated using the statistical programming meta package R to determine effect sizes, confidence intervals, standardized mean differences, standard errors and odds ratios.

Data obtained from the selected studies determined the meta-analysis model. Standardized mean differences were used to build forest plots of continuous data to evaluate differences in MMBIs and low or high frequency of substance use. Odds ratios were used to build forest plots of dichotomous data to assess differences in MMBIs and recidivism. Forest plots visually exhibited the weight of each MMBI study and their confidence intervals with its pooled effect, the overall observed effect of the comparative studies, heterogeneity, and statistical

significance (Gough et al., 2017). Furthermore, Borenstein's et al. (2009) I^2 statistic was used to test heterogeneity as it measured the proportion of total variability in the pooled effect size influenced by heterogeneity rather than variations due to sampling error.

The risk of bias across studies and potential publication bias was graphically represented using Egger's et al. (1997) funnel plot. Plots presented the variability of the individual studies (standard error) against the mean effect sizes and odds ratios. Finally, Rosenthal's (1979) fail-safe N , Begg and Mazumdar's (1994) rank correlation test and Egger's et al. (1997) regression intercept test were used to test funnel plot asymmetry and to quantify publication bias.

4. Results

4.1. Study Selection

The research objective was to identify MMBIs among incarcerated populations with reference to substance use and recidivism. Screening began with identifying inclusive and exclusive studies that were relevant to the title and abstract. Total search results yielded 92 citations. Following duplicate citation removal and abstract screening, 40 articles remained. Full-text articles were retrieved, and the remaining articles were located within reference lists, with 16 being excluded, having not met the inclusion criteria. Of the 32 articles remaining, 15 were excluded for reasons summarized in Figure 1. Conclusively, the remaining 17 full-text articles were reviewed and confirmed eligible for inclusion, having met all the outlines criteria of MMBI's as the independent variable. Of these 17 studies, 8 corresponded with substance use and 10 studies with recidivism, with one of these studies (Malouf et al., 2017) examining both covariates. One study was based in Taiwan, one in India and the remaining in the United States. All studies were written in English and published between 1973 and 2018.

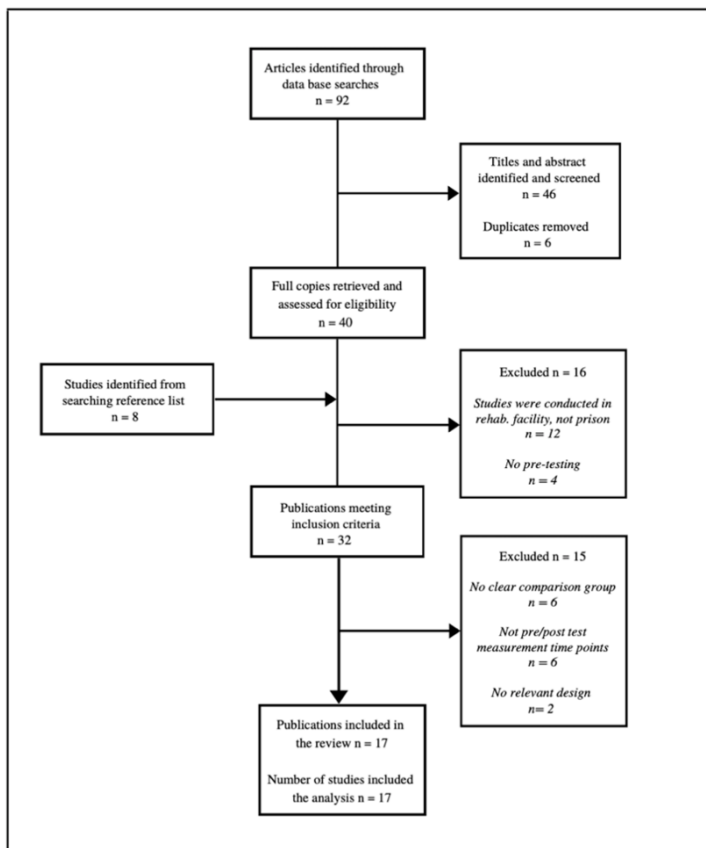


Figure 1. Flow chart of study selection procedure

4.2. Classification of Dependent Measures

The classification of the dependent measures was determined by the data found within the 17 full-text articles. Each dependent measure examined throughout the selected studies was summarized into 8 different categories to be coded under the two covariates - substance use and recidivism. Substance use contained the variable codes; alcohol use, illicit drug use, locus of control/cravings, and expectancy of use. Recidivism consisted of the variable codes; recidivism/re-incarceration, re-offending/re-arrest, parole revocations/outcomes, and prison rule infractions/criminal propensity. Only the dependent measures in the aforementioned inclusion criteria were examined. Dependent measures were classified under a positive-negative dimension to indicate whether changes led to a reduction or increase in the dependent measures.

4.3. Data Extraction and Summary of Study

Table 1 displays the extracted data summarizing the key study characteristics included in this review. To avoid data extraction inconsistencies or the possibility of misinterpreting data leading to error or bias, the co-authors completed data extraction separately to ensure inter-rater reliability (Higgins et al., 2011). Minimum, medium and maximum correctional facilities can be observed in the review, demonstrating a diverse range of incarcerated populations. Males were the predominant sex, with a mean age of 33.96. The mean sample population consisted of $n=66.22$ for MMBIs and $n=127.67$ for active controls.

Table 1.

Characteristics of Studies Reporting the Effects of MMBIs on Behavioral Changes - Substance Use and Recidivism

Study	Primary Aim	Participants	Intervention	Comparison	Outcome (Measure)
Substance Abuse					
Bowen et al. (2006)	VM on post-incarceration, substance use and psychological outcomes	Male: 79.2% Female: 20.8% Age: 37, 48 Min. security	10-day VM course, 11 hrs per day (n=63)	Education, addiction program (n=242)	VM decrease in alcohol/substance use, alcohol related problems, psychiatric symptoms. Increases in psychosocial outcomes, internal drinking-related locus of control and optimism. Less significant finding in comparison (pre, post, 3 and 6-month follow-up assessments: DDQ, DDTQ, SIP, DRIE, WBSI, BSI, LOT)
Bowen et al. (2007)	VM on thought suppression/avoidance and subsequent alcohol use	Male: 79% Female: 21% Age: 37.5 Min. security	10-day VM course, 11 hrs per day (n=57)	TAU (n=116)	VM decrease in avoiding unwanted thoughts than TAU. Post-treatment drinking regressed for VM and TAU. Change in WBSI subscale scores regressed for VM. Change in levels of avoidance partially mediated between VM and alcohol use at 3-month follow-up compared to TAU (pre and post assessments: WBSI, DDQ, SIP)

Study	Primary Aim	Participants	Intervention	Comparison	Outcome (Measure)
Lee et al. (2011)	MBRP on psychosocial variables among abstinent incarcerated illicit drug users who abstinent	Male Age: 40.7, n/a.	MBRP, 10 weeks, 1.5 hrs per week (n=10)	TAU (n=14)	MBRP significantly higher negative expectancies of use, decreased depressive mood over time compared to TAU. Neither changes in positive expectancies nor self-efficacy. Differences BDI-II scores among MBRP showing downward trend over time (pre and post assessments: DUDIT-E, DASE, BDI-II)
Lyons et al. (2018)	MBRP for a jail substance use disorder treatment setting	Male Age: 35.8, Urban jail	MBRP, 6 weeks, 1.5 hrs week (n=88)	Comm. skill program (n=101)	At baseline, measures of mindfulness were inversely correlated with anxiety, PTSD symptoms and drug cravings. Anxiety, PTSD symptoms, drug cravings declined in both treatment arms. Comparison of the two study arms suggested small but significant increase in mindfulness treatment arm (pre and post assessments: FFMQ, FMI, BAI, PACS, the PTSD Symptom Checklist)
Malouf et al. (2017)	REVAMP on post-release risky behavior including crime and substance misuse	Male. Age: n/a, Min. security	REVAMP 4-week course, 1.5 hrs per week (n=21)	TAU (n=19)	Statistically significant trend of medium effect size for lower criminal behavior in the REVAMP group compared to TAU. REVAMP group demonstrated a greater (although not statistically significant) reduction of substance misuse compared to TAU (pre, post and 3-month follow-up assessments: BSCS, UPPS-P, TCU-CRTF)
Marlatt et al. (2004)	VM and other rehabilitation programs on alcohol/drug use, alcohol/drug-related consequences	Mixed Age: 37.71, Min. security.	10-day VM course, 11 hrs per day (n=29)	TAU, volunteer courses (n=59)	VM significant differences in pre-course to 3-month follow-up on SIP, DAST, DRIE, LOT and WBSI average weekly drug use, peak weekly marijuana and powder and crack cocaine. Both VM and comparison significant improvements in marijuana use pre-course to 3-month follow-up (pre, post and 3-month follow-up assessments: WBSI, BSI, LOT, SIP, ASI, AUDIT, ADS, DAST, DRIE, RCQ)

Study	Primary Aim	Participants	Intervention	Comparison	Outcome (Measure)
Simpson et al. (2007)	MBI on comorbidity in PTSD symptoms and SUD	Mixed Age: 37.6, Min. security	10-day VM course, 11 hrs per day (n= 57)	TAU (n=117)	VM greater reductions in substance use regardless of PTSD symptom severity levels, illicit drug use and drinking outcomes than TAU. VM lower use at 3-month follow-up (pre, post and 3-month follow-up assessments: DDQ, DDTQ, SIP-2R, BSI, PCL-C)
Witkiewitz et al. (2005)	VM as a treatment for addictive behavior and relapse prevention	Mixed Age: 37.71, Min. security	10-day VM course, 11 hrs per day (n=29)	TAU, volunteer courses (n=59)	VM greater reductions in average marijuana, powder cocaine, crack cocaine use, drinking per week. Significant time by treatment interaction at 3-month period for VM than TAU (pre, post and 3-month follow-up assessments: DAST, DRIE, SIP, ASI, LOT, WBSI)
Recidivism					
Alexander (1982)	TM on psychological changes, ego-development and recidivism rates	Male Age: 28.6, Max. security	TM, 20 months, 20 mins twice daily (n=53)	Counseling, drug rehab, AA, religious activities, political caucus, education and control (n=240)	TM significant increase in ego development, post conceptual experience and decreased aggression, schizophrenic symptoms, trait-anxiety. TM recidivism 32% lower than four programs combined (46%) (four-year assessment: DOC records, SCT, DIT, SCI, TAS, STAI, SHAPS, TAT)
Alexander et al. (2003)	TM on recidivism	Male Age: n/a, Max. security	TM, 59 months, 20 mins twice daily (n=53)	Counseling, drug rehab, Christian org., Muslim activities (n=233)	New convictions lower for TM (11.4%) than combined comparison (21.7%), with warrant for arrest/returned to prison 41.5% TM compared to 56.5% combined comparison. (59-month assessment: DOC records)
Ballou (1973)	TM on state and trait anxiety, participation in prison activities, and rule infractions	Male Age: n/a, Max. security	TM, 10 weeks, 20 mins twice daily (n=30)	Matched controls (n=36)	TM substantial decrease trait/state anxiety, TAU increased slightly. Prison rule infractions reduced two-thirds for TM, almost no change for TAU (10-month assessment: STAI, self-report prison activity, prison records of inmate infractions)

Study	Primary Aim	Participants	Intervention	Comparison	Outcome (Measure)
Bleick (1983)	TM on parole outcomes (less recidivism, more clean parole records)	Male Age: n/a, Med. & min. security	TM, 20 mins twice daily, n/a, (n=203)	Matched control (n=203)	TM significantly better parole outcomes than matched control. TM significantly more clean parole records, less total prison recidivism (parole revocations, new prison terms) (1, 6 month and 2-year assessments: parole revocations new prison terms (DOC records))
Bleick & Abrams (1987)	TM on recidivism reduction	Male Age: 33, Max. & med. security	TM, 12 weeks, 20 mins twice daily (n=259)	Match controls (n=259)	TM superior parole outcomes, rap sheet records, outcome rank significantly lower (better) every year after release compared to statewide parolee data. Decrease in recidivism, compared to matched control (6 month, 1 and 2-year assessments: post-release criminal records, parole data, rap sheets, pending case data, prison term reductions)
Khurana & Dhar (2000)	VM on subject well-being and criminal propensity	Female Age: n/a, Max. security	10-day VM course, 11 hrs per day (n=30)	Matched control (n=30)	VM scored higher on subjective well-being than matched control. VM scored lower in criminal propensity than control however, the difference was not significant (pre and post assessment: SUBI, CP)
Malouf et al. (2017)	REVAMP on improving mindfulness, proximal outcomes of action, reduction of post-release risky criminal behavior	Male. Age: n/a, Min. security	REVAMP 4-week course, 1.5 hrs per week (n=21)	TAU (n=19)	Significant decrease in non-judgment of self and shame, significant increase in willingness/acceptance compared to TAU. Re-arrest: REVAMP (62.5%), TAU (80%) (pre, post and 3-year follow-up assessments: MIND, TOSCA-4, PAI, Correctional Treatment Forms, official crime records)
Murphy (2002)	VM on post-program criminal behaviour	Mixed Age: 37.71, Min. security.	10-day VM course, 11 hrs per day (n=75)	General prison population (n=437)	Overall rate of recidivism for VM was 56% compared to general prison population 75%. Average number of bookings declined from 2.9 pre-program to 1.5 post-program for VM (pre, post and 2-year assessment: King County Jail records)

Study	Primary Aim	Participants	Intervention	Comparison	Outcome (Measure)
Perelman et al. (2012)	VM on long-term psychological and behavioral effects (anger, emotional intelligence, mood states, prison rule infractions)	Male. Age: 35.4 High security, long-term offenders.	10-day VM course, 11 hrs per day (n=60)	House of Healing, stress management, healthy coping seminars (n=67)	VM significant increase mindfulness, emotional intelligence, significant decreases in mood-disturbance. Comparison slight increase mindfulness, emotional intelligence. Both groups reduced average annual infractions rates (pre, post and 1-year follow-up assessments: CAMS-R, NAI-25, POMS-SF, TMMS, prison records, infirmary visits)
Rainforth et al. (2003)	Recidivism examination over 15-year period among former inmates who learned TM	Male Age: 37.4, Max. security	TM, n/a, (n=120)	Voluntary programs: education, vocational training, group therapy (n=128)	TM recidivism rate follow-up period reduced 46.7% compared to comparison (to 66.7%). Cox regression model reduced 43.5% for TM, Weibull model 58.1% TM versus 73.7% comparison would re-offend. Levels of severity, rates of reoffending lower in TM than comparison (15-year assessment: post-release criminal records, rap sheets, follow-up rearrest)

Note: n = number of participants, Vipassana Meditation (VM), Mindfulness-Based Relapse Prevention (MBRP), Mindfulness-Based Intervention (MBI), Transcendental Meditation (TM), Re-Entry Values and Mindful Program (REVAMP), Substance Use Disorder (SUD), Daily Drinking Questionnaire (DDQ), Daily Drug-Taking Questionnaire (DDTQ), Short Inventory of Problems (SIP), Drinking-Related Locus of Control Scale (DRIE), White Bear Suppression Inventory (WBSI), Brief Symptom Inventory (BSI), Life Orientation Test (LOT), Drug Use Identification Disorders Test: extended (DUDIT-E), Drugs Avoidance Self-Efficacy Scale (DASE), The Beck Depression Inventory-II (BDI-II), the Five-Facet Mindfulness Questionnaire (FFMQ), the Freiburg Mindfulness Inventory (FMI), Beck Anxiety Inventory (BAI), the Penn Alcohol/Drug Craving Scale (PACS), the PTSD Symptom Checklist, Addiction Severity Index (ASI), Alcohol Use Disorders Identification Test (AUDIT), Alcohol Dependence Scale (ADS), Drug Abuse Screening Test (DAST), Readiness To Change Questionnaire (RCQ), the Short Inventory of Problems - Revised (SIP-R), Post Traumatic Stress Disorder Checklist-Civilian version (PCL-C), Department of Corrections (DOC), Washington University Sentence Completion Test (SCT), The Defining Issues Test (DIT), Stage of Consciousness Inventory (SCI), Tellegen Absorption Scale (TAS), State-Trait Anxiety Inventory (STAI), Special Hospitals Assessment of Personality and Socialization (SHAPS), Thematic Apperception Test (TAT), the Mindfulness Inventory (MIND), Brief Self-Control Scale (BSCS), Impulsive Behavior Scale (UPPS-P), Subject Well-Being Inventory (SUBI), Criminal Propensity Scale (CP), Test of Self-Conscious Affect-4 (TOSCA-4), Personality Assessment Inventory (PAI), Initial Substance Use Assessment (TCU-CRTF), Cognitive Affective Mindfulness Scale Revised (CAMS-R), King County Jail (KCJ), Novaco Anger Inventory-Short Form (NAI-25), Profile of Mood States-Short Form (POMS-SF).

4.4. Risk of Bias within Individual Studies

Table 2 summarizes the quality measures for each selected study. Only one study employed a blind allocation design (Alexander, 1982), three were RCTs (Lee et al., 2011; Lyons et al., 2018; Malouf et al., 2017), nine were longitudinal trials, and the remaining were quasi-experimental. The facilitator's MMBI training style was not specified by one study (Lyons et al., 2018). Two studies contained a high risk of bias as they contained a relatively small sample

size and lacked a long-term follow-up (Khurana & Dhar, 2000; Lee et al., 2011). Khurana and Dhar (2000) was not derived from an independent source and proved statistically insignificant.

Table 2.

Quality Measures of Studies Reporting the Effects of MMBI on Behavioural Changes

Study	Design	Allocation		Intervention			Risk of Bias
		Method	Conceal	Level of Detail	Facilitator	Attrition	
Alexander (1982)	DB, LT	Unmatched controls	Yes	Detailed	MMBI instructor	29-31% explained	Low
Alexander et al. (2003)	LT	Quasi-random	No	Detailed	MMBI instructor	N/A	Unclear
Ballou (1973)	CT, LT	Matched controls	No	Detailed	MMBI instructor	20% explained	Low
Bleick (1983)	CT, LT	Matched controls	No	Manualized	MMBI instructor	No attrition	Low
Bleick & Abrams (1987)	CT, LT	Matched controls	No	Detailed	MMBI instructor	12% explained	Low
Bowen et al. (2006)	QE	Unmatched controls	No	Manualized	MMBI instructor	18% explained	Low
Bowen et al. (2007)	QE	Unmatched controls	No	Manualized	MMBI instructor	47% explained	Unclear
Khurana & Dhar (2000)	CT	Matched Control	No	Manualized	MMBI Instructor	No attrition	High
Lee et al. (2011)	RCT	Randomly assigned	No	Manualized	Clinical psych.	No attrition	High
Lyons et al. (2018)	RCT	Randomized cohort	Yes	Detailed	Not specified	33% explained	Unclear
Malouf et al. (2017)	RCT, LT	Randomly assigned	Yes	Detailed	Clinical psych.	37% explained	Unclear
Marlatt et al. (2016)	Quasi	Unmatched controls	No	Detailed	MMBI instructor	39% explained	Unclear
Murphy (2002)	LT, QE	Unmatched controls	No	Manualized	MMBI instructor	N/A	Unclear
Perelman et al. (2012)	LT, QE	Unmatched controls	No	Manualized	MMBI instructor	18%	Low
Rainforth et al. (2003)	CT, LT	Matched controls	No	Detailed	MMBI instructor	19%	Low
Simpson et al. (2007)	QE	Unmatched controls	No	Manualized	MMBI instructor	42% explained	Unclear
Witkiewitz et al. (2005)	QE	Unmatched controls	No	Manualized	MMBI instructor	39% explained	Unclear

Note. Adapted from Cooper et al. (2016). DB = Double-blind, LT = Longitudinal, CT = Controlled trial, QE = Quasi-experimental, RCT = Randomized control trial, Detailed = allows for replication, Manualized = standard set of procedures, Psych = Psychologist.

The risk of bias within individual studies was presented through high attrition levels. In many studies, the attrition rates ranged from 12% to 47%, with two studies (Alexander et al., 2003; Murphy, 2002) failing to report attrition rates. Only one study (Bleick, 1983) reported no attrition and had extensive follow-up periods, while two studies (Khurana & Dhar, 2000; Lee

et al., 2011) revealed no attrition as they only measured pre- and post- scores with no extensive follow-up periods. Half of the selected studies contained high attrition rates.

4.5. Synthesis of Substance Use and Recidivism Results

The primary outcome measures were defined as the standardized mean score difference in substance use and the odds ratio in recidivism, in the MMBI group, following the intervention. A secondary outcome measure was calculated, reflecting the difference in mean gain score in substance use and percentage gain score in recidivism between MMBIs and active controls. This was performed to provide confidence towards the validity of the pre- and post-intervention analysis. Additionally, pooled standard deviations were weighted by sample size to adjust for biases in small sample size studies. The random-effects model was employed to allow for statistical inference from the variability in the data, offering a better understanding and characterization of the results (Nagashima et al., 2019).

Figure 2 shows the effects of MMBIs on substance use. Alcohol use, illicit drug use, locus of control, cravings, and expectancy of use were the most commonly used measures across the selected studies and were coded and collated to form the covariate substance use. It should be noted one study only recorded excessive alcohol use (Bowen et al., 2007). All other studies recorded a variety of illicit substances to measure the frequency of use between MMBIs and active controls (Bowen et al., 2006; Marlatt et al., 2004; Simpson et al., 2007; Witkiwitz et al., 2005), and two studies examined substance use with its relationship to cravings and expectancy (Lee et al., 2011; Lyons et al., 2018). The data was averaged, as opposed to summed, to measure substance use within the incarcerated individuals across the studies for both MMBIs and active controls. For each of the eight papers, means and standard deviations was collected, along with sample sizes for each group. The Forest plot was then constructed based on the average number of substances used for the MMBI group and compared to the active controls. Since the 95% confidence interval does not contain >0 , it can be concluded that there is a statistically significant effect of MMBI on substance use. Since 0 lies to the left of the confidence interval, the true difference is negative, meaning that MMBIs used fewer substances than the active controls. The standardized differences in the forest plot show MMBI were all negative, demonstrating MMBI reduced substance use across all studies. Two studies (Bowen et al., 2007; Malouf et al., 2017) revealed that their confidence intervals crossed the line of no effect, demonstrating that these studies were not statistically significant.

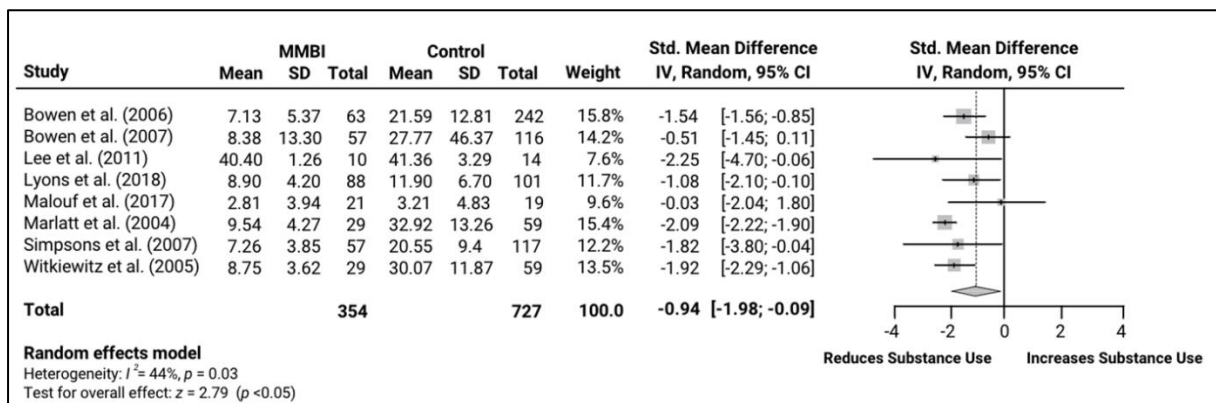


Figure 2. Substance Use following MMBIs

The pooled results of the meta-analysis were statistically significant, revealing that the overall standardized mean difference was -0.94 with a 95% confidence interval [-1.98 to -0.09], suggesting a small to moderate reduction of substance use. I^2 demonstrated definitive

confidence intervals across all heterogeneity assessment measures. Heterogeneity for the effect of MMBIs on substance use was $I^2 = 44\%$, $p < 0.03$, meaning that the null hypothesis of homogeneity of studies was rejected. This value signifies slight to moderate heterogeneity, suggesting a degree of similarity in the results of the individual studies, and thus statistical tests could be performed. The overall effect p value test is below 0.05 ($p < 0.05$), suggesting a statistically significant positive correlation between MMBIs and decreased substance use.

Figure 3 shows the effects of MMBIs on recidivism. Data was collected from ten papers. Recidivism, re-incarceration, re-offending, re-arrests, parole revocations and outcomes, prison rule infractions, and criminal propensity were collated and used to measure overall recidivism across all sourced studies. One study measured criminal propensity (Khurana & Dahr, 2000) and two studies recorded rule infractions (Ballou, 1973; Perelman et al., 2012). All other studies examined recidivism, with two investigating parole revocations and outcomes (Bleick, 1983; Bleick & Abrams, 1987). Percentage data was obtained from each of the ten papers. The odds ratio was obtained by calculating the probability of recidivists divided by non-recidivists by the sample size (Cooper, 2016). Odds ratios of MMBI groups and active controls were then simply defined and summed, giving a ratio measure from the percentages of recidivism for both MMBI and active control groups. The forest plot was constructed based on the odds ratio of recidivism for MMBIs versus active controls. Since the 95% confidence interval does contain 1, it can be concluded that there was a statistically significant effect of MMBIs on recidivism compared to active controls. All but one study (Perelman et al., 2012) in the forest plot was greater than 1. Hence, the meta-analysis shows that MMBIs do reduce recidivism. All but two studies (Khurana & Dhar, 2000; Perelman et al., 2012) revealed that their confidence interval crossed the line of no effect. Furthermore, the effect sizes of these studies were below 1 or slightly past 1, demonstrating that these studies were statistically insignificant.

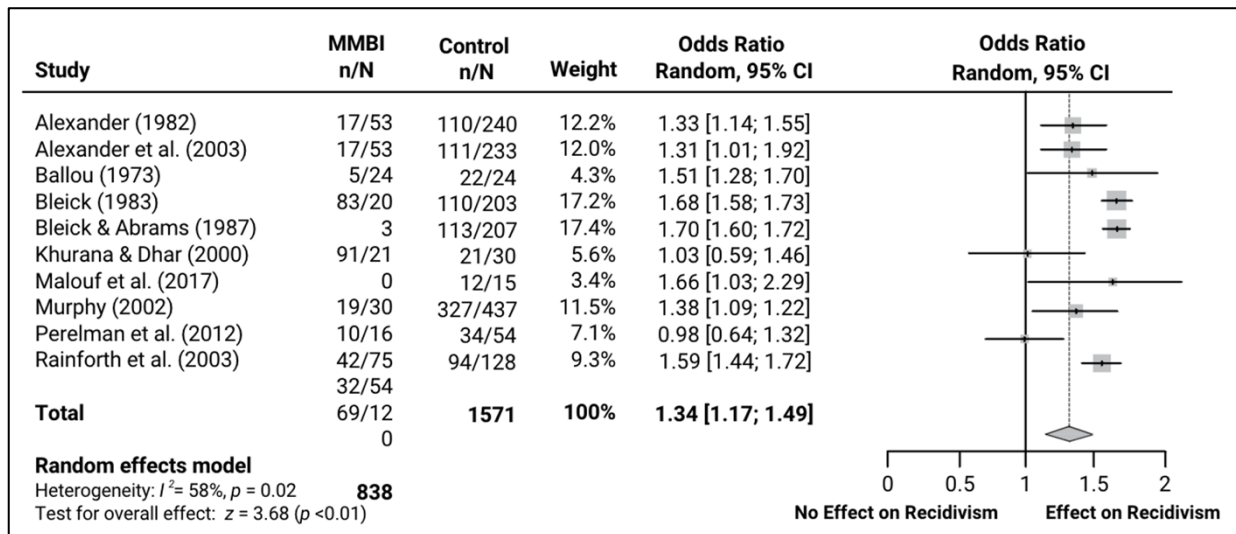


Figure 3. Recidivism following MMBIs

The overall pooled results of the meta-analysis were statistically significant, revealing that the overall odds ratio was 1.34 with a 95% confidence interval [1.17 to 1.49], suggesting a moderate to substantial reduction in recidivism. Additionally, the heterogeneity test for the effect of MMBIs on recidivism was $I^2 = 58\%$, $p < 0.02$, meaning that the null hypothesis of homogeneity of studies was rejected. Overall, this value signifies moderate to substantial heterogeneity. Again, the results of the individual studies are statistically sufficiently similar and do not need to be combined. However, given the breadth of the research question and the pooled effect sizes, caution was had when interpreting high heterogeneity. Lastly, the test of

the overall effect p value is below 0.05 ($p < 0.01$), indicating a statistically significant correlation between MMBIs and a moderate to substantial effect in reducing recidivism.

4.6. Risk of Bias across Studies

Egger's et al. (1997) funnel plot was used to present potential publication bias graphically. Publication bias was assessed based on the pre- and post-intervention of the included studies and their effect size calculations. The standard errors of effect sizes were plotted against the standardized mean difference for substance use (Figure 4) and odds ratio for recidivism (Figure 5). Upon visual inspection, both funnel plots resembled an inverted funnel, suggesting negative findings seem to have been published and included in the review. Taken together, results from both funnel plots resemble an inverted funnel. Even so, some possible bias was detected.

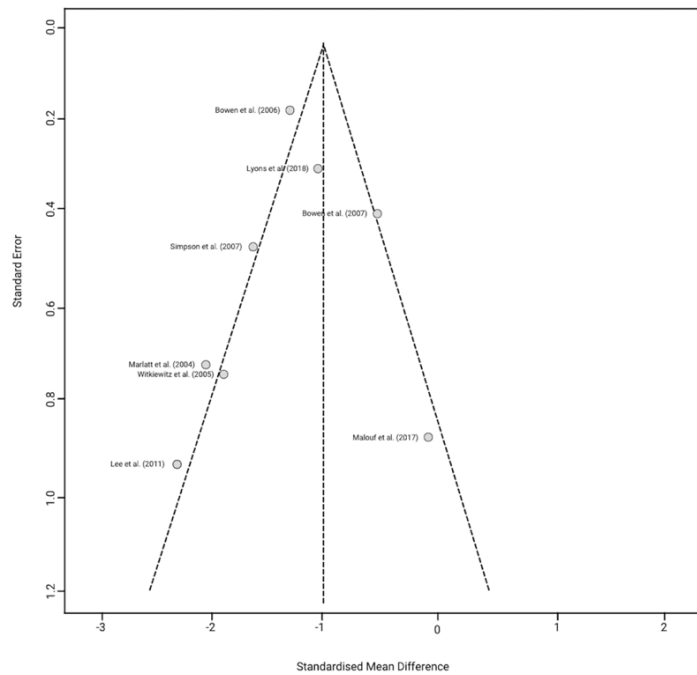


Figure 4. Funnel Plot Standard Error by Standardized Mean Difference (Substance Use)

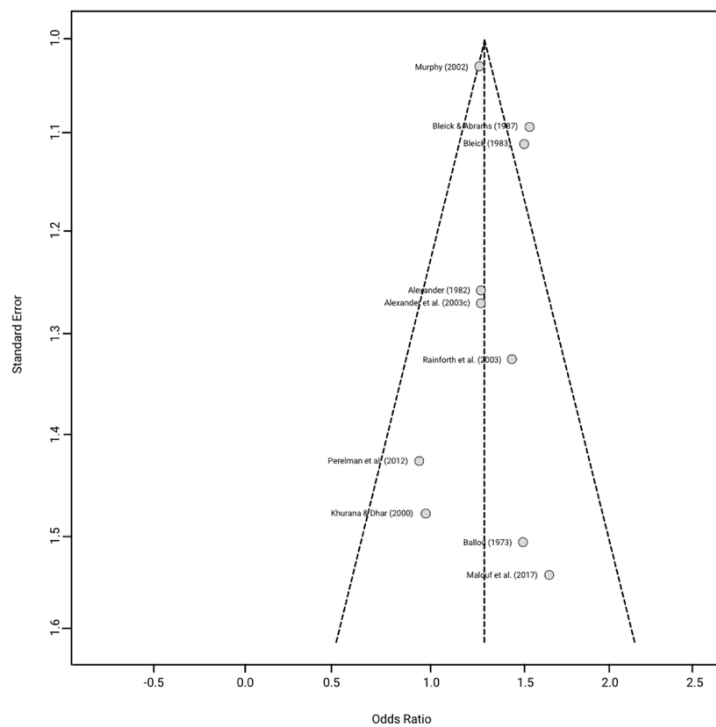


Figure 5. Funnel Plot Standard Error by Odds Ratio (Recidivism)

Accordingly, sensitivity tests were performed to test for asymmetry and to quantify publication bias. Begg and Mazumdar's (1994) test for rank correlation, Egger's et al. (1997) test for regression intercept and Rosenthal's (1979) fail-safe N were used. Figure 4 funnel plot demonstrated possible publication bias, with the Begg and Mazumdar's (1994) test giving a p value of 0.084 and Egger's et al. (1997) test showing a p value of 0.029. However, Figure 5 funnel plot indicated no evidence of publication bias. The Begg and Mazumdar test demonstrated a p value of 0.806, and Egger's test gave a p value of 0.699. In the substance use meta-analysis of 8 studies (z value = 2.79; $p < 0.05$, two-tailed), Rosenthal's (1979) fail-safe N was 108, meaning there would need to be 98 studies with effect sizes of zero to make the p value insignificant and exceed .05. In the recidivism meta-analysis of 10 studies (z value = 3.68; $p < 0.01$, two-tailed), the fail-safe N was 124, meaning there would need to be 124 studies with effect sizes of zero to make the p value insignificant and exceed .01.

5. Discussion

The evidence from the systematic review and meta-analysis in this research suggested that MMBIs in prison settings had positive benefits. The pooled effect sizes from variables were meaningful, demonstrating both tests of overall effect revealed that MMBIs were statistically significant in reducing substance use ($p < 0.05$) and recidivism ($p < 0.01$). MMBIs statistically reduced the use of several substances compared to the active controls. Six of eight studies (Bowen et al., 2006; Lee et al., 2011; Lyons et al., 2018; Marlatt et al., 2004; Simpson et al., 2007; Witkiwitz et al., 2005) reported statistically significant reductions in substance use. The two remaining studies (Bowen et al., 2007; Malouf et al., 2017) showed no statistically significant difference in the treatment condition. It is unclear to what extent these null findings are related to the effectiveness of MMBIs when considering the methodological shortcomings due to the small sample sizes and high attrition rates observed in these two studies. Nonetheless, although all studies varied in their design quality (retrospective surveys to random assignment experiments), MMBIs demonstrated a small to moderate reduction in substance use for those who participated in MMBIs, contributing towards decreased use for substance-involved

offenders. Therefore, the results of this study must be interpreted conservatively as these findings only examined short-term effects of MMBIs, with the most extended follow-up period being 6 months. Due to a paucity of extensive follow-up examinations found in prison MMBIs, there was not enough evidence to suggest that long-term changes in this review are unknown.

Regardless, incarcerated individuals in the current MMBI sample showed differential changes towards reductions in substance use compared to active controls, indicating better abstinence and a reduction in cravings. In line with the literature (see Grant et al., 2017; Li et al., 2017), the overall observed reduction in substance use within the MMBI sample in the context of behavioral changes and substance-related management was identified. A similar pattern was identified within emergent research (see Rosenthal et al., 2021; Tang et al., 2016) on the causes and maintenance of addiction, wherein the core processes that led to habitual substance misuse included increased avoidance-oriented coping, impaired self-control, cravings and emotional dysregulation. Corresponding findings from Garland and Howard (2018) contend MMBIs facilitate and reinforce cognitive control of drug cue-reactivity behaviors. However, it was beyond the scope of this current study to evaluate the direct cognitive effects that may have mediated the effects of MMBIs for substance use without an in-depth qualitative investigation.

Furthermore, recidivism data showed statistical reductions across the dependent measurements. Eight of ten studies (Alexander, 1982; Alexander et al., 2003; Bleick, 1983; Bleick & Abrams, 1987; Malouf et al., 2017; Murphy, 2002; Rainforth et al., 2003) demonstrated a reduction in recidivism, while two studies (Khurana & Dhar, 2000; Perelman et al., 2012) were statistically insignificant. Upon further investigation, null findings may be due to an absence of continued practice. Though there were discrepancies in the delivery of the MMBIs, meaningful comparisons between the interventions across studies were made, indicating a moderate to substantial reduction for MMBI participants. The current study revealed MMBIs exhibited a significant change towards reductions in recidivism and mirrored the recidivist statistical trends, demonstrating a total mean average recidivism rate of 60% for active controls compared to 44% for MMBI participants. A meta-analysis conducted by Lipsey (2019) examined the impact of multiple rehabilitation interventions for adult offenders and found the most effective programs represented an approximate 20% reduction. The findings from this current study indicated that MMBIs produced a similar reduction of 10% to 20%. Consistent with Cullen (2011), this meta-analytic review provided future validation of previous reports of MMBI participants demonstrating positive changes in risk factors associated with recidivism. However, De Andrade et al. (2018) argue that MMBIs may have attracted incarcerated residents who possessed motivations for rehabilitation prior to the program, thus predictively reducing recidivism.

Nonetheless, corresponding research comparing incarcerated MMBI groups and active controls recognized an increase in psychological well-being, such as optimism (Garland et al., 2009), subjective mood states (Samuelson et al., 2007) and self-compassion (Morley, 2017). Reductions of recidivism in the current findings resonated with existing literature whereby MMBIs were reported to inhibit criminal tendencies through the development of healthier psychological functioning, thus contributing to and reinforcing rehabilitative environments in the prison setting (see Bouw et al., 2019; Ronel et al., 2011). Similar reports found a decrease in negative psychological states, such as obsessive-compulsive behavior depression, anxiety anger, hostility and trauma symptomology (Spina, 2023). However, the current study cannot confirm this as further subgroup analysis examining psychological-specific variables was not conducted.

5.1. Limitations

Consequently, the findings were interpreted conservatively as several studies revealed shortcomings regarding methodological rigor, limited matched controls, and confidence intervals containing wider variations, thus limiting the external validity (Borenstein et al., 2009). Concerns regarding lack of randomization, small sample sizes, high risk of bias and limited statistical power were evident. These studies revealed smaller effect sizes with larger confidence intervals. Due to the methodological diversity of the selected studies, slight to substantial levels of heterogeneity was unavoidable, given the variations in MMBIs and study duration. Although studies did not equally use the same measurement methods, according to Higgins et al. (2011), this does not necessarily affect the intervention's overall outcome. While the findings support the effects of MMBIs, the researcher notes that publication bias was still possible. Biasing factors may be attributed to less consistent studies publishing secondary outcomes due to a weakness in methodological rigor or selective outcome reporting (Cooper, 2016).

Moreover, attrition, especially in studies of longitudinal design, was an inherent limitation. When using an incarcerated sample, reductions in program completion and follow-up assessments are common. The average attrition rate was 26%, consistent with a meta-analysis conducted by Olver et al. (2011) of overall prison intervention attrition (27.1%). Upon further investigation, attrition was commonly due to institutional logistics, prisoner transfer, or release upon intervention completion. Though not all were negative circumstances, the statistical power of these studies was affected. Furthermore, an alternative explanation for the current findings could be attributed to self-reported responses bias. Substance use results may have had this possibility. However, regarding recidivism results, this data was compared with the official department of justice records, lending more confidence in the validity of these findings.

5.2. Conclusions and Broader Implications

Although the findings demonstrated MMBIs were sufficient to produce reductions in substance use and recidivism, this research does not propose MMBIs are superior to other prison rehabilitation initiatives, nor should they replace current interventions. Instead, MMBIs should be offered in conjunction with other established treatment modalities, especially for those who suffer from chronic comorbidities (Simpson et al., 2007). Safeguarding well-designed MMBI within prison walls is essential to ensure program effectiveness and safety to avoid disturbances in such highly stressed environments (Davies et al., 2021). As such, programs that successfully address empathy, conscience and self-respect may be beneficial in transforming the prison atmosphere. MMBIs may serve as a synergistic extension to existing treatments, whereas in severe cases, it might be suitable as a multi-modal approach, one that combines MMBIs, psychotherapy, and medication (Granados et al. 2023). Adjunct MMBI approaches may eliminate institutional limitations related to prison resources, staff, time and space. This may increase engagement in criminogenic need-specific programs relating to addiction and post-release recidivism.

References

Asterisk-marked references indicate studies included in the meta-analysis.

- Alexander, C.N. (1982). Ego Development, Personality and Behavioral Change in Inmates Practicing the Transcendental Meditation Technique or Participating in other Programs: A Cross-Sectional and Longitudinal Study. *Dissertation Abstracts International*, 43(2-B), 539.
- Alexander, C.N., Rainforth, M.V., Frank, P.R., Grant, J.D., Stade, C.V., & Walton, K.G. (2003). Walpole study of the Transcendental Meditation program in maximum security prisoners III: Reduced Recidivism. *Journal of Offender Rehabilitation*, 36(1-4), 161-180. https://doi.org/10.1300/J076v36n01_08
- Auty, K.M., Cope, A., & Liebling, A. (2017). A Systematic Review and Meta-Analysis of Yoga and Mindfulness Meditation in Prison: Effects on Psychological Well-Being and Behavioural Functioning. *International Journal of Offender Therapy and Comparative Criminology*, 61(6), 689-710. <https://doi.org/10.1177/0306624X15602514>
- Ballou, D. (1973). The Transcendental Meditation Program at Stillwater Prison. In Orme-Johnson, D.W., & Farrow, J.T. (Eds.). *Scientific Research on the Transcendental Meditation Program: Collected Papers* (pp. 569-576). NY: MIU Press.
- Begg, C.B., & Mazumdar, M. (1994). Operating Characteristics of a Rank Correlation Test for Publication Bias. *Biometrics*, 50(4), 1088-1101. <https://doi.org/10.2307/2533446>
- Bleck, C.R. (1983). Influence of the Transcendental Meditation Program of Criminal Recidivism. *Scientific research on Maharishi's Transcendental Meditation and TM-Sidhi program*, 3(286), 2151-2158.
- Bleck, C.R., & Abrams, A.I. (1987). The transcendental meditation program and criminal recidivism in California. *Journal of Criminal Justice*, 15(3), 211-230. [https://doi.org/10.1016/0047-2352\(87\)90045-6](https://doi.org/10.1016/0047-2352(87)90045-6)
- Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2009). *Introduction to Meta-Analysis*. Chichester, UK: Wiley. <https://doi.org/10.1002/9780470743386>
- Bouw, N., Huijbregts, S. C. J., Scholte, E., & Swaab, H. (2019). Mindfulness-Based Stress Reduction in Prison: Experiences of Inmates, Instructors, and Prison Staff. *International journal of offender therapy and comparative criminology*, 63(15-16), 2550-2571. <https://doi.org/10.1037/0893-164X.20.3.343>
- Bowen, S., Witkiewitz, K., Dillworth, T.M., Chawla, N., Simpson, T.L., Ostafin, B.D., Larimer, M.E., Blume, A.W., Parks, G.A., & Marlatt, G.A. (2006). Mindfulness Meditation and Substance Use in an Incarcerated Population. *Psychology of Addictive Behaviours*, 20(3), 343-347. doi:10.1037/0893-164X.20.3.343
- Bowen, S., Witkiewitz, K., Dillworth, T.M., & Marlatt, G.A. (2007). The Role of Thought Suppression in the Relationship between Mindfulness Meditation and Alcohol Use. *Addictive Behaviours*, 32(10), 2324-2328. <https://doi.org/10.1037/0893-164X.20.3.343>
- Cooper, H.M. (2016). *Research Synthesis and Meta-Analysis: A Step-by-Step Approach* (5th ed.). Thousand Oaks, CA: Sage Publications. <https://doi.org/10.4135/9781071878644>
- Cullen, M. (2011). Mindfulness-Based Interventions: An Emerging Phenomenon. *Mindfulness*, 2(3), 186-193. <https://doi.org/10.1007/s12671-011-0058-1>

- Dafoe, T., & Stermac, L. (2013). Mindfulness Meditation as an Adjunct Approach to Treatment Within the Correctional System. *Journal of Offender Rehabilitation*, 52, 198 - 216. <https://doi.org/10.1080/10509674.2012.752774>
- Davies, J., Ugwu-dike, P., Young, H., Hurrell, C., & Raynor, P. (2021). A Pragmatic Study of the Impact of a Brief Mindfulness Intervention on Prisoners and Staff in a Category B Prison and Men Subject to Community-Based Probation Supervision. *International Journal of Offender Therapy and Comparative Criminology*, 65(1), 136-156. <https://doi.org/10.1177/0306624X20944664>
- Day, A. (2020). At a crossroads? Offender rehabilitation in Australian prisons. *Psychiatry, Psychology, and Law*, 27(6), 939–949. <https://doi.org/10.1080/13218719.2020.1751335>
- De Andrade, D., Ritchie, J., Rowlands, M., Mann, E., & Hides, L. (2018). Substance Use and Recidivism Outcomes for Prison-Based Drug and Alcohol Interventions, *Epidemiologic Reviews*, 40(1), 121–133. <https://doi.org/10.1093/epirev/mxy004>
- Derlic, D. (2020). A Systematic Review of Literature: Alternative Offender Rehabilitation-Prison Yoga, Mindfulness, and Meditation. *Journal of Correctional Health Care*, 26(4), 361-375. <https://doi.org/10.1177/1078345820953837>
- Egger, M., Smith, G.D., Schneider, M., & Minder, C. (1997). Bias in Meta-Analysis Detected by a Simple Graphical Rest. *BMJ*, 315(7109), 629-634. <https://doi.org/10.1136/bmj.315.7109.629>
- Garland, E.L., Gaylord, S.A., & Park, J. (2009). The role of Mindfulness in Positive Reappraisal. *Explore*, 5(1), 37-44. <https://doi.org/10.1016/j.explore.2008.10.001>
- Garland, E.L., & Howard, M.O. (2018). Mindfulness-Based Treatment of Addiction: Current State of the Field and Envisioning the Next Wave of Research. *Addiction Science and Clinical Practice*, 13(1), 14. <https://doi.org/10.1186/s13722-018-0115-3>
- Gough, D., Oliver, S., & Thomas, J. (2017). *An Introduction to Systematic Reviews* (2nd ed.). London: Sage Publications. <https://doi.org/10.53841/bpsptr.2017.23.2.95>
- Grant, S., Colaiaco, B., Motala, A., Shanman, R., Booth, M., & Sorbero, M. (2017). Mindfulness-Based Relapse Prevention for Substance Use Disorders: A Systematic Review and Meta-Analysis. *Journal of Addiction Medicine*, 11(5), 386–96. <https://doi.org/10.1097/ADM.0000000000000338>
- Grecucci, A., Pappaianni, E., Siugzdaite, R., Theuninck, A., & Job, R. (2015). Mindful Emotion Regulation: Exploring the Neurocognitive Mechanisms behind Mindfulness. *BioMed Research International*, 670724, 1-9. <https://doi.org/10.1155/2015/670724>
- Granados, L., Suriá, R., Perea, C., Payá, C., Sánchez-Pujalte, L., & Aparisi, D. (2023). Effectiveness of a program for the development of socio-emotional competences in people admitted to a penitentiary center. *Frontiers in Public Health*, 10, 1116802. <https://doi.org/10.3389/fpubh.2022.1116802>
- Hamilton, L., & Belenko, S. (2019). Substance Use Disorder Treatment in the Reentry Environment: Service Receipt and Prisoner Community Reintegration. *Criminal Justice and Behaviour*, 46(9), 1295-1318. <https://doi.org/10.1177/0093854819846528>
- Hasan, M. N. (2016). Positivism: To what Extent does it Aid our Understanding of the Contemporary Social World? *Quality and Quantity*, 50, 317-325. <https://doi.org/10.1007/s11135-014-0150-4>

- Higgins, J.P.T., Altman, D.G., Gøtzsche, P.C., Jüni, P., Moher, D., Oxman, A.D., Savovic, J., Schulz, K.F., Weeks, L., & Sterne, J.A. (2011). The Cochrane Collaboration's tool for assessing risk of bias in randomized trials. *BMJ*, 18, 343:d5928. <https://doi.org/10.1136/bmj.d5928>
- Himelstein, S. (2011). Meditation Research: The State of the Art in Correctional Settings. *International Journal of Offender Therapy and Comparative Criminology*, 55(4), 646-661. <https://doi.org/10.1177/0306624X10364485>
- Hunnicutt, G., & Rhodes, D. (2015) Meditation Practices and the Reduction of Aggression and Violence: Towards a Gender-Sensitive, Humanitarian, Healing-Based Intervention. In J. Joseph, & W. Crichlow (Eds.), *Alternative Offender Rehabilitation and Social Justice* (pp. 15-31). London: Palgrave Macmillan. https://doi.org/10.1057/9781137476821_2
- Jones, D.R., Lehman, B.J., Noriega, A., & Dinnel, D.L. (2019). The Effects of a Short-Term Mindfulness Meditation Intervention on Coping Flexibility. *Anxiety, Stress and Coping*, 32(4), 347-361. <https://doi.org/10.1080/10615806.2019.1596672>
- Khanna P. (2019). Positivism and Realism. In P. Liamputtong (Ed.), *Handbook of Research Methods in Health Social Sciences* (pp. 151-168). Singapore: Springer. https://doi.org/10.1007/978-981-10-5251-4_59
- Khurana, A., & Dhar, P.L. (2000). *Effect of Vipassana Meditation on Quality of Life, Subjective Well-being, and Criminal Propensity among Inmates of Tihar jail, Delhi*. Maharashtra, India: Vipassana Research Institute.
- Lee, K.H., Bowen, S., & An-Fu, B. (2011). Psychosocial Outcomes of Mindfulness-Based Relapse Prevention in Incarcerated Substance Abusers in Taiwan: A Preliminary Study. *Journal of Substance Use*, 16(6), 476-483. <https://doi.org/10.3109/14659891.2010.505999>
- Li, W., Howard, M. O., Garland, E.L., McGovern, P., & Lazar, M. (2017). Mindfulness Treatment for Substance Misuse: A Systematic Review and Meta-Analysis. *Journal of Substance Abuse Treatments*, 75, 62-96. <https://doi.org/10.1016/j.jsat.2017.01.008>
- Lipsey, M.W. (2019). Rehabilitation Programs for Adult Offenders: A Meta-Analysis in Support of Guidelines for Effective Practice. *Department of Justice, Office of Justice Programs, National Institute of Justice*. <https://www.ojp.gov/pdffiles1/nij/grants/252504.pdf>
- Lyons, T., & Cantrell, W.D. (2015). Prison Meditation Movements and Mass Incarceration. *International Journal of Offender Therapy and Comparative Criminology*, 2(4), 1-13. <https://doi.org/10.1177/0306624X15583807>
- Lyons, T., Womack, V.Y., Cantrell, W.D., & Kenemore, T. (2018). Mindfulness-Based Relapse Prevention in a Jail Drug Treatment Program. *Substance Use and Misuse*, 54(1), 57-64. <https://doi.org/10.1080/10826084.2018.1491054>
- Malouf, E.T., Youman, K., Stuewig, J., Witt, E.A., & Tangney, J.P. (2017). A Pilot RCT of a Values-Based Mindfulness Group Intervention with Jail Inmates: Evidence for Reduction in Post-Release Risk Behaviour. *Mindfulness*, 8(3), 603-614. <https://doi.org/10.1007/s12671-016-0636-3>
- Marlatt, G.A., Witkiewitz, K., Dillworth, T., Bowen, S.W., Parks, G.A., Macpherson, L.M., Lonzak, H.S., Larimer, M.E., Blume, A.W., & Crutcher, R. (2004). Vipassana Meditation as a Treatment for Alcohol and Drug Use Disorders. In Hayes, S.C., Follette, V.M., & Linehan, M. M. (Eds.). *Mindfulness And Acceptance: Expanding The Cognitive-Behavioural Tradition* (pp. 261-279). New York: Guildford Press.

- Murphy, D. (2002). The NRF Vipassana Recidivism Study: Final Report. *American Jails*, 17, 13-17.
- Nagashima, K., Noma, H., & Furukawa, T.A. (2019). Prediction Intervals for Random-Effects Meta-Analysis: A Confidence Distribution Approach. *Statistical Methods in Medical Research*, 28(6), 1689-1702. <https://doi.org/10.1177/0962280218773520>
- Olver, M.E., Stockdale, K.C., & Wormith, J.S. (2011). A meta-analysis of predictors of offender treatment attrition and its relationship to recidivism. *Journal of Consulting and Clinical Psychology*, 79, 1, 6-21. <https://doi.org/10.1037/a0022200>
- Perelman, A.M., Miller, S.L., Clements, C.B., Rodriguez, A., Allen, K., & Cavanaugh, R. (2012). Meditation in a Deep South Prison: A Longitudinal Study of the Effects of Vipassana. *Journal of Offender Rehabilitation*, 51(3), 176-198. <https://doi.org/10.1080/10509674.2011.632814>
- Pratt, T.C. (2019). *Addicted to Incarceration: Corrections Policy and the Politics of Misinformation in the United States* (2nd ed.). London: Sage Publications. <https://doi.org/10.4135/9781544345079>
- Quick, J., & Hall, S. (2015). Part Three: The Quantitative Approach. *Journal of Perioperative Practice*, 25(10), 192-196. <https://doi.org/10.1177/175045891502501002>
- Rainforth, A. (2003). Effects of the Transcendental Meditation Program on Recidivism Among Former Inmates of Folsom Prison: Survival Analysis of 15-Year Follow-Up Data. *Journal of Offender Rehabilitation*, 36(1-4), 181–203. https://doi.org/10.1300/J076v36n01_09
- Ronel, N., Frid, N., & Timor, U. (2011). The Practice of Positive Criminology: A Vipassana Course in Prison. *International Journal of Offender Therapy and Comparative Criminology*, 20(10), 1-21. <https://doi.org/10.1177/0306624X11427664>
- Roos, C., Bowen, S., & Witkiewitz, K., (2020). Approach Coping and Substance Use Outcomes Following Mindfulness-Based Relapse Prevention Among Individuals with Negative Affect Symptomatology. *Mindfulness*, 11, 2397–2410. <https://doi.org/10.1007/s12671-020-01456-w>
- Rosenthal, R. (1979). The “file drawer problem” and tolerance for null results. *Psychological Bulletin*, 86, 638-641. <https://doi.org/10.1037/0033-2909.86.3.638>
- Rosenthal, A., Levin, M.E., Garland, E.L., Romanczuk-Seiferth, N. (2021). Mindfulness in Treatment Approaches for Addiction: Underlying Mechanisms and Future Directions. *Current Addiction Reports*, 8, 282-297. <https://doi.org/10.1007/s40429-021-00372-w>
- Samuelson, M., Carmody, J., Kabat-Zinn, J., & Bratt, M. (2007). Mindfulness-Based Stress Reduction in Massachusetts Correctional Facilities. *The Prison Journal*, 87(2), 254-268. <https://doi.org/10.1177/0032885507303753>
- Sears, S., & Kraus, S. (2019). I Think Therefore I Om: Cognitive Distortions and Coping Style as Mediators for the Effects of Mindfulness Meditation on Anxiety, Positive and Negative Affect, and Hope. *Journal of Clinical Psychology*, 65(6), 561-573. <https://doi.org/10.1002/jclp.20543>
- Siddaway, A.P, Wood, A.M., & Hedges, L.V. (2019). How to Do a Systematic Review: A Best Practice Guide for Conducting and Reporting Narrative Reviews, Meta-Analyses, and Meta-Syntheses. *Annual Review of Psychology*, 4(70), 747-770. <https://doi.org/10.1146/annurev-psych-010418-102803>
- Simpson, T., Kaysen, D., Bowen, S., MacPherson, L., Chawla, N., Blume, A., Marlatt, G., &

- Larimer, M. (2007). PTSD Symptoms, Substance Use, and Vipassana Meditation among Incarcerated Individuals. *Journal of Traumatic Stress*, 20(3), 239-49. <https://doi.org/10.1002/jts.20209>
- Spina, F. (2023). The Importance of Mindfulness Meditation in Correctional Settings. *Journal of Correctional Education (1974-)*, 74(2), 56–71. <https://www.jstor.org/stable/48730994>
- Tang, Y.Y, Tang, R., & Posner, M.I. (2016). Mindfulness Meditation Improves Emotion Regulation and Reduces Drug Abuse. *Drug and Alcohol Dependence*, 163(1), 13-18. <https://doi.org/10.1016/j.drugalcdep.2015.11.041>
- West, A. (2016). *The Psychology of Meditation Research and Practice*. Oxford, UK: Oxford University Press. <https://doi.org/10.1093/med:psych/9780199688906.001.0001>
- Witkiewitz, K., Marlatt, G.A., & Walker, D. (2005). Mindfulness-Based Relapse Prevention for Alcohol and Substance Use Disorders. *Journal of Cognitive Psychotherapy*, 19(3), 211–228. <https://doi.org/10.1891/jcop.2005.19.3.211>