Self-Help Mindfulness Group to Increase Mindfulness and Improve Stress Management in Those

with Substance Use Disorders

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Abstract

Stress is the direct source of some health issues and the precursors to many illnesses. The effects of stress are felt by the majority of the population and is usually undertreated or overlooked as a norm of life rather than a potential source of illness. Though everyone has different thresholds of stress, chronic or constant stress is debilitating for some and can manifest itself in limitless ways (McEwen, 2017). For adults with substance use disorders (SUDs), research supports that mindfulness based interventions (MBIs) could be beneficial for stress management (Garland, Hanley, Baker, & Howard, 2017). The techniques incorporated in mindfulness based practices can decrease the baseline stress of its practitioners by increasing their awareness and mindfulness within daily life and during stressful situations. This increase in awareness and mindfulness has shown numerous benefits that may be crucial in increasing the likelihood of sobriety for those with SUDs. Some of these benefits may include, improved stress management, improved mitigation of craving symptoms, reduced incidences of relapse, and a better quality of life (Glasner et al., 2016). A 4-week self-help mindfulness pilot program was conducted twice within two separate residential substance recovery settings. The participant's satisfaction and the internalization of mindfulness concepts were measured within the pre and post implementation of a self-help mindfulness class. In the pilot program, participants rated high satisfaction of the mindfulness class and showed increased levels of mindfulness through the use of the client satisfaction questionnaire (CSQ-8) and the five facets of mindfulness questionnaire (FFMQ-39).

Keywords: Mindfulness, MBI, self-help mindfulness, meditation, stress, stress management, stress reduction, substance use disorder, addiction, drug use

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Stress is a daily aspect of life. Though fundamentally unpleasant, stress is essential for

growth, development, and adaptation; while small amounts of this discomfort may be healthy, a

chronic and excessive amount is detrimental (McEwen, 2017). Studies have recognized stress as

a significant risk factor with direct associations to relapse and drug use (Kwako & Koob, 2017;

Sinha, 2008; Sinha, 2001). Those with substance use disorders (SUDs) experience additional

distress from withdrawals, cravings, guilt, irritability, adverse effects, and acute/chronic changes

in the brain (O'Neil, 2015; American Psychiatric Association [APA], 2013, p. 483-484; Sinha,

2008). With thousands of new substance users each year, the U.S. Department of Health and

Human Services (HHS) (2016) warned of worsening conditions as a report from 2015 showed 66

million Americans admitting to binge drinking in the last month, more than 36 million disclosing

marijuana use in the past year, 12.5 million misusing prescription pain meds (p. 7), and 20.8

million American or 7.8% of the U.S. population (p. 7), having some form of SUD. In addition

to the 47,055 drug overdose deaths occurring in 2014 alone (p. 15), it is clear that substance

abuse has become a growing epidemic in the United States (U.S.) (HHS, 2016). Without proper

stress management and treatment, the epidemic of drug use shall continue its devastation upon

the nation.

Background/Significance

Substance use and abuse needs to be understood in order to combat its progression. The

APA (2013) defines SUDs as a cluster of cognitive, behavioral, and physiological symptoms that

develops as an individual continues to use substances despite significant substance-related

problems (p. 483). The diagnosis of this disorder is based on maladaptive pathological patterns

of behaviors that become associated with the substance being abused; thus as a person's disorder

continues, maladaptive behaviors (persistent/increased drug use, extensive preoccupations

related to drug use, failure to fulfill major roles due to drug use,) increase despite the

consequences (APA, 2013, p. 483). The context of this disorder is validated further by the

underlying changes that occur within the brain circuitry that may remain even after

detoxification (APA, 2013, p. 483). A few noted manifestations upon the myriad of symptoms

associated to substance use are: decreased stress tolerance, disruptions in sleep, reduced

concentration, hallucinations, and impaired memory (APA, 2013). The number of people that

will be diagnosed with SUD, grows each year. The National Survey on Drug Use and Health

(NSDUH) reported in 2015, 8.6 million new drug users with 2.6 million of those being new

marijuana users, 2.1 million being new pain prescription misusers, 1.4 million being new

tranquilizer prescription misusers, 1.3 million being new stimulant prescription misusers, and 1.2

million being new hallucinogen users (Lipari, Williams, Copello, & Pemberton, 2016, p. 10;

HHS, 2016, p. 9). With millions of Americans, suffering from this diagnosis, its growing

presence and havoc on society is clearly apparent on a national scale.

Substance use has burdened society with major economic consequences. Since those with

SUDs also have higher incidences of suicide, domestic violence, mortality, crime, and lost

productivity, the U.S. spends over $400 billion each years to cover these costs (APA, 2013;

HHS, 2016, p. 2). These expenses are expected to increase annually as illicit drug use has been

rising steadily almost every year from 2002 to 2014, with the last year of data marking the

largest increase from 9.4% to 10.2% (HHS, 2016, p. 2). The NSDUH also reported in 2015 that

within that past year, substance use treatment was needed for 8.1 percent or 21.7 million people

aged 12 or older, but only 10.8 percent of that 21.7 million actually received treatment within a

specialty facility (Lipari, Park-Lee, & Horn, 2016). The increase of annual users, economic costs, and lack of treatment received for current users, show a clear picture of today's substance abuse crisis. However, the true tragedy of those with SUDs, are the individuals themselves who must endure the difficult road of addiction.

The effects of substance abuse is devastating on health. The consequence of drug use is ultimately addiction, which can further lead to increased risks for cardiovascular disease, stroke, cancer, lung disease, mental disorders, hepatitis B and C, and human immunodeficiency virus (HIV)/ acquired immunodeficiency syndrome (AIDS) with one out of every three U.S. deaths from AIDS being related to drug abuse (National Institute on Drug Abuse [NIDA], 2014, p. 21; Schulte & Hser, 2014). When a person becomes addicted to a substance, there are biological changes that occur within the brain causing physical or mental dependence of the drug that can later cause tolerance, withdrawal, and compulsive behavior (APA, 2013, p. 484). Furthermore, depending on the type of substance, chronic use can cause the brain to shrink, have less white/gray matter, reinforce addictive reward circuits, and become less efficient in general (Koob, Arends, & Le Moal, 2014; Weiland et al., 2014). With these biological changes, those with SUDs are also prone to various psychological risks like cognitive impairments, behavioral/personality changes, neurological dysfunctions, and increased risks for developing other psychiatric disorder (APA, 2013; O'Neil, 2015). In addition to these changes, to understand how SUDs affects a person's daily life, it is crucial to recognize how stress influences substance use.

Stress and SUDs exaggerate the effects of each other. Stress has multiple definitions, and is frequently defined as "a process involving perception, interpretation, response and adaptation to harmful, threatening, or challenging events" (Sinha, 2001, p. 343). Another definition of stress

is "a circumstance that disturbs, or is likely to disturb, the normal physiological or psychological functioning of a person" (Sadock, Sadock, & Ruiz, 2015, p. 477). The physiological and psychological consequences of unmanaged stress can cause a myriad of symptoms: low immune system function, hypertension, muscle aches, depression, anxiety, suicidal ideation, and other unpleasant symptoms that can severely impact a person's mental and physical well-being (Schneiderman, Ironson, & Siegel, 2005; McCance & Huether, 2014; McEwen, 2017). The relationship of stress to SUD has such a profound connection that people who experienced two or more stressful life events are significantly more likely to develop SUDs (Verplaetse et al., 2018). Stress can directly increase the risk of drug abuse and relapse in those with SUDs, as stress is known to cause increased cravings, impulsive behaviors, decreased self-control, and cause individuals to seek a quick resolution; drugs (Vallejo & Amaro, 2009; Bodenlos, Noonan, & Wells, 2013; Amaro et al., 2014). On the other side, substance abuse inevitably causes more stress over time as the constant cycle of drugs can cause cravings, anxiety, dependence, develop tolerance, isolation, and other socioeconomic consequences which all contributes to increased rates of relapse and further use (Sinha, 2008; Sinha 2001; Vallejo & Amaro, 2009; APA, 2013; Amaro et al., 2014). To properly overcome and endure distress caused not only by drug use, but also by daily living, people with SUDs need to utilize new coping skills to better manage their stress.

Internal Evidence

The organization's Clinical Oversight Supervisor and Quality Manager of a residential substance recovery treatment facility reported that patients entering care in the organization typically had issues related to stress due to withdrawal symptoms, cravings, anxiety, legal issues, family issues, and other consequences associated with addiction. They further identified that the

newest facility, a 38 bed men's program, needed the most help in program development. The

organization offers multiple classes throughout the day to understand addiction, learn expected

symptoms, and find ways to cope with unhealthy behavior. Other techniques of coping like yoga,

some meditation, and counseling are also provided, but the curriculum has very limited

mindfulness classes offered and lacks daily emphasis on mindfulness/meditative techniques and

teachings. The main technique offered for stress management amongst patients is 24 hour peer

support, which is available and encouraged between patients and staff members. The majority of

patients report significant progress throughout their stay per patient satisfaction survey data, yet

staff feel that there is always room for improvement. The Clinical Oversight Supervisor and

Quality Manager voiced that having regular classes on mindfulness may be a beneficial pilot

project that would help further meet the needs of the patients within the program.

Problem Statement

The current methods for treating substance abuse is limited and needs to be expanded or

revised for safer and more effective interventions. Currently there are two main approaches to

treatment, medication assisted treatment (MAT) and psychological/psychosocial treatment.

While there are variations of these approaches for different types of SUDs, relapse rates for

substance abuse remains around 40 to 60 percent (NIDA, 2014). In confronting today's opioid

crisis, psychosocial interventions used alone typically have produced unacceptable outcomes

with 80% of opiate users returning to opiates within two years even after receiving intensive

residential treatment (Bart 2012). The purpose of MAT is based on maintaining sobriety by

relieving/preventing withdrawals to avoid relapse (Bart, 2012). In opioid treatment, the use of

MATs like Methadone or Buprenorphine, is effective in treating long-term opiate addiction, but

is ineffective in helping people with SUDs abstain after its initial stabilization period (Bart,

2016). Additionally, giving a patient who is addicted to one substance, another type of addictive

substance to ease withdrawal symptoms is controversial since the patient remains

dependent/addicted to another drug indefinitely and there is stigma within the recovery

community related to dependence on any substance (Magura & Rosenblum, 2001). When

compared side-by-side, psychosocial interventions showed poorer results with higher positive

urine toxicology tests, increased mortality rates, and less retention in treatment (Bart, 2012).

Even within therapeutic communities that treat SUDs, attrition rates are often as high as 50%

with most of the attrition occurring within the first three to six months (Marcus et al., 2009).

Furthermore, while information-based provisions on substance abuse are used often, they have

been found to be ineffective, whereas skills-based interventions demonstrated greater success

(Stocking et al., 2016). Although interventions like exercise programs, counseling, and social

support, are offered to reduce the stress of those abusing or recovering from SUDs, presently

there is no universally known standard treatment specifically to cope with stress. Thus, without

expanding the current forms of treatment for SUDs, results will remain disappointing.

       So what can help those with SUDs improve their stress and decrease their withdrawal

symptoms? The solution may be mindfulness-based interventions (MBIs). While stress and

substance use can cause numerous detrimental changes on a person's physical and mental health,

MBIs have the potential to improve the majority of these symptoms caused by these issues.

When patients learned and incorporated MBI, studies showed changes in the brain along with

increases in the concentration of gray matter in regions that were involved in emotional

regulation, learning and memory, focus and attention, perspective insight, and self-referential

processing (Hölzel et al., 2011; Goldin & Gross, 2010; Gotnik et al., 2016). Furthermore there is

plenty of evidence on MBIs decreasing depression, improving anxiety, and lessening the severity

of substance addiction/withdrawal (Amaro et al., 2014; Gotnik et al., 2016; Bowen et al., 2014; Glasner et al., 2016; Witkiewtiz & Bowen, 2010; Gawrysiak et al., 2016).

To understand MBIs, it is important to acknowledge that there are varieties of formal and informal programs that incorporate MBIs for different treatments. Mindfulness-based stress reduction (MBSR), is a formal program that utilizes self-help techniques with emphasis on mindfulness to help patients detach from stress-inducing thoughts (Kabat-Zinn, 2013). This is done by acknowledging stress-inducing thoughts but maintaining conscious awareness that they are just thoughts that will subside in time (Buttery, 2009). Originally created to help patients who experience stress from chronic illnesses, the MBSR program shows promising results in helping patients cope with anxiety, depression, and stress from many different vulnerable populations (Kabat-Zinn, 2013). One of the unique aspects of MBSR is that it is not specifically tailored to a particular diagnosis allowing the foundational concepts to be flexible and molded to focus on specific issues (Smith, Collard, Nicolson, & Bayne, 2012). Other formal MBI programs also have similar foundational concepts to MBSR, yet emphasize different subjects, like mindfulness-based cognitive therapy (MBCT) which focuses on depression, and mindfulness-based relapse prevention (MBRP) which focuses on preventing drug relapse (Nauriyal, Drummond, & Lal, 2010). Since MBSR helps individuals lower their baseline distress tolerance, adults with SUDs who are taught MBIs may have improved relapse rates and are better prepared in enduring the distressful cravings and withdrawals which may inevitably occur (Gawrysiak et al., 2016; Bodenlos, Noonan, & Wells, 2013). This could mean that MBIs may significant decrease the occurrence of relapse rates and increase the patient satisfaction for those in treatment. Research also showed objective evidence supporting decreased stress levels when participants diagnosed with SUDs participated in mindfulness program within a therapeutic community, by

demonstrating significantly lower salivary cortisol levels (Marcus et al., 2009). If programs that taught MBIs were available to all adults experiencing SUDs, these techniques could help patients fight their cravings, daily stress, and withdrawals, while improving day-to-day life.

With emerging evidence for effective Mindfulness based stress management treatment in those with SUDs, the clinically relevant PICOT question, "For men enrolled in a residential substance recovery setting with a history of SUD, how does a weekly self-help mindfulness class affect mindfulness levels and perceived satisfaction towards mindfulness education over 4 weeks?"

<div align="center">**Search Strategy**</div>

Literature searches were conducted in Pubmed, CINAHL, and Web of Science. The following key words were used: *addicted, addiction, alcohol, anxiety, brain changes, brief, cravings, dependence, distress, distress tolerance, drug treatment, drug use, MBRP, mindfulness-based relapse prevention, MBSR, mindfulness-based stress reduction, mindfulness, MBI, stress, substance, substance use, systematic review, TAU,* and *worry.* The literature search was conducted through performing five searches using multiple combinations of the keywords with "AND/OR" to clarify the searches. See appendix A, B, C to see the combinations and the search results. Exclusion criteria included children, studies that were older than ten years, poor experimental designs, and subjects that were not experiencing substance use disorders. Inclusion criteria included journal articles only, subjects being in a treatment milieu/program, and subjects receiving some form of MBI. Studies that also measured stress and/or distress symptoms, brain changes, and polysubstance use were included.

Web of science yielded 68 studies, but seven of the studies were duplicates of each other so there was actually a total of 61 studies. Of the 61, 16 were eliminated due to being about

topics other than stress or SUDs, seven were eliminated due to focusing primarily on pain or

oncology, six were either not related to mindfulness or mildly related to the topic, five were low

levels of evidence, two were not about adults, and 25 were considered as potentials, but only

eleven studies were chosen based on their relatability, study design, and relevance to the PICOT

topic. The Pubmed and Cinahl searches also produced the chosen 11 studies found from the Web

of Science search thus, duplicates to the already chosen studies for analysis.

<div align="center">**Critical Appraisal and Synthesis**</div>

All studies were analyzed for significance to practice and evaluated for quality using

rapid critical appraisal (Appendix D). Based on the hierarchy of evidence, the majority of the

studies were high-level evidence, indicating strong quality (Melnyk & Fineout-Overholt, 2015;

Appendix E). All of the studies were done in the U.S. except for one from Iran (Appendix D).

Many of the articles were recent, with nine of the eleven being published in 2013 or later

(Appendix D). Lastly, most of the studies showed quality in their methods and analysis by

providing standard deviations (SD), effect sizes (ES), significance (P < .05), and confidence

intervals (CI).

From the chosen studies, there were moderate degrees of homogeneity noted in the

demographics and sample sizes. Within the studies, the participants were predominately

Caucasian males, had an average age of 30, and had several perform their MBI interventions at

addiction clinics. Ethnic minorities were also well represented with certain studies (Appendix E).

Sample sizes ranged from 24 to 318 participants and had a mean age that ranged between 19-49

years per study (Appendix E). There could be a sense of bias from the skewed Caucasian and

male population, as people of different gender and cultures respond differently to stress and other

symptoms and/or consequences related to stress. Attrition rates were higher than desirable, however concordant with studies of similar high-risk populations (Appendix D).

Across studies, validity and reliability of evidence was attained by use of multiple standardized measuring tools and were reported in most studies. In the measurements, certain tools were used multiple times. The most frequently used tools included the Alcohol Severity Index (ASI), Perceived Stress Scale (PSS-14), Five-Facet Mindfulness Questionnaire (FFMQ-39), Beck Depression Inventory-II (BDI-II), and Time Follow-back (TFB). The PSS-14 was used predominately (Appendix E).

Studies exhibited a moderate degree of heterogeneity regarding interventions and measurement tools, however all studies included MBI and the majority demonstrated its beneficial practice on outcomes of stress symptoms, mental health, emotion/mood regulation, perceived stress, alcohol addiction severity, drug addiction severity, competence/knowledge of mindfulness, and anxiety (Appendix E). All the studies but one measured mental health outcomes, while only a select few measured physical/general health outcomes, and over half the studies measured mindfulness competence/knowledge/skill outcomes (Appendix E). About half of the studies measured addiction severity outcomes with drug addiction and alcohol addiction being the focus. Statistically significant changes were noted in regards to MBIs making positive changes for adults with SUD (Appendix E). However, considering that the tools used were self-reported by the participant, there is a possibility of social desirability bias that can alter the scores, resulting to skewed data. Furthermore, most of the MBIs were based off MBSR, meaning they used similar exercises and techniques but changed the focus of the teachings to target the specific population. Yet this indicates that all participants, regardless of a specific target population, can benefit from incorporating mindfulness teachings and exercises.

There were important findings noted from the studies that were considered influential during the developmental phases of the mindfulness program. The research showed consistent significant results pointing MBI as a beneficial practice from two or more studies for the following outcomes: stress symptoms, mental health, emotion/mood regulation, perceived stress, alcohol addiction severity, drug addiction severity, competence/knowledge of mindfulness, and anxiety (Appendix E). There were some heterogeneity in the lengths of the study, as study interventions ranged from 8 weeks to 12 years, with over half of the studies being carried out for one year (Appendix E). Outcome measures were consistent across studies with the greatest degree of effect noted in decreased alcohol addiction severity and drug addiction severity (Appendix E). Lastly, there was one systematic review that studied how MBIs can cause changes in the brain and in it there was evidence found supporting how MBI contributes to increasing brain volume and activity (Gotink et al., 2016).

Conclusions from the Evidence

The supporting evidence shows that MBI used within various mindfulness programs significantly decrease stress, alcohol addiction severity and drug addiction severity, and competence/knowledge of mindfulness for adults with SUDs. None of the studies showed negative or harmful results from MBIs, as all studies showed high effectiveness or improvement from the mindfulness education with statistically significant results supporting its use (Appendix E). Furthermore, the evidence points to MBIs being an improvement from the present standard of care. MBIs are efficient, sustainable, cost-effective, practical, and safe. MBIs should be encouraged and practiced in treating those with SUDs. To make the implementation of MBIs more appeasing and effective for those in substance abuse treatment, a self-help mindfulness approach was utilized by introducing simple educational videos that guided the audience in

performing simple mindfulness activities to become better accustomed to the concepts and teachings/practices of mindfulness and meditation.

Purpose and rationale

The current methods for treating SUDs lack diversity and holistic approaches, therefore a self-help MBI program was developed for individuals in substance use treatment. To measure for sustainability and effectiveness, the participant's perceived satisfaction of the education was measured after each class and their level of mindfulness was measured on their first and last expected day of class (or 4th class). Many patients who have SUDs and are in the early stages of recovery experience higher levels of stressors related to addiction; not only the physiological changes experienced in the body, but also the consequences the addiction causes in their daily life (Georgi & Flores, 2005). Examining MBIs in SUD treatment may provide more evidence for mindfulness education to be augmented or integrated as part of the standard plan of care for treating addiction in the future.

EBP Model and Conceptual Model

To implement MBIs with those recovering from SUDs, *The Liverpool Mindfulness Model* (Appendix F) helped guide and conceptualize the practice of mindfulness by emphasizing the concepts of motivational factors, mind training, core processes, mental stance, and outcomes (Malinowski, 2013). With "attention" as the central tenet of the model's core processes, it addresses how people build a willingness to start practicing mindfulness. This, in turn influences attention, emotional flexibility, and cognitive flexibility, to develop non-judging awareness, achievement of positive behavioral changes and an increase in overall wellbeing (Malinowski, 2013). The theory matches the proposed project design in educating people with SUDs on MBIs.

In addition, *The ACE-STAR Model of Knowledge Transformation* (Appendix G) furthered the project by providing a structure on how to incorporate the evidence from research into practice, thus guiding the approach in creating evidence-based practice (EBP). The goal of this model is to integrate "knowledge transformation," meaning the conversion of research findings from primary research results, through a series of stages and forms to impact health outcomes by way of evidence-based care (Gawlinski & Rutledge, 2008, p.298). The model starts by analyzing research, then summarizing the evidence, translating the research summary into guidelines, incorporating the guidelines into intervention(s) utilized in practice, and finally evaluating the outcome(s). This method provides the project foundation for changes in the treatment of stress of those with SUDs. As the review of literature (Appendix D and E) showed high levels of evidence supporting various forms of MBIs causing positive changes that decrease the negative manifestations from stress, this model provides a solid approach on what must be done further to implement this knowledge into practice and achieve "knowledge transformation." After making the guidelines for the pilot program, the program was initiated at a SUD treatment site, then later evaluated for its effectiveness and sustainability for future implications and improvements.

The *ACE-STAR Model of Knowledge Transformation* and the *Liverpool Mindfulness Model* both played a crucial role in guiding this project throughout its development and implementation. The *ACE-STAR Model of Knowledge Transformation* provided clear direction on how to integrate EBP processes into practice. Starting from the first stage, "discovery research," numerous academic journals on different types of mindfulness and meditation were gathered along with internal evidence from the project site (Stevens, 2013). The "evidence summary" was done by processing the gathered research into a manageable evidence synthesis that allowed the research to be organized and utilized for further application. During this stage

upon analyzing all the literature it was noted that all the different forms/styles/techniques of

mindfulness showed mild to significant improvement upon individuals. The "translation" was

when the summarized evidence was then developed into a self-help mindfulness class and a

manual was made to sustain/maintain this class by allowing anyone to be able to implement and

lead this class upon reading it. During this phase organizational stake-holders were identified and

supported the pilot program. The "integration" occurred when the self-help mindfulness class

became available to the patients at the residential substance recovery treatment facility over a

total period of 8 weeks (Stevens, 2013). During this stage, specific staff were chosen to

champion this class and continue running the self-help mindfulness program after the 8 weeks.

Lastly the data was gathered, analyzed, "evaluated" and then presented to the organization and

the academic community to report how the project was successful in both benefiting the majority

of the participants and creating positive changes to the current standard of care within that

facility. The *Liverpool Mindfulness Model* helped in the development of the self-help

mindfulness program by providing a basis on how mindfulness works. This model helped

organize the educational content (youtube videos) by serving as a foundation in understanding

the process of how mindfulness integrates into a person's life, starting from why they begin

learning about mindfulness to the expected benefits they receive once they internalized it. Thus,

while the two models are different in their purpose and nature, both were needed for the

development and success of this project.

Project Methods

Ethics/Risks to Participants

The project had a number of ethical guidelines that were approved by the internal review

board (IRB). There were no foreseeable physical, social, legal, and economic risks directly noted

by participation in the proposed research study. There were potential discomforts or

psychological distress that could be experienced by some participants related to the meditation

exercises performed during class. Thus a plan was made to assist in removing any participants

who experienced feelings of depression, anxiety, restlessness, or any other signs of distress

during the class-time by arranging support staff to escort the distressed participant away from the

stimuli by leading them out the class and providing them peer support. The data collected during

this study was de-identified for confidentiality and protection of privacy.

At the same time, there are numerous realistic potential benefits of the mindfulness

program. Research has supported the utilization of mindfulness practices being associated with

decreased anxiety, depression, physical pain, perceived stress, stress symptoms, PTSD

symptoms, and alcohol/drug addiction severity, while increasing physical functioning, social

functioning, self-awareness, self-compassion, mental health, and emotion/mood regulation

(Appendix D).

<u>Setting</u>

The project classes were held in two separate residential substance recovery settings; both

owned by the same organization and both only for men. Facility one had 38 beds and the self-

help mindfulness classes were voluntary to the participants. Facility two had 56 beds and the

classes were mandatory as part of the treatment curriculum. Both facilities were highly

structured, staffed 24 hours a day, incorporated the 12 steps, cognitive behavioral based, and

utilizes peer support openly. The main difference between the two facilities is that facility one is

only meant to be a 30-day program while facility two offers a more extensive length of

treatment.

Innovation leadership/Team collaboration

The leadership innovation was that the Clinical Quality Manager, the facility manager, and the staff who were to take over the class after the 8th week, were all cooperative and supportive in the process of adapting the weekly classes to make this project possible. The collaboration amongst the team leaders and the staff was noted by the open communication and supportive culture.

Participants

The participants were adult males who spoke English, patients of the residential substance treatment facility, had a SUD diagnosis, and were able to consent to the self-help mindfulness program.

Procedure or Process

The program consists of a one-hour class over a four week period. To improve sustainability, the program was repeated; first led by the project lead for four weeks, then led by the staff who had sat in on the first four weeks of class to observe. Participants were permitted to leave the class at any time in the first facility, the participants were required to stay in the room at the second facility yet not required to participate in the study or class during the hour. The right to not participate was clearly explained prior to the start of each class and only patients that consented to participate were provided survey tools. Table 1 is an example of the class breakdown along with the youtube videos for the first week. At the end of each class, the participants were given a "weekly handout" that summarizes the main teachings of that day along with the youtube websites, so the participants can listen to the educational material and practice the guided meditation on their own. The materials for week two, three, and four, are

available upon request. In addition, a manual was developed for the organization with all the

guides, materials, instructions, scripts, and other necessary information required to run the class

explained in a step-by-step manner. Feedback on the class materials, process, and manual, was

obtained from staff during the project period and the manual was given to the organization after

the completion of the project.

Table 1: Class Breakdown

Class Breakdown for the First Session			
Time	**Action**	**Steps**	**Focus / Special Considerations**
(20 Minutes before class)	Preparation	Steps 1-4	* Prepare all required papers * Test websites, sound, and TV/projector *Set up classroom layout
8 minutes	Introduction, general class information, and ground rules	Steps 5-8	* VERY important for leaders to practice the speech for the ground rules and be familiar with them
10 minutes	Provide FFMQ-39 Survey	Steps 9-10	* Even if they're not done by 10 minutes, it's OK
12 minutes	Start Educational Videos	Steps 11-13	* Have the videos ready to be played literally one after another
10 minutes	Start Guided Mindfulness Meditation Videos	Step 14	* If you notice someone is clearly in distress, you should help them leave the room
10 minutes	Break up for Group Discussions	Step 15	* If a group is finished early, a leader could go join the group and facilitate everyone's feedback on the class
5 minutes	Conclusion / Wrap up Huddle	Step 16	* The wrap up huddle is short and simple as everything said is already on the "Week 1 Handout"
5 minutes	Allow participants to finish the FFMQ-39, collect the surveys, and provide the "Week 1 Handout"	Step 17-19	* As the wrap up huddle is ending, have the other leader stand near the exit and handout the "Week 1 Handout" while the participants are leaving the room
Week 1 videos: Video #1 (Less 1: introduction to mindfulness) = https://www.youtube.com/watch?v=5ghm8J7LSlQ Video #2 (Mindfulness animated in 3 minutes) = https://www.youtube.com/watch?v=mjtfyuTTQFY Video #3 (What is mindfulness and how does it work?) = https://www.youtube.com/watch?v=EbyzVB6w9bM Video #4 (10 minutes guided breath meditation) = https://www.youtube.com/watch?v=h0H_4Cf_B1Y			

<u>Outcome measures</u>

The Five Facet Mindfulness Questionnaire (FFMQ-39) is based off the factor analytic study of five different mindfulness questionnaires and developed by a team led by Dr. Ruth A. Baer (Baer et al., 2008). It includes 39-questions answered from a 5-point Likert-type format that is then broken down by the researcher using a separate instructional key to measure five component skills of mindfulness: observing the inner experience, describing the experience, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. Scores range from 39 to 195, with higher scores meaning a higher internalization and level of mindfulness day-to-day. The FFMQ has been used in numerous studies and has a reliability alpha coefficient that ranges from .75 to .91 for its subscales (Baer et al., 2008).

The Client Satisfaction Questionnaire (CSQ-8) is a satisfaction survey for health and human services that was developed as a general scale for measuring client/patient satisfaction of services (Perreault, Leichner, Sabourin, & Gendreau, 1993). The scale was made by a collaboration of interpersonal medical faculty in 1979. Using a 4-point Likert type format, patients can rate their satisfaction level from eight different questions related to perceived satisfaction of service. The patients are asked about what they thought of the quality of service, if the type of service was what was wanted, if the service met their needs, if the service would be recommended to another, if enough help was provided, if the service was helpful in better dealing with their problems, if they were overall satisfied with the service, and if they would return to this service. Scores range from 8 to 32, with higher scores meaning a higher level of client satisfaction. The CSQ-8 has been used extensively for patient satisfaction and has a reliability Cronbach's alpha coefficient of .92 for its 8-item scale (Perreault, Leichner, Sabourin, & Gendreau, 1993).

The Demographic Survey used was developed by the project lead. It asked for the

following information: age, gender, ethnicity/race, previous drug(s) of choice, and total length of

substance abuse. The demographics were used to gain information about the study population

and observe for any noticeable correlation between the participants and the program results.

There were no other long-term follow-up data, lab procedures, nor any exterior

compensation provided to participants other than the taught content.

Proposed Budget

The proposed items needed to run the project were online/wifi access, laptop,

projector/large TV, a rented room, the youtube websites, HDMI cable, printer, and a staff

member. The proposed budget to run the project was $50, which consisted of the cost of printing

out all the material, since the other items were either already owned or provided.

Project Results

Description statistics and a paired t-test were used to find the average weekly CSQ rating,

to check for statistical or clinical significance from the pre and post FFMQ, and see if there are

any consistencies amongst the demographic data. There were a total of 91 documented

participants who took the pre-FFMQ, however only 34 participants (37.4%) took the post-FFMQ

while 57 participants (62.6%) did not complete the study by taking the post-FFMQ. Of the 91

participants, 58.2% of them attended the class and took the CSQ-8 for week one, 56.0% for week

two, 56.0% for week three, and 40.7% for week four. Out of the total participants, 27 (29.7%) of

them were from facility one, and the remaining 64 (70.3%) were from facility two. The

satisfaction scores showed positive results upon the analysis of the combined mean scores

gathered from the weekly CSQ-8. For week one the mean satisfaction score was 79.45%, for

week two - 84.44%, for week three - 84.74%, and for week four - 84.46%. Upon ethical

guidelines, all surveys and questionnaires given were voluntarily done by the participants and not

required as a means to remain in the class, thus some participants may have attended other

weekly classes but remain undocumented by refusing to take the CSQ-8 after.

Table 2

Comparison of Weekly Attendance by Completed CSQ-8's						
	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
CSQ_WK1TSP	53	58.2%	38	41.8%	91	100.0%
CSQ_WK2TSP	51	56.0%	40	44.0%	91	100.0%
CSQ_WK3TSP	51	56.0%	40	44.0%	91	100.0%
CSQ_WK4TSP	37	40.7%	54	59.3%	91	100.0%

TSP = Total score percentage

Table 3

Pre and Post FFMQ-39 Scores						
(N = 34)	Minimum	Maximum	Std. Deviation	Mean Score	Mean Percentage	Post-Intervention Improvement
Pre_FFO	11	40	7.01	27.57	0.6893	7.40%
Post_FFO	16	40	5.55	30.53	0.7632	
Pre_FFD	16	39	5.94	27.03	0.6757	6.50%
Post_FFD	23	40	4.76	29.63	0.7408	
Pre_FFA	14	38	5.44	27.07	0.6768	2.10%
Post_FFA	10	38	6.9	27.9	0.6974	
Pre_FFN	10	37	5.67	25.37	0.6342	0.40%
Post_FFN	13	40	6.42	25.54	0.6386	
Pre_FFR	8	33	4.92	21.76	0.6218	9%
Post_FFR	13	34	4.85	24.9	0.7113	
Pre_FFMQT	59	179	22.42	128.81	0.6606	5%
Post_FFMQT	89	187	20.91	138.5	0.7103	

****The results of the pre- and post-FFMQ showed improved post- scores for all five subscales in varying degrees.

FFO = "Observing the inner experience"   FFD = "Describing the experience"
FFA = "Acting with awareness"   FFN = "Non-judging of inner experience"
FFR = "Non-reactivity to inner experience"   FFMQT = "FFMQ Total"

Table 4

Total Weekly CSQ-8 Scores Percentage Per Facility					
Facilities		CSQ_WK1TSP	CSQ_WK2TSP	CSQ_WK3TSP	CSQ_WK4TSP
Facility #1	Mean	0.851	0.8996	0.8798	0.888
	N	15	14	13	12
	Std. Deviation	0.14	0.12	0.11	0.11
Facility #2	Mean	0.7722	0.8235	0.8363	0.8238
	N	38	37	38	25
	Std. Deviation	0.15	0.13	0.11	0.15
Total	Mean	0.7945	0.8444	0.8474	0.8446
	N	53	51	51	37
	Std. Deviation	0.15	0.13	0.12	0.14

Table 5

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair	Pre_FFMQTS - Post_FFMQTS	-9.69118	19.93475	3.41878	-16.64674	-2.73561	-2.835	33	.008

Table 6

Paired Samples Test for Facility One

		Paired Differences							
					95% CI of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre_FFMQTS - Post_FFMQTS	-15.58333	26.46252	7.63907	-32.39682	1.23015	-2.040	11	.066

Table 7

Paired Samples Test for Facility Two

		Paired Differences							
					95% CI of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre_FFMQTS - Post_FFMQTS	-6.47727	15.06690	3.21227	-13.15756	.20301	-2.016	21	.057

A paired t test was calculated to compare the mean pre-FFMQ scores to the mean post-FFMQ scores within both facilities. The mean on the pre-FFMQ was 128.81 (sd = 22.42), and the mean on the post-FFMQ was 138.50 (sd = 20.91). A significant increase from the pre to post FFMQ scores were found (t(33) = -2.835, p< .008). Thus statistical significance was noted as the p-score was <.05

When a paired t test was calculated to compare the mean pre-FFMQ scores to the mean post-FFMQ scores within each facility, there was no statistical significance noted independently for Facility one or two, but positive trends showed clinical significance for both facilities.

Table 8

Report

		Frequency (Total 91)	Percentage (Total 91)	Frequency (Completed 34)	Percentage (Completed 34)
Age	21 to 26	21	23%	5	14.7%
	27 to 32	24	26%	8	23.5%
	33 to 38	16	18%	6	17.6%
	39 to 44	11	12%	5	14.7%
	45 to 50	10	11%	4	11.8%
	51+	8	9%	6	17.6%
	Missing data	1	1%	0	0%
Length of Substance Use (Years)	2 to 7	13	14%	3	9%
	8 to 14	30	33%	5	15%
	15 to 24	28	31%	16	47%
	25+	17	19%	10	29%
	Missing data	3	3%	0	0%
Drug(s) of choice (Number of drugs)	1	30	33%	11	32%
	2	26	29%	11	32%
	3	11	12%	4	12%
	4	10	11%	2	6%
	5+	14	15%	6	18%

Table 9

Ethnicity/Race

	Frequency (Total)	Percent (Total)	Frequency (Completed)	Percent (Completed)
Valid Caucasian/White	55	61%	20	59%
Hispanic/Latino	20	22%	7	20%
African American/Black	10	11%	4	12%
Native American or American Indian	2	2%	2	6%
White and Hispanic/Latino	2	2%	0	0
White and African American/Black	1	1%	0	0
Hispanic/Latino and African American/Black	1	1%	1	3%
Total	91	100%	34	100.0

Table 10

		N	Missing data	Minimum	Maximum	Mean
Age (Years)	Total 91	90	1	21	64	35.0
	Completed 34	34	0	22	64	38.2
Length of use	Total 91	88	3	2	48	16.1
(Years)	Completed 34	34	0	3	48	20.1
Drug(s) of choice	Total 91	90	1	1	9	1.4
(Number of drugs)	Completed 34	34	0	1	7	2.5

The analysis combined the number of participants from both facilities in order to gain
comprehensive knowledge regarding the entire study. It is noted that the majority of participants
for the total length of the class and those who completed the post-FFMQ were predominantly
Caucasian. Of the total number of 91 participants, the average age was 35, the average length of
substance use was 16 years, and the average number of different substances used by the

participants were 1.4 drugs (meaning they used one to two different types of drugs in average).

Of the 34 participants who completed the study, the average age was 38, the mean length of

substance use was 20 years, and the average number of different drugs taken were 2.5 drugs.

Discussion

There are a number of noticeable differences between the ethnicities and facilities. The

majority of the participants were Caucasians, aged 21 to 44. This is actually consistent with the

main population of today's opioid epidemic, which consists of middle-aged Caucasian males

(Netherland & Hansen, 2017). Facility score comparisons found that Facility one had higher

CSQ scores, lower standard deviations, and less participants than Facility two. This is likely due

to the self-help mindfulness class being optional and not required in the curriculum of Facility

one, as compared to Facility two, where the class was incorporated into the treatment curriculum

requirements. Both Facility one and two showed clinical significance for the pre and post FFMQ

analysis, with facility two trending closely to statistical significance. The cause for increased

FFMQ scores at Facility two is likely due to mandatory participation. Since Facility one's class

participants were all voluntary and "wanting" to attend, there likely was already some previous

history of meditative practices, previous exposure to mindfulness concepts, or some level of

interest/curiosity regarding mindfulness/meditation. Facility two, class participants were likely to

have received their first exposure to meditation and mindfulness concepts, which would explain

why there was so much more improvement amongst their pre and post FFMQ scores. Substance

recovery practice sites may want to consider making meditative and mindfulness teachings

mandatory in treatment as it is likely to initiate exposure in those who had no education, interest,

or experience with mindfulness practice and its benefits. This recommendation is contradictory

to the advice of mindfulness teachings as voluntary participation is highly recommended for the

full benefit and compliance of mindfulness and meditative practice/education (Kabat-Zinn,

2013). However, due to the benefits of exposing those who may have never practiced meditation

nor know much about the teachings of mindfulness, adding the self-help mindfulness class as a

mandatory session within the substance abuse treatment curriculum may prove to be surprising

more effective and helpful for the majority of patients, than only targeting those who are

interested to know more.

The self-help mindfulness class has a potential to make a lasting impact in patients with

SUDs who are receiving treatment within a substance recovery treatment facility. The combined

results from both facilities showed a statistically significant improvement on the pre- and post-

FFMQ scores after participants attended two to four classes. Furthermore, the CSQ-8 scores

showed significant support for the continuation of the program as the majority of participants

reported high satisfaction scores for each class. Thus, not only is the self-help mindfulness

program an effective and sustainable program, it also fully addresses all the goals of the triple

aim to improve the health system: decreased cost, increased patient experience of care (this

includes quality of care), and improving the health of the population (Berwick, Nolan, &

Whittington, 2008). The cost of this program was almost free with exclusion of the equipment

used to deliver the videos from the internet to the classroom. Training the staff for sustainability

was also easily addressed by providing the self-help mindfulness manual, weekly educational

hand out, and initial observational training. The patient experience/quality of care, can be

represented by the CSQ-8 score which showed almost every weekly class having 80% or above

in satisfaction scores. Lastly, the improved improvement of the health of the population can be

noted by the improvements seen in all five subscales of mindfulness from the FFMQ-39. As

increased mindfulness practice has been seen by studies to decrease cravings and the use of

substances, it is imperative for mindfulness programs to continue in order to improve the chances

of the individuals within this population to successfully maintain their sobriety over time

(Witkiewtiz et al., 2013; Enkema & Bowen, 2017).

This pilot program demonstrates the need for further improvements and research in utilizing

self-help mindfulness classes to play a more active role in substance recovery programs. The

guided meditations utilized in this project has already been adopted into the organization that

hosted the classes, as daily meditation sessions have now been added into their curriculum within

all facility sites. For improvement recommendations, future self-help mindfulness classes could

provide yoga mats and advise participants to come to class wearing something comfortable, as it

is fundamental during the guided-meditations that a relaxed comfortable position is maintained

for full effectiveness. Also for future reference, the class may be more effective if there was

more time spent on the guided meditation and group discussion than the educational section, as

participants were noticeably more active during these interactive sessions than the educational

speeches and handout materials. It is further recommended that this program be introduced to an

all-women's facility and studied to see if there are differences in the results regarding

effectiveness and overall participants satisfaction as women, historically have been under

represented in substance use population studies. While there is room for improvement and future

research, this pilot program has successful with both the participants and the organization

reporting the benefits received from this experience.

Conclusion

Upon initial results noted from this program, developing more self-help mindfulness

classes may be helpful in diversifying the learning experience and expanding this form of

education and stress reduction practice to not only those with SUDs but also people who have no

illnesses. The primary purpose of teaching basic concepts regarding this practice is to help

reduce the stress of daily life through increasing the overall mindfulness levels experienced upon

the practitioner. The study also showed how technology, such as youtube videos, can be an

innovative method of education that provides easy access for people to learn a plethora of new

coping skills for stress. This project supports the idea that anyone who wishes to commit

themselves to a few minutes of learning and meditation can substantially increase their

mindfulness levels and live more in the present than the future or the past. With mindfulness

providing benefits through real-life applications and diverse forms of meditation, there is hope

that this form of treatment may one day not only augment substance use treatment, but also

become the universal stress reduction intervention.

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Appendix A

Search Strategy 1

Web of Science

Appendix B

Search Strategy 2

CINAHL

Appendix C

Search Strategy 3

Pubmed

PubMed Advanced Search Builder   You Tube Tutorial

ⓘ Filters activated: Publication date from 2009/01/01. Clear all

Use the builder below to create your search

Edit   Clear

Builder

	All Fields ▼				⊖	Show index list
AND ▼	All Fields ▼				⊖ ⊕	Show index list

Search or Add to history

History   Download history Clear history

Search	Add to builder	Query	Items found	Time
#2	Add	Search (MBSR OR "mindfulness-based stress reduction") AND (substance use OR drug use OR addiction OR dependence) AND (stress OR distress OR worry OR anxiety) Filters: Publication date from 2009/01/01	31	01:44:15
#6	Add	Search MBSR AND ("psychological health" OR "distress tolerance") AND (efficacy OR effects) Filters: Publication date from 2009/01/01	8	01:41:07
#5	Add	Search (mindfulness based intervention) AND stress AND treatment AND (drug OR drugs) Filters: Publication date from 2009/01/01	37	01:40:59
#4	Add	Search (MBSR OR MBRP OR MBI) AND (craving OR distress) AND (substance use OR drug use) Filters: Publication date from 2009/01/01	15	01:40:48
#3	Add	Search ((MBSR OR mindfulness based stress reduction) OR (MBRP OR mindfulness based relapse prevention)) AND brain changes AND systematic review Filters: Publication date from 2009/01/01	7	01:40:34
#1	Add	Search (MBSR OR "mindfulness-based stress reduction") AND (substance use OR drug use OR addiction OR dependence) AND (stress OR distress OR worry OR anxiety)	34	01:39:27

Appendix D

Table 11

Evaluation Table

Citation	Theory / CF	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/Results	LOE, S and W, AP/CS, and FE
Marcus et al., (2009) MBSR in therapeutic community treatment: a stage 1 trial Funded by NIDA No conflicts of interest recognized	Cognitive behavioral theory	**Design**: Quasi-experimental **Purpose**: To examine the use an adapted form of MBSR called MBTC to compare its efficacy of	N= 459 MBTC n= 295 TAU (consists of CD counseling, life skills training, cognitive restructuring, and vocational training) = 164 MBTC - Male/Female (85.8% / 14.2%)	IV1- MBTC IV2- TAU DV1- Stress SX DV2- Cortisol levels DV3- Attrition	DV1- SOSI DV2- Saliva obtained by using the Salivete sampling device and assayed using Cortisol RIA kits	* two sample t-test for continuous variables * chi-square test for categorical variables * linear mixed models	* No statistically significant demographic differences between the two group except for gender. *IV1+IV2-DV1 = --Total mean SOSI scores decreased significantly over the 9 months of the study in both groups (P<.01). --Females had consistently higher SOSI mean scores over time (P<.01) --The muscle tension and emotional irritability subscales within the SOSI, the MBTC	**LOE: lll** -- S = Measurements of SOSI were gathered on admission then months 1, 3, 6, and 9. Saliva samples were gathered at 0, 15, 30, and 45 minutes after awakening at each of the five study points. Intervention was within a TC and measured for

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| Slight bias by the lack of female PTs

USA | | reducing stress and increasing retention when compared to TAU of those suffering from SUDs within a TC | - White/Black/ Hispanic or other (53.6%, 29.8%, 16.6%)
- Primary drug is cocaine/marijuana / alcohol (33.7%, 25.8%,17.2%)

TAU
- Male/Female (76.2% / 23.8%)
- White/Black/ Hispanic or other (57.3%, 29.9%, 12.8%)
- Primary drug is cocaine/marijuana / alcohol (33.3%, 21.0%, 21.0%)

IC: Met DSM-4 criteria for substance dependence, were residing at the | DV4- PT Participati on in MBTC | DV3- Retention data gathered by tracking the PTs' continued involveme nt or dropout in Cenikor at each study time point

DV4- Level of engageme nt measured using a 5- point scale (1 = never to 5 = very | *log-rank test

*cox proportional hazards regression model | group showed significantly lower scores at 3 months when compared to the TAU group (muscle tension, p =.02) (emotional irritability p =.03) Females also scored higher on the muscle tension and emotional irritability when compared to males (p<.02)

*IV1+IV2-DV2 = The MBTC and TAU group showed significant differences in trends over time (p =.03)
--The MBTC group showed a steady decline in levels over the 9 month study while the TAU group showed an irregular patterns of change
--This trend of decreasing cortisol levels changed over time but had the strongest correlation occurring at 9 months (p<.01)
--No significant differences were noted on the average cortisol values between the genders. | stress reduction and increase in retention -- W = Skewed male to female population, PT participation of intervention only measured for MBTC group, no randomization, and no full validation for measuring if reported scores are true due to lack of full observation after class -- AP/CS = Level of participation in MBTC had a significant relation to retention. Changes in cortisol levels followed the same pattern of results as the SOSI scores, which |

			Houston facility of Cenikor Foundation, accepted to be part of the study within 72 hours of admission, and participants gave informed consent EC: If the PT chose to leave the facility		often) to the question "to what extend did the participant engage in class?"		--The TAU subjects tended to have higher cortisol values than the MBTC group (p = <.01) --Higher total mean SOSI scores had a direct correlation to higher cortisol values (p<.01) *IV1+IV2-DV3 = No statistical significance found between TX center dropouts between the MBTC and TAU group (p = .45) --Median survival time for the MBTC was 46 days, and 44 days for the TAU group --Legal stipulation and baseline SOSI scores were found to affect survival rates, with PTs legally required to be at the TC being 29% less likely to drop out (hazard ratio .71, p =0.1) --Higher total mean SOSI scores upon entry were directly associated with an increased likelihood of dropping out (hazard ratio = 1.20, p = .03)	showed decreased levels found in the MBTC group by three months. Strong consistency in stress measures meaning stress phenomenon was reliably measured. Stress reducing benefits seem to decrease after 3 months possibly suggesting the need for continuing education to follow-up on the MBTC techniques learned. The baseline scores of the SOSI showed a strong prediction in early dropout, which supports a relationship between stress and retention within the

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							--Baseline muscle tension directly associated to increased probability of dropout (hazard ratio 1.14, p =0.2) --Emotional irritability did not affect survival (hazard ratio 1.03, p = .56) Salivary cortisol levels at baseline were not associated with survival (p =.87) nor were the baseline mean SOSI score and group affiliation (p =.78) *IV1-DV4 = --Mean number of class hour attended by the MBTC group was 11.7 (SD =6.1, range 0-17) --Mean level of engagement score 3.5 (SD =1.6, range 1-5), mean participation level (class hours times engagement score) was 48.4 (SD = 26.8, range 0-85) --70% attended 10 or more hours of classes, 15% attended no classes, 1/3 attended all 17 hours,	TC treatment and that MBTC can be provided as an early adjunctive therapy to manage stress -- FE = MBTC may be too intense for an unmotivated individual. MBTC is meant to be utilized in a TC than general population

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							and 60% had an average level of engagement score of 4 or higher --After adjusting for legal stipulation, gender, and baseline total mean SOSI score, an increase in participation level was associated with a decrease in the likelihood of TX center dropout (hazard ratio = .976, p < .01)	
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Hosseinzadeh Asl (2014) Effectiveness of MBSR intervention for HRQOL in drug-dependent males Funded by Addiction	Cognitive behavioral theory	**Design:** RCT **Purpose:** To examine the effects of MBSR on health-related QOL in drug-	N= 53, all males undergoing methadone TX MBSR n= 24 TAU (methadone TX but no therapy) n= 25 Dropped out before experiment n= 4	IV1- MBSR IV2- TAU DV1- Physical function DV2- Physical role	DV1,2,3,4,5,6,7,8 = SF-36	*independent-samples t test *ANCOVA	* IV1+IV2-DV1,2,3,4,5,67,8 = Comparison between mean score of groups at pre-test showed no statistically significant difference between the mean scores of the experimental and control groups on any of the SF-36 scale before starting the study * IV1+IV2-DV1,2,3,4,5,67,8 = Comparison between mean score of groups at posttest	**LOE: ll** -- S = Appropriate statistical analysis, has a control group receiving standard TX but no therapy, and instrumentation allowed various data to be obtained in regards to HRQOL

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| TX Clinic of Milad

No conflicts or biases recognized

Researchers are Turkish and PTs are Iranian

Done in Iran | | dependent males | Mean age = 36.8 years (range 19-46)

IC: PTs are regular attendants of the addiction TX center, were either opium or heroin dependent, and were under methadone maintenance TX throughout the study

EC: If PT decides to drop out of experiment | functioning

DV3- Emotional role functioning

DV4- Vitality

DV5- Mental health

DV6- Social role functioning

DV7- Bodily pain | | | -- Physical function = mean square 60.17, F-test 3.28, P-value 0.077, n^2 0.066, observed power 0.426
-- Physical role functioning = mean square 59.423, F-test 1.830, P-value 0.183, n^2 0.038, observed power 0.263
-- Emotional role functioning = mean square 172.78, F-test 6.21, P-value 0.016, n^2 0.119, observed power 0.685
-- Vitality = mean square 495.42, F-test 21.97, P-value 0.000, n^2 0.323, observed power 0.996
-- Mental health = mean square 769.84, F-test 11.11, P-value 0.002, n^2 0.195, observed power 0.904
-- Social role functioning = mean square 248.2, F-test 5.63, P-value 0.022, n^2 0.109, observed power 0.642
-- Bodily pain = mean square 241.97, F-test 5.71, P-value | -- W = Small sample size
-- AP/CS = Posttest mean scores for all scales were higher in the MBSR group over the control group, and scales of vitality, mental health, role emotional, social functioning, bodily pain showed significant differences between the study groups (P>0.05). Research is supporting evidence that MBSR is effective in increasing HRQOL in drug-dependent males
-- FE = MBSR has potential in improving the |

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				DV8-General health			0.021, n^2 0.110, observed power 0.648 -- General health = mean square 61.12, F-test 1.99, P-value 0.165, n^2 0.042, observed power 0.282	HRQOL of drug-dependent males who present are in TX for drug dependence within addiction TX centers.
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Amaro (2014) Feasibility, acceptability, and preliminary outcomes of a MBRP intervention for culturally-diverse, low-income	Cognitive behavior theory	**Design**: Cohort study **Purpose**: To evaluate the feasibility, acceptability, and benefits of an adapted version of the MBSR	N= 360, all females n=318 Excluded n=42 Hispanic = 45.3% Black = 34.6% Non-Hispanic White and other = 20.1% IC: Must be a woman who is 18 years or older,	IV-MBRP-W DV1- Feasibility and acceptability of MBRP-W DV2- Treatment dosage	DV1- 17-item satisfaction questionnaire DV2- categorical variable chart for higher and lower doses/sess	*Chi-square tests *Analysis of variance *Pairwise comparison *Bonferroni correction	* There were no significant differences noted for baseline perceived stress, posttraumatic stress symptomatology across the dosage groups *IV-DV1 = --Client satisfaction for all questions had a mean score of a 3 or above (mean=3.4, SD=.3), meaning women generally saw their increase in skills and knowledge to be "considerable"	**LOE: IV** -- S = Put into factor trauma, cultural diversity, and feasibility/acceptability which addresses a major gap in the literature, large sample, appropriate statistical analysis -- W = No comparison group, no randomization,

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women in SUD TX Unknown source of funding No conflicts of interests recognized Biased in that researchers' adapted form of MBSR was tailored towards Hispanic and black women USA		program meets the needs of culturally-diverse low-income women with SUDs in regards to decreasing substance use, perceived stress, and trauma SX	actively enrolled in one of the five publicly funded SUD TX programs at Boston, Massachusetts, and give informed consent. EC: PT cannot repeat the intervention program, have missing data on significant covariates, nor dropout of their SUD TX	DV3-Alcohol addiction severity DV4-Drug addiction severity DV5-perceived stress DV6-posttraumatic stress symptomatology DV7-sociodemographic and TX-related	ions of MBRP-W DV3-ASI DV4-ASI DV5-PSS-14 DV6-Posttraumatic Diagnostic Symptom Scale DV7-Self-report on race/ethnicity, employment status, court-ordered	*Linear regression models *Likelihood ratio test *Two-tailed tests with alpha criterion of .05	(1-not at all, 2=OK, 3=considerable, 4=extremely) *IV-DV2 = --19.8% attended 1-4 sessions --35.8% attended 5-9 sessions --44.3% didn't attend any sessions *IV-DV3 = --Significant time-by-group interaction ($x2=19.0$, DF=4, $p<.001$) --General pattern of decreased alcohol severity over time --Significant decline in ASI alcohol scores from baseline and 12 months for those who had 5-9 sessions (unstandardized beta= -.07 points, linear regression coefficient=.03, $p<.05$) *IV-DV4 = --Significant time-by-group interaction ($x2=10.0$, DF=4, $p<.05$)	no measurement of motivation in study, self-reporting may cause social desirability bias, and satisfaction ratings were only available in the last session meaning those not present were unable to give their scores -- AP/CS = Culturally diverse women also benefits from MBRP-W, high satisfaction ratings in quality and growth of MBRP-W by PTs, research supports that MBRP-W decreases alcohol and drug severity, MBRP-W is

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| | | | | characteristics | TX, arrests in the last 30 days, TX modality, length of TX, and Life stressor checklist-Revised for trauma exposure | | --General pattern of decreased drug severity over time
--Significant decline in ASI drug scores from baseline at 6 months and 12 months for those who had 5-9 sessions
--At 6 months (unstandardized beta= -.03 points, linear regression coefficient=.01, p<.01)
--At 12 months (unstandardized beta= -.04 points, linear regression coefficient=.01, p<.05)

*IV-DV5 =
--PSS-14 scores decreased by a mean of 1.7 points per 6-month survey interval in all PTs
--For those with 5-9 sessions of MBRP, there was an additional decrease of 2.3 points per 6-month survey interval (linear regression coefficient=.74, p<.05)

*IV-DV6 =
--Only significance was the time (linear) in TX difference, p<.05 | supported for a specific population
-- FE = MBRP-W may be used for all types of women, women who attend MBRP-W may be more satisfied with TX thus being more compliant to remaining in their SUD TX, this is therapy intervention that does not use medications or invasive procedures |

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							--No significance changes in trauma symptom scores by exposure to MBRP-W --Trauma SX scores decreased on average of 1.7 points per 6-month survey interval in all PTs *IV-DV7= --Higher fraction of women from white or other racial/ethnic backgrounds were in the lower dosage groups and no MBRP-W groups --Significant correlation of women in the high dosage group being in a residential TX and court-ordered TX when compared to women in the low dosage groups and the no MBRP-W groups --Women in the higher dosage group had a significantly higher chances of being in SUD TX at 6- and 12-months follow-up versus women in the lower dosage groups or no MBRP-W groups	

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							--All women in the sample has a history of exposure to traumatic life events --92% were exposed to traumatic life events within 6 months before the study	
Citation	Theory / CF	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	LOE, S and W, AP/CS, and FE
Gotink (2016) 8-week MBSR induces brain changes similar to traditional long-term meditation practice: a systematic review	Physio logic theory	**Design**: Systematic review **Purpose**: To systematically review the evidence of the effect of secular mindfulness techniques	N= 30 studies Neuroimaging studies on MBSR effect n= 11 Aspects in MBSR program n= 15 Dispositional mindfulness n= 4 Randomized controlled trial n=13 Cohort studies n=9	IV1- TX option DV1- Changes in brain activity	N/A	The chosen articles were picked through a qualitative approach after meeting all criteria	*MBSR shows overall increased activity in the prefrontal cortex, especially the dorsomedial and dorsolateral areas, after use *Mixed reviews on how MBSR effects the insula, but many studies show that mindfulness-based tasks caused increased activity in this region *Mixed reviews on how MBSR effects the cingulate cortex, but many studies show that	**LOE: l** -- S = multiple articles reviewed, results show a trend of increased brain activity, and reliable results -- W = Mixed reviews between studies, no quantitative meta-analysis, and many of the studies had a small population sample, notable

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Funded by Erasmus MC No conflicts of interest recognized Risk of publication bias USA		on function and structure of the brain, with emphasis on the neuronal explanation of the stress-reducing effects of the 8-week MBSR and MBCT program	Cross-sectional studies n=8 IC: The study had to include dispositional mindfulness or MBSR/MBCT as aspects of the program or intervention, and functional and /or structural MRI as imaging technique EC: The study was excluded if MBSR or MBCT were not mentioned or were components as intervention, did not have MRI as the imaging technique, and other forms of			mindfulness-based tasks caused increased activity in this region *MBSR increased the volume and activity within the hippocampus *Mixed review in regards to activity, volume, and differences of how MBSR affects the amygdala	heterogeneity, and high risk of publication bias -- AP/CS = Users who are long-term practitioners of meditation show functional and structural differences within the sensory cortices, hippocampus, insula, prefrontal cortex, and cingulate cortex. MBSR training showed similar brain changes in the prefrontal cortex, insula, hippocampus, and cingulate cortex. -- FE = N/A

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			meditation or mindfulness techniques					
Citation	Theory / CF	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	LOE, S and W, AP/CS, and FE
Bodenlos (2013) Mindfulness and Alcohol Problems in College Students: The Mediating Effects of Stress

No funding was used to support this research | Social cognitive theory | **Design**: Cross sectional

Purpose: To examine the relationship between mindfulness and alcohol problems in college students, as well as the role of stress as a | N= 310, undergraduate college students

Male n= 32% Female n=68%

Caucasian n=85% Mean age = 19.7 (range 18-24, SD=1.3) Freshman n= 40% Sophomore n= 24% Juniors n= 20% Seniors n= 16% | IV- Survey of college population about stress, drinking, and mindfulness

DV1- level of mindfulness

DV2- severity of | DV1- FFMQ

DV2- RAPI

DV3- PSS-14 | *Hierarchical linear regression analyses *Kenny and Baron approach

*Bivariate correlations

*Sobel test

*Post hoc power analysis | *IV-DV1 = --No significant differences noted on overall mindfulness between genders (FFMQ score: $t[304] = -.17$, $p=.86$) --However, for the mindfulness facet, non-reactivity to inner experience, males scored significantly higher (mean=22.14, SD=3.64) than females (mean=21.25, SD3.61; $t[303]=2.01$, $p=.04$)

*IV-DV2 = --Class years did not differ significantly on RAPI scores ($F[4, 304]$ 1.75, $p=.14$) | **LOE: IV** -- S = Appropriate statistical analysis, large sample, accumulates the factors of mindfulness, stress, and drinking altogether -- W = Skewed population with higher amounts of females, freshman, and Caucasians. Slightly biased method of recruitment as psychology |

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No conflicts of interest recognized Slight bias by the significant majority of PTs being Caucasian USA		mediator in this relationship	IC: Had to be attending a small liberal arts college in the Northeast, sign an informed consent form, and complete a series of self-report surveys EC: Not attending college, refusing to sign the consent, nor completing the surveys	drinking habits DV3- perceived stress			--Men scored significantly higher (mean=9.35, SD=9.07) than females (mean=6.52, SD=7.61; t[302] = 2.84, p=.00) *IV-DV3 = --Females reported higher stress levels on the PSS-14 (mean=38.25, SD=7.02) than male (mean=36.14, SD=8.29; t[306]=-2.299, p=.02) *IV-DV1-DV2-DV3= --Mindfulness was significantly associated with alcohol problems (β=-0.20, p<.00) --Mindfulness was significantly associated with stress (β=-0.60, p<.00) --Stress was significantly associated with alcohol problems after controlling for mindfulness (β=0.16, p<.05) --Mindfulness did not remain independently associated with alcohol problems when	students were targeted with incentives to participate and mainly people who are interested in mindfulness may take the initiative to sign up for this experiment. This was a cross-sectional study, so causality between variables couldn't be determined. Variables of the PTs like certain personality traits and negative mood states were not measured. Different cultural backgrounds were not measured which may impact perceived stress

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							controlling for stress (β=-0.11, p=.12 --Sobel test indicates that the indirect effects of mindfulness on alcohol problems through stress was significant (Z=-3.82, P<.00) --Post hoc power analysis indicated that the power to detect obtained effects at the .05 level was .96 for the overall regression in the prediction of alcohol problems	levels and coping styles. Possible self-report bias as all data was gathered through self-reporting. No measurement in differences of socioeconomic classes, social support, and other background information which may influence perceived stress -- AP/CS = Results support that stress is a full mediator between mindfulness and alcohol problems. Mindfulness correlated with all the facets of mindfulness and negatively

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								correlated with alcohol problems and stress, while alcohol problems were negatively correlated with the acting with awareness and describing experience facets of mindfulness and positively correlated with stress. Thus mindfulness is negatively associated with stress and alcohol problems, and stress was positively associated with alcohol problems. Study supports that the relationship between alcohol

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Citation	Theory /	Design/ Method	Sample/ Setting	Major Variables	Measurem ent/	Data Analysis	Findings/ Results	LOE, S and W, AP/CS, and FE
								problems and mindfulness can be accounted for by level of stress -- FE = Increasing mindfulness can help with alcohol problems and stress. Mindfulness can be useful in the college student population as there are direct correlations between mindfulness and perceived stress and alcohol problems. MBSR trainings should be offered to help reduce stress and problematic alcohol use in students

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	CF			& Definitions	Instrumentation	(stats used)		
Bowen (2014) Relative efficacy of MBRP, standard RP, and TAU for SUD: a randomized clinical trial Funded by NIH and NIDA Possible conflict of interest by Drs. Bowen, Grow, and Chawla receiving monetary	Cognitive behavioral theory	**Design**: RCT **Purpose**: To evaluate the long-term efficacy of MBRP in reducing relapse compared with RP and TAU (12-step programming and psychoeducation) during a 12-month follow-up period	N= 286 MBRP n= 103 RP n= 88 TAU n= 95 Males = 71.5% Females = 28.5% Caucasian = 57.9% Ethnic/racial minority = 42.1% IC: Had to be enrolled in a designated non-profit chemical dependency TX agency, speak English fluently, be aged 18 or older, receive	IV1- MBRP IV2 – Standard RP IV3 – TAU (12-step programming based on AA and psychoeducation DV1- Drug relapse rates	DV1 – self-report, calendar-formatted Timeline Follow-back for alcohol use, urinalysis drug and alcohol screenings DV2 – Through weekly supervision and review of audio-	- Sample size-weighted orthogonal contrasts - Cox proportional hazards regression modeling - Generalized linear models, specifically, negative binomial hurdle regression models	- Significant baseline differences on the severity of dependence scale with TAU PTs having lower severity than RP or MBRP PTs. *IV1+IV2 on DV1+DV4 = In the 6-month FU, for PTs who received RP or MBRP in comparison to TAU PTs, there was a significantly higher probability of abstinence from drug use and probability of not engaging in heavy drinking *IV1-IV2 = By the 6-month FU, there were no significant difference between RP and MBRP, except for RP showing an advantage over MBRP in time to first drug use *IV1+IV2 on DV4 = For PTs that drank heavily, RP and MBRP PTs	**LOE: ll** -- S = appropriate sample size, statistical analysis, and observation of variables. Data measured over 3, 6, and 12 months -- W = imbalance of baseline severity of dependence amongst the groups, use of self-reporting on substance abuse -- AP/CS = MBRP, RP, and TAU may be equally effective for first 3 months. MBRP and RP is more effective than TAU in regards to relapse risk to drug use and heavy

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incentives from conducting MBRP trainings. No bias recognized USA			medical clearance, give informed consent, be able to attend TX sessions, agree to random assignment and follow-up assessments, and complete the initial intensive outpatient or inpatient care EC: If unable to attend TX sessions, agree to random assignment or follow-up assessment, complete initial TX, have a current psychotic disorder or suicidality,	DV2-Treatment adherence DV3-Competence of MBSR DV4-Length and severity of drug/alcohol use	recorded sessions DV3 – A13-item competence scale DV4 - self-report, calendar-formatted Timeline Follow-back for alcohol use, severity of dependence scale, addiction severity index, urinalysis drug and		reported 31% fewer days of heavy drinking compared with those assigned to TAU by 6 month FU *IV1+IV2 on DV1+DV4 = By 12-month FU, MBRP PTs reported significantly fewer drug use days and higher probability of not engaging in heavy drinking compared with RP PTs *IV1-DV3 = competence rated between adequate and good (4.64[0.42]) *DV2 = FU completion rates were not significantly different across TX groups. Attrition analyses revealed that PTs with missing data at the 12-month follow-up were significantly older (P<.02)	drinking. By 12 months, MBSR PTs had significantly fewer days of drug use and higher chances of not engaging in heavy drinking when compared to RP PTs -- FE = MBSR is safe, low costing, and can be used universally based on individual preference

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Citation	Theory / CF	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	LOE, S and W, AP/CS, and FE
			decline/ fail to attend/ unable to schedule baseline appointment, decide to withdraw from study, become incarcerated, or is unable to maintain contact		alcohol screenings			
Glasner (2016) MBRP for stimulant dependent adults: a pilot randomized clinical trial	Cognitive behavioral theory	**Design**: RCT **Purpose**: To compare the incremental efficacy and outcomes	N= 63 stimulant-dependent adults *Of the 63, 9 of the MBRP group were terminated and 14 of the HE group were terminated for various reasons *Furthermore, 9 of the MBRP	IV1- CM IV2- MBRP IV3- HE DV1- stimulant use	DV1- urine toxicology assay using enzyme immunoassay test procedures	*Generalized linear model (generalized estimating equation) *Mixed model analyses	*IV1+IV2+IV3-DV1= --Average proportion of stimulant-free urine samples of MBRP and HE showed no significant difference (0.73 versus 0.70. p>0.05) --For PTs with MDD, MBRP showed significantly greater benefits which decreased the chances of stimulant use when	**LOE: ll** -- S = Was randomized, well designed in comparing MBRP to HE within CM environment, and measured multiple variables using valid scales and indexes

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Funded by NIDA No conflicts of interest recognized No bias recognized USA		of MBRP to a health education control condition for stimulant-dependent adults receiving contingency management	group dropped out while 14 in the HE group dropped out CM+MBRP, n=31 CM+HE, n= 32 CM+MBRP -males/females= 21/10 -mean age= 44.6 -Hispanic/African /White/Other= 7/ 12/ 9/ 3 -meth dependence= 14 -cocaine dependence= 17 CM+HE -males/females= 24/8 -mean age= 46.1	DV2-psychiatric and addiction severity DV3-depression severity DV4-anxiety severity ONLY FOR MBRP GROUP DV5-feasibility and acceptability	DV2- ASI DV3-BDI-II DV4-BAI DV5- self-completion of mindfulness practice log with the minutes they practiced mindfulness DV6-DERS DV7-WBSI	*Multivariate logistic regression analyses	compared to HE (odds ratio=0.78, p=0.03, n²=0.20) --For PTs with GAD, MBRP showed significantly greater benefits which decreased the chances of stimulant use when compared to HE (odds ratio=0.68, p=0.04, n²=0.13) *IV1+IV2+IV3-DV2= --ASI-drug severity scores showed no significant differences over time as a function of group (p>.05) --ASI-psychiatric severity scores showed significant improvement over time for the MBRP over the HE (X^2=3.07, df=1, p0.04, d=0.61) --Pairwise contrasts showed no significance at mid- or end-of-TX, but was significant at 1 month follow-up (t= -2.33, df=41, p=0.01) *IV1+IV2+IV3-DV3=	-- W = Small sample size, high attrition, -- AP/CS = When compared, results showed CM with MBRP was more effective than CM with HE. in reducing stimulant use, dependence, adults, overall psychiatric severity, possible decrease in anxiety severity, depression severity, emotion regulation, and high feasibility -- FE = MBRP could be helpful in treating cocaine and meth dependence, could be used to decrease stimulant use while having improved mood

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| | | | -Hispanic/African/White/Other= 6/ 16/ 10/ 0
-meth dependence= 14
-cocaine dependence= 14

MDD (43% of sample. Consisted of 53% of MBRP and 33% of HE)
GAD (24% of sample. Consisted of 30% of MBRP and 19% of HE)

IC: Had to be 18 years or older, have a DSM-4 diagnosis of stimulant dependence using the MINI, is able to read and write English, gave | DV6- emotion regulation

DV7- thought suppression or deliberate attempts to avoid unwanted thoughts

DV8- acquisition of mindfulness skills

DV9- fidelity monitoring | DV8- FFMQ

DV9- On a random 50% of sessions using the MBRP Adherence Scale with feedback as needed | | --Significant decrease in BDI-II scores during and after TX for MBRP when compared to HE (X^2=2.88, df=1, p=0.04, d=0.58)
--Pairwise comparisons at mid-TX (t= -2.09, df=32, p=0.02)
--Pairwise comparisons at end-of-TX (t= -1.92, df=33, p=0.03)
--Pairwise comparisons at 1 month post TX (t= -2.17, df=42, p=0.01)

*IV1+IV2+IV3-DV4=
--Findings suggest that anxiety decreased more over time for the MBRP group but it failed to achieve significance (X^2=1.53, df=1, p=0.10, d=0.72)
--Pairwise contrasts showed no significance at mid- and end-of-TX
-- Pairwise contrasts showed significance advantage for MBRP on anxiety severity at 1-month follow-up (t= -2.34, df=28, p=0.01) | stability, and provide depressive and anxiety symptoms. |

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| | | | informed consent, and be able to physically sit still for 30 minutes or longer.

EC: If PT exhibited medical impairment that would compromise their safety, withdraws consent, requires medical detox from any substance, 2-week absence from protocol participation, exhibit psychiatric impairment that warrants hospitalization or primary TX, or were homeless | | | | *IV1+IV2-DV5=
--PTs reported practicing MBRP of an average of 18.5 days over the 8 weeks (SD=16.0, range 0-49)
--PTs reported practicing a total of 145.3 over the 8 weeks (SD=287.0, range 0-1188)

*IV1+IV2-DV6=
--No significance for group x time interaction for DERS
--MBRP group showed significantly lower scores (meaning less difficulty in regulating emotion) at both TX end (t= -2.02, df=41, p=0.02) and follow-up (t= -1.93, df=42, p=0.03)

*IV1+IV2-DV7=
--No significance identified of neither the group x time interaction nor any pairwise comparisons | |

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								*IV1+IV2-DV8= --Changes in the FFMQ failed to show significance for group x time interaction effect ($x^2 < 1$) --Pairwise comparisons showed that there was significantly higher scores for mid-TX of those in MBRP (t=2.32, df=41, p=0.01) --Noted difference observed at TX end, but no statistical difference (t=1.36, df=42, p=0.09) *IV1+IV2-DV9= Results showed acceptable to excellent fidelity of all four domains of the MBRP adherence and competence scale: mean percentage of MBRP components delivery was 85%, therapist style/approach 4.5 (scale from 1 to 5), discussing key concepts 100%, and overall therapist performance 4.2 (scale from 1 to 5)	

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Citation	Theory / CF	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	LOE, S and W, AP/CS, and FE
Witkiewitz (2010) Depression, craving, and substance use following a randomized trial of MBRP Funded by NIDA No conflicts or biases recognized USA	Cognitive behavioral theory	**Design**: RCT **Purpose**: To examine the relation between measures of depressive SX, craving, and substance use following MBRP	N=168 MBRP n= 93 TAU (standard admission outpatient aftercare, 12-step model, process-oriented groups, and psychoeducation) n= 75 Sample: -mean age= 40.45 years, SD=10.28 -male= 63.7 -female= 36.3 -White (non-Hispanic)= 53.6%	IV1-MBRP IV2- TAU DV1-substance use DV2-alcohol and drug cravings DV3-depression TX	DV1-Timeline Follow-Back DV2-PACS DV3-BDI-II	*Full information maximum likelihood through the expectation maximization algorithm *negative binomial distribution *multivariate normality *Mardia's coefficient of skewness and kurtosis	*Significant difference noted on racial distribution amongst the groups $X^2(1, N=168)=5.51$, p=.02. By coincidence of randomization for the MBRP group there were 59 white PTs (63%) and 34 white PTs (45%) for the TAU group *No difference in attrition were found between whites and non-white PTs in the MBRP group $X^2(1, N=93) = 0.631$, p=.43. *No difference in attrition were found between groups at post-intervention (p=.20), 2 months (p=.22), or 4 months (p=.91) *No other differences between baseline interventions from key demographic variables (ps>.14) *TAU PTs received significantly less hours of TX than the MBRP	**LOE: ll** -- S = moderate sample size, randomized trial, had a comparison TAU group, measured cravings, substance use, and depression -- W = poorly descried analysis, skewed male population and white population -- AP/CS = MBRP can help decrease cravings, depression, and substance use -- FE = applying MBRP may be

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			-African American= 28.6% -Native American= 7.7% -Hispanic/Latino= 6.0% -Unemployed= 41.3% -Earn less than $4,999= 62.3% -Obtained high school diploma= 71.6% Primary drugs of abuse were: -alcohol 45.2% -cocaine/crack 36.2% -meth 13.6% IC: PT had to be fluent in English, completed intensive			*product of coefficients method *nonsignific ant chi-square statistic *moderation tests, f^2 was used to estimate the effect size *moderated regression analyses *descriptive statistics and bivariate correlation coefficients	group (mean TAU=9.75 hours versus MBRP=12.79. p=.006) *IV1+IV2-DV1= --Average days of use over 60-days (5.62 days for MBRP, 9.33 days for TAU) ---Use of substance only once within the 60-day follow-up period (28.6% TAU, 33.3% MBRP) --Use of substance on any day of use within the 60-day follow-up period (29.1% TAU, 28.6% MBRP) *IV1-DV2-DV3= --Both groups had lower craving scores at baseline and 4 months postintervention but did not reach statistical significance --TAU had the highest substance use days for those with the highest BDI-II scores --PTs with the highest BMI-II scores in MBRP showed	more cost effective than TAU, research shows MBRP to show more favorable results than TAU

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			outpatient or inpatient TX within the previous 2 weeks EC: If the PT has current psychosis, dementia, imminent suicide risk, significant risk for withdrawal, are unable to attend TX, needing more intensive TX due to high risk of relapse or continued heavy use, having less than 8 weeks until completion of aftercare, not completing inpatient or intensive outpatient TX,			*chi-square tests *t-tests	significantly lower caving scores and days of use versus TAU PTs who also had high MBI-II scores --craving scores significantly mediated the tie between postintervention depressive symptoms and the prediction of days of use over the 4 months after the intervention *IV1-DV3= Mean depression scores in both conditions showed no significant difference	

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			declining participation, and failing to complete the baseline assessment.					
Citation	Theory / CF	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	LOE, S and W, AP/CS, and FE
Short (2017) Reducing stress among mothers in drug TX: A description of a mindfulness based parenting intervention Funded by the	Cognitive behavioral theory	**Design**: Cohort study **Purpose**: To examine whether a mindfulness based parenting intervention could be successful in decreasing	N= 59 women Mean age = 30 years old (range 22-40) White = 73.2% Black = 5.4% Multiracial = 5.4% Other race = 14.3% Unknown/refused race = 1.8% Unemployed/disabled/unable to	IV1- MBP DV1- parenting stress DV2- general stress	DV1- PSS DV2- PSI	*Chi square tests *Mixed-effects linear regression models *Pearson correlation	*IV1-DV1 = --General stress decreased significantly from baseline to post-intervention (pre to post mean difference, for PSS was 19.7 to 16.1. The 95% CI for pre and post were -5.3 and -1.8. P-value <0.001, ES 0.64) --There was a statistically significant decrease expressed in total stress scores for women with low and women with high baseline stress scores	**LOE: IV** -- S = Covering a common but difficult vulnerable population, -- W = Small sample size which may have affected the detection of significant differences, no formal evaluation of other types of support the PTs may have received,

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| Children's Bureau

No conflicts or biases recognized

USA | | general and parenting stress for women with infants or children in TX for SUD | work/student = 96.1%
Employed = 3.9%

Married = 9.9%
Single = 49.1%
Partner/domestic partner/significant other = 40.9%

Number of children:
1 child = 28.3%
2-3 = 48.9%
4+ = 22.8%

PTs had in average more than two children and a history of four pregnancies

IC: PTs had to be women who were English speakers, aged 18 to 40, | | | | --Women with the lowest baseline stress had a mean difference of -2.5 (95% CI -4.6, -0.41; p=0.02).
--Women with the highest baseline stress had a mean difference of -6.51 (95% CI -9.9, -3.1; P<0.001).
--Changes in total stress among women with moderate baseline stress was not statistically significant (P = 0.31)

*IV1-DV2 =
--No significant change in the Total Stress Scores from baseline (73.8, SE 1.8) to post-MBP (74.4, SE 2.8).
--No significant changes found with the Parent-Child Dysfunctional Interaction subscale or the Difficult Child subscale.
--For the Parental Distress subscale there was significant improvement noted by PTs reporting significantly less stress | possibly selection bias as PTs who were more likely to want to participate were more likely to sign up and use what was taught for their stress, all data was self-reported causing increase in reporting bias, no control group of mothers who did not participate in MBP, and no FU reports after.
-- AP/CS = PTs who receive MBP report significant decrease in general stress, the study showed that MBP impacted women with the highest level of general stress. Study |

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Citation	Theory / CF	Design/ Method	Sample/ Setting	Major Variables &	Measurem ent/	Data Analysis (stats used)	Findings/ Results	LOE, S and W, AP/CS, and FE
			within 28 weeks of gestation or delivered within the past 3 years, gave informed consent, and were being treated at either "Family Center," an out-patient TX facility or at "My Sister's Place," a comprehensive, long-term, residential TX facility EC: If PT decides to withdrawal from the program				post-intervention compared to baseline (pre and post MBP scores, 31.8 and 28.3. pre to post mean difference, -3.5, 95% CI of -5.8,-1.1. P-value 0.005. ES 0.31).	suggests that MBP may also help reduce stress of women who previously had high exposure to childhood trauma -- FE = MBP is cost efficient, easily deliverable, provided by certified mindfulness instructors, 12 week MBP intervention may be too long of a commitment, may have compliance issues, results may not be relatable to women with SUD who are not in a clinic-setting

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				Definitions	Instrumentation			
Gawrysiak (2016) Dimensions of distress tolerance and the moderating effects on MBSR Funded by VISN 4 Mental illness Research, Education, and Clinical Center, Philadelphia Veterans Affairs Medical Center	Cognitive behavioral theory	**Design**: Quasi-experimental **Purpose**: To examine the relationship between distress tolerance and psychosocial changes within PTs participating in MBSR	N= 372 PTs who completed an 8-week MBSR course n= 255, completed all post-MBSR assessment measures n= 113, failed to complete these measures PTs were primarily married (59%) Mean age of PTs were 48.9 years old IC: Self-referral or referral by a clinician, physician, or	IV1- MBSR DV1- distress tolerance DV2- perceived stress DV3- mood states	DV1-DTS DV2- PSS DV3- POMS-SF	*principal axis factoring *Cronbach's alpha measure of internal consistency *Generalized estimating equation model *Two-tailed paired t-tests *Type 3 score test *Kaiser-Meyer-	*IV1-DV1 = DTS score with 4 first-order factor subscales of the DTS -- DTS = (Difference of mean pre and post score, 0.5. Difference of mean pre and post SD, 0.8. 95% CI of differences, 0.4, 0.6. t -score 10.2. P-value <.0001) -- Absorption = (Difference of mean pre and post score, 0.7. Difference of mean pre and post SD, 1.1. 95% CI of differences, 0.5, 0.8. t -score 10.0. P-value <.0001) -- Appraisal = (Difference of mean pre and post score, 0.2. Difference of mean pre and post SD, 0.9. 95% CI of differences, 0.0, 0.3. t -score 2.7. P-value .0000) -- Regulation = (Difference of mean pre and post score, 0.5. Difference of mean pre and post SD, 1.0. 95% CI of differences,	**LOE: lll** -- S = Large sample size, appropriate statistical analysis, multiple measurement of variables. -- W = No control group, all data were self-reported thus possible self-report bias, no FU after completion of MBSR program, demographic variables and data were not adequately available, and there was no data collected on how compliant the PTs utilized the MBSR techniques at home

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No conflicts of biases recognized USA			friend. PT had to agree in completing an 8-week MBSR course, complete and pass a telephone screening questionnaire, and assent to complete the self-report measures prior to and following the group participation EC: If the PT did not complete the self-report measures or were not considered appropriate based on the telephone screening			Olkin measure	0.4, 0.6. t -score 8.1. P-value <.0001) -- Tolerance = (Difference of mean pre and post score, 0.6. difference of mean pre and post SD, 0.9. 95% CI of Differences, 0.5, 0.7. t -score 11.4. P-value <.0001) *IV1-DV2 = PSS = (Difference of mean pre and post score, -6.7. Difference of mean pre and post SD, 6.0. 95% CI of differences, -7.4, -6.0. t -score -18.0. P-value <.0001) *IV1-DV3 = POMS-SF score which is made up of six subscales --Anger = (difference of mean pre and post score, -2.1. difference of mean pre and post SD, 3.5. 95% CI of differences, -2.5, -1.6. t -score -9.5. P-value <.0001) --Confusion = (difference of mean pre and post score, -1.7. difference of mean pre and post	outside of class meetings -- AP/CS = Distress tolerance, perceived stress, and mood states showed beneficial changes from pre to post MBSR, results showed baseline distress tolerance significantly moderated reduction on perceived stress meaning there is an inverse correlation between baseline distress tolerance and perceived stress, consistent findings of mindfulness training being beneficial for the majority of its users

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							SD, 3.0. 95% CI of differences, -2.0, -1.3. t -score -8.9. P-value <.0001) --Depression = (difference of mean pre and post score, -2.3. difference of mean pre and post SD, 3.8. 95% CI of differences, -2.8, -1.9. t -score -10.1. P-value <.0001) --Fatigue = (difference of mean pre and post score, -3.3. difference of mean pre and post SD, 4.6. 95% CI of differences, -3.9, -2.8. t -score -11.7. P-value <.0001) --Tension = (difference of mean pre and post score, -2.7. difference of mean pre and post SD, 3.8. 95% CI of differences, -3.2, -2.3. t -score -11.9. P-value <.0001) --Vigor = (difference of mean pre and post score, 2.6. difference of mean pre and post SD, 3.8. 95% CI of differences, 2.1, 3.1. t -score 11.0. P-value <.0001)	and especially for those with low distress tolerance FE = Pt compliance outside of the classroom may be difficult to implement, cost-efficient method for reducing stress, MBSR is dependent to the consistency of the user to practice its techniques making it good for motivated PTs

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Citation	Theory / CF	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis (stats used)	Findings/ Results	LOE, S and W, AP/CS, and FE
Bergen-Cico (2013), Examining the efficacy of a brief MBSR program on psychological health No funding was used to support this research No conflicts of interest recognized No bias	Cognitive behavioral theory	**Design**: Quasi-experimental **Purpose**: To examine potential psychological health benefits of participating in a brief 5-week MBSR program integrated into an academic course	N= 119 undergraduate students Brief MBSR n=72 TAU (Received weekly didactic lectures and discussions about mindful and present centered awareness) n=47 MBSR group -Mean age 21.5 -Males 14 (20%) -Females 58 (80%) -White 47 (65%) -Black 9 (12%) -Hispanic 8 (11%)	IV1- Brief MBSR IV2- TAU DV1- mindfulness skills DV2- self-compassion DV3- trait anxiety	DV1- KIMS and PHLM DV2- SCS DV3- STAI-T	*Chi-square analysis *t test analyses *ANCOVA) *Cohen's d formula *Cronbach's alpha *Carmody and Baer's meta-analysis	*No significant differences found or any of the demographic variables *IV1+IV2-DV1= --For the TAU group, self-compassion and mindfulness measures showed that their scores remained stable with no significant changes noted --For the brief MBSR group, significant improvement was noted from the pre (125±18) to post (133±19) scores in mindfulness of the KIMS composite score (p≤.001) --Subscale scores for KIMS Observing (observational skills without judgment) (p≤.001) was also significant	**LOE: lll** -- S = Moderate sample size, valid and reliable tools for measurement, and appropriate statistical analysis -- W = Sample was not randomized, no follow-up post intervention, samples were mostly white and female, and there were skewed sample quantities among groups, -- AP/CS = Brief MBSR showed a decrease in isolation and

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USA			-Native American 2 (3%) TAU group -Mean age 21.1 -Males 13 (28%) -Females 34 (72%) -White 28 (59%) -Black 5 (12%) -Hispanic 4 (8%) -Native American 2 (4%) IC: Had to be a student enrolled at Syracuse University with an elective health course that was available between 2010 and 2012, give informed consent to be in a study regarding				--For the brief MBSR group, significant improvement was noted from the pre (65±11) to post (68±11) scores in mindfulness of the PHLM composite score (p≤.001) --Subscale scores for PHLM Acceptance (without judgment) (p≤.032) was also significant *IV1+IV2-DV2= --Significant increase in SCS composite scores pre (84±17) and post (89±16) brief MBSR (p≤.001) --Significant improvements noted in SCS subscales for isolation (p≤.045), self-judgment (p≤.044), and common humanity (p≤.05)for post-program *IV1+IV2-DV3= --No significant decrease in trait anxiety post brief MBSR program (p=.10)	increases in mindfulness, self-compassion, observational skills, self-judgment, and common humanity. Brief MBSR may decrease anxiety -- FE = Brief MBSR is easier to implement and follow than traditional MBSR, brief MBSR may increase compliance and acceptability for people who are not as committed or motivated, and brief MBSR would cost less to implement

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			psychological health EC: If PT voluntarily drops out or is unable to attend the TX sessions				--Anxiety scores did decrease from pre (39.4±9.2) and post (38.7±8.8) brief MBSR --Anxiety scores slightly increased from pre (40.2±8.6) and post (41.2±8.8) brief MBSR	

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Appendix E

Synthesis Table

	Studies	Marcus	Hosseinzadeh Asl	Amaro	Gotink	Bodenlos	Bowen	Glasner	Witkiewitz	Short	Gawrysiak	Bergen-Cico
Basics	**Year**	2009	2014	2014	2016	2013	2014	2016	2010	2017	2016	2013
	LOE	lll	ll	IV	1	IV	ll	ll	ll	IV	lll	lll
	Design	QE	RCT	CS	SR	CrS	RCT	RCT	RCT	CS	QE	QE
	Length	9 mo	8 wk	3 yr	N/A	1 yr	3 yr	2 yr	1yr	12 wk	7 yr	2yr
	N	295	24	318		310	n1 – 103 n2 – 88	63	93	59	255	72
Demographics	**Mean age**	34.3	36.8 tp	33.9		19.7	n1-39.1, n2-38.9	44.6	40.45tp	30	48.9	21.5
	Male/Female (%)	85.8 / 14.2	100 / 0	0 / 100		32 / 68	n1- 73.8 / 26.2 n2- 63.6 / 36.4	70 / 30	63.7 / 36.3tp	0 / 100	N/A	20 / 80
	White race (%)	53.6	0	20.1		85	n1-55.3, n2-48.9	29	53.6 tp	73.2	N/A	65
	Other races (%)	46.4	100	79.9		15	n1-44.7, n2-51.1	71	46.4 tp	26.8	N/A	35
	Setting	RES	AC	AC	SR	C	AC	OP	AC / OP	RES	OP	C
Interventions	**Mindfulness Intervention**	X	X	X	X	X	X	X	X	X	X	X
	MBSR		X								X	
	MBTC	X										
	MBRP						X	X	X			
	MBRP-W			X								
	MBCT				X							
	MBP										X	
	B-MBSR											X

Standard relapse prevention						X					
General mindfulness				X	X						

Outcomes												
	Mental Health Outcomes	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	**X**
	Stress symptoms	↓!!		↓	↓	↓!!				↓!!	↓!!	
	Parenting stress									↓!!		
	Mental health	↑	↑!!					↑!!				
	Emotion/mood regulation	↑!!	↑!!	↑	↑			↑!!			↑!!	
	Perceived stress			↓!!	↓	↓!!				↓!!	↓!!	
	Depression	↓						↓!!	↓!!		↓!!	
	Anxiety	↓						↓!!				↓
	Distress tolerance				↑						↑!!	
	Self-compassion											↑!!
	Physical/General Health Outcomes	**X**	**X**	**X**	**X**							
	Bodily pain	↓!!	↓!!									
	Physical functioning	↑	↑									
	General health	↑	↑									
	Social functioning		↑!!		↑							

↑- clinically significant increase of intervention group; ↓- clinically significant decrease of intervention group; **!!**- statistically significant; **A13**- A13 item competence scale; **AC-** addiction clinic; **ASI**- addiction severity index; **BAI**- Beck anxiety inventory; **BDI-II**- Beck depression inventory-ll; **B-MBSR**- brief-mindfulness-based stress reduction; **C-** college; **CrS**- cross-sectional study; **CS**- cohort study; **DERS-** difficulty in emotion regulation scale; **DTS-** distress tolerance scale; **FFMQ**- five facet mindfulness questionnaire; **KIMS**- Kentucky inventory of mindfulness skills; **LOE**- level of evidence**; MBCT**- mindfulness-based cognitive therapy; **MBRP**- mindfulness-based relapse prevention; **MBRP-W**- moment-by-moment in women's recovery: a mindfulness-based approach to relapse prevention; **MBSR**- mindfulness-based stress reduction; **MBTC**- mindfulness-based stress reduction adapted for therapeutic community treatment; **MBP**- mindfulness based parenting; **mo**- months; **N/A**- not available; **N**- sample size; **n**- sample arm; **OP**- outpatient; **PACS**- Penn alcohol craving scale; **PDS**- posttraumatic diagnostic symptom scale; **PHLM**- Philadelphia mindfulness scale; **POMS-SF**- profile of mood states-short form; **PSI**- parenting stress index-short form; **PSS**- perceived stress scale-10; **PSS-14**- Cohen's 14-item perceived stress scale; **QE**- quasi-experimental study; **RAPI-** Rutgers alcohol problem index; **RCT**- randomized controlled trial; **RES**- residential treatment facility; **SCS**- self-compassion scale; **SF-36**- Short form health survey for health related quality of life; **SOSI**- symptoms of stress inventory; **SR**- systematic review; **SS**- sample size; **STAI-T**- Spielberger state-trait anxiety inventory-trait form Y-2; **TAU**- treatment as usual; **TC**- therapeutic community; **TFB**- timeline follow-back; **tp**- total population; **wk-** weeks; **yr-** years

|											
	Vitality		↑!!								
	PTSD symptoms			↓	↓						
	Mindfulness Competence/Knowledge/ Skill Outcomes	X		X	X		X	X				X
	Participation/Engagement/Adherence	↑!!					↑				
	Competence/Knowledge of mindfulness			↑	↑		↑	↑!!				↑!!
	Addiction Severity Outcomes			X		X	X	X	X			
	Alcohol addiction severity			↓!!		↓!!	↓!!		↓!!			
	Drug addiction severity			↓!!			↓!!	↓!!	↓!!			
Measurements	**Mental Health Tools**	X	X	X		X		X	X	X	X	X
	PSS-14			X		X				X	X	
	BDI-II							X	X			
	BAI							X				
	STAI-T											X
	PSI									X		
	DTS										X	

↑- clinically significant increase of intervention group; ↓- clinically significant decrease of intervention group; **!!**- statistically significant; **A13**- A13 item competence scale; **AC-** addiction clinic; **ASI**- addiction severity index; **BAI**- Beck anxiety inventory; **BDI-II**- Beck depression inventory-ll; **B-MBSR**- brief-mindfulness-based stress reduction; **C-** college; **CrS**- cross-sectional study; **CS**- cohort study; **DERS-** difficulty in emotion regulation scale; **DTS-** distress tolerance scale; **FFMQ**- five facet mindfulness questionnaire; **KIMS**- Kentucky inventory of mindfulness skills; **LOE**- level of evidence**; MBCT**- mindfulness-based cognitive therapy; **MBRP**- mindfulness-based relapse prevention; **MBRP-W**- moment-by-moment in women's recovery: a mindfulness-based approach to relapse prevention; **MBSR**- mindfulness-based stress reduction; **MBTC**- mindfulness-based stress reduction adapted for therapeutic community treatment; **MBP**- mindfulness based parenting; **mo**- months; **N/A**- not available; **N**- sample size; **n**- sample arm; **OP**- outpatient; **PACS**- Penn alcohol craving scale; **PDS**- posttraumatic diagnostic symptom scale; **PHLM**- Philadelphia mindfulness scale; **POMS-SF**- profile of mood states-short form; **PSI**- parenting stress index-short form; **PSS**- perceived stress scale-10; **PSS-14**- Cohen's 14-item perceived stress scale; **QE**- quasi-experimental study; **RAPI-** Rutgers alcohol problem index; **RCT**- randomized controlled trial; **RES**- residential treatment facility; **SCS**- self-compassion scale; **SF-36**- Short form health survey for health related quality of life; **SOSI**- symptoms of stress inventory; **SR**- systematic review; **SS**- sample size; **STAI-T**- Spielberger state-trait anxiety inventory-trait form Y-2; **TAU**- treatment as usual; **TC**- therapeutic community; **TFB**- timeline follow-back; **tp**- total population; **wk-** weeks; **yr-** years

DERS							X				
SCS											X
Mental and Physical Health Tools	X	X	X							X	
SOSI	X										
SF-36		X									
POMS-SF										X	
PDS			X								
Mindfulness Competence/Knowledge/ Skill Tools					X	X	X				X
KIMS											X
PHLM											X
FFMQ					X		X				
A13						X					
Alcohol/Drug Severity Tools			X		X	X		X			
RAPI					X						
TFB						X		X			
ASI			X								
PACS								X			
Own Scale/Index/Tool	X		X								

↑- clinically significant increase of intervention group; ↓- clinically significant decrease of intervention group; **!!**- statistically significant; **A13**- A13 item competence scale; **AC-** addiction clinic; **ASI**- addiction severity index; **BAI**- Beck anxiety inventory; **BDI-II**- Beck depression inventory-ll; **B-MBSR**- brief-mindfulness-based stress reduction; **C-** college; **CrS**- cross-sectional study; **CS**- cohort study; **DERS-** difficulty in emotion regulation scale; **DTS-** distress tolerance scale; **FFMQ**- five facet mindfulness questionnaire; **KIMS**- Kentucky inventory of mindfulness skills; **LOE**- level of evidence**; MBCT**- mindfulness-based cognitive therapy; **MBRP**- mindfulness-based relapse prevention; **MBRP-W**- moment-by-moment in women's recovery: a mindfulness-based approach to relapse prevention; **MBSR**- mindfulness-based stress reduction; **MBTC**- mindfulness-based stress reduction adapted for therapeutic community treatment; **MBP**- mindfulness based parenting; **mo**- months; **N/A**- not available; **N**- sample size; **n**- sample arm; **OP**- outpatient; **PACS**- Penn alcohol craving scale; **PDS**- posttraumatic diagnostic symptom scale; **PHLM**- Philadelphia mindfulness scale; **POMS-SF**- profile of mood states-short form; **PSI**- parenting stress index-short form; **PSS**- perceived stress scale-10; **PSS-14**- Cohen's 14-item perceived stress scale; **QE**- quasi-experimental study; **RAPI-** Rutgers alcohol problem index; **RCT**- randomized controlled trial; **RES**- residential treatment facility; **SCS**- self-compassion scale; **SF-36**- Short form health survey for health related quality of life; **SOSI**- symptoms of stress inventory; **SR**- systematic review; **SS**- sample size; **STAI-T**- Spielberger state-trait anxiety inventory-trait form Y-2; **TAU**- treatment as usual; **TC**- therapeutic community; **TFB**- timeline follow-back; **tp**- total population; **wk-** weeks; **yr-** years

Appendix F

Figure 1: The Liverpool Mindfulness Model

FIGURE 1 | The Liverpool Mindfulness Model.
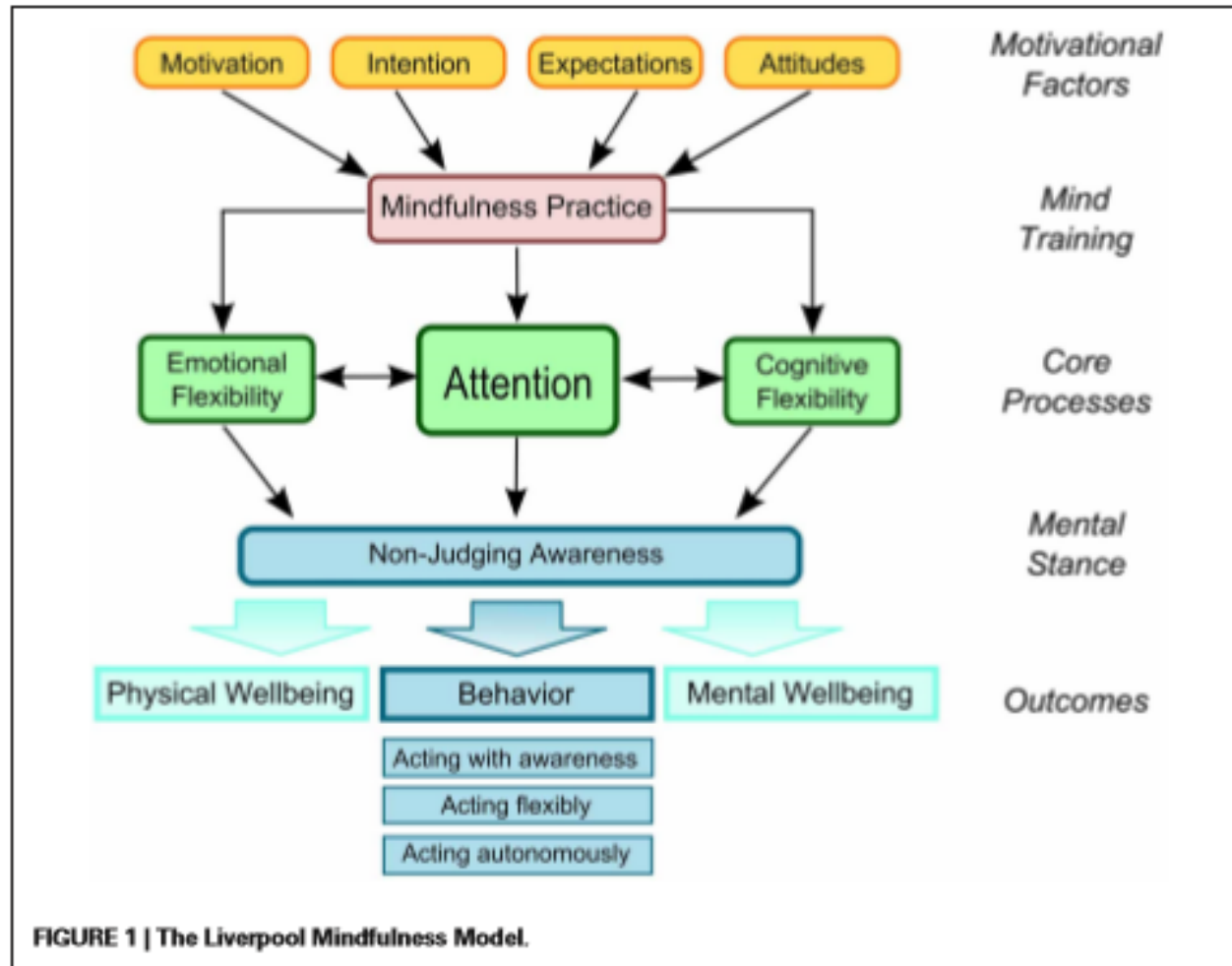
Appendix G

Figure 2:ACE-STAR Model of Knowledge Transformation