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A Pilot RCT of a Values-Based Mindfulness Group Intervention with Jail Inmates: Evidence for Reduction in Post-Release Risk Behavior

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Abstract

This study pilot-tested a values and mindfulness-based intervention (Re-Entry Values and Mindfulness Program: REVAMP) in a sample of male jail inmates. REVAMP aimed to reduce post-release risky behavior by targeting dimensions of mindfulness (e.g., willingness/acceptance) and associated proximal outcomes/mechanisms of action (emotion regulation, self-control, shame/guilt). Inmates were randomly assigned to REVAMP (n=21) or treatment as usual (TAU, n=19). Attendance and feedback supported REVAMP's feasibility and acceptability. At post-treatment, ANCOVAs showed that the REVAMP group increased more on willingness/acceptance, self-judgment and shame relative to TAU. Relative increases in willingness/acceptance persisted at 3-month post-release. Criminal activity was assessed by self-report at three months post-release and official criminal records at three years post-release. At both time-points, there was a marginally statistically significant trend of medium effect size for lower criminal recidivism in the REVAMP group compared to TAU. There were no statistically significant differences in self-reported post-release substance misuse. This pilot RCT indicated mindfulness-based interventions may hold promise for reducing inmates' post-release risky behavior and encourages future research in this area.

Keywords

Mindfulness; Criminal Behavior; Substance Abuse; Jail Inmates; Values

Introduction

Crime and substance misuse constitute major public health and safety issues among the 13.7 million criminal offenders who are released from jails and prisons annually in the United States (Minton, 2011; West, Sabol, & Greenman, 2010). Because of their potential for

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Compliance with Ethical Standards

The authors declare that they have no conflict of interest.

enhancing adaptive behavior, mindfulness based interventions (MBI) have been identified as promising treatment options for offenders (Dafoe & Stermac, 2013). At its core, mindfulness promotes present awareness, acceptance of experience, a quiet mind and non-judgment. Several proximal outcomes of these core mindfulness components may serve to reduce risky behavior among criminal offenders re-entering the community, including: emotion regulation, self-control, and moral emotions.

Emotion dysregulation appears to be an important risk factor for offenders re-entering the community. Surveys of recidivists find that negative emotional states often precipitate re-offense (Zamble & Quinsey, 1997). Empirical research supports that mindfulness enhances the capacity to identify and regulate emotions (for review, see Chambers, Gullone, & Allen, 2009). Mindfulness promotes an approach orientation towards internal and external experiences and increases the ability to act on intention rather than impulse during times of distress. Thus, mindfulness strengthens distress tolerance (i.e., the capacity to endure distressing experience), while reducing experiential avoidance, (i.e., the strategy of avoiding an unpleasant experience), and emotion-driven impulsivity (i.e., the tendency to act impulsively when distressed).

Self-control refers to the ability to override impulses in order to conform behavior to one's own standards and goals (Baumeister, Vohs & Tice, 2007). Research has established a link between low self-control, substance use, and antisocial behavior among offenders (Malouf et al., 2014). Importantly, self-reported trait mindfulness is positively correlated with self-control (e.g., Bowlin & Baer, 2012) and multiple studies find higher self-control and executive functioning among those who practice mindfulness compared to controls (e.g., Hodgins & Adair, 2010). Theory suggests several ways in which mindfulness may strengthen self-control. Mindfulness involves greater self-awareness, which may promote thoughtful, rather than reactive, responding (Dafoe & Stermac, 2013). Additionally, there is evidence that regular exercise of self-control in one specific area can lead to overall improved general self-control (see Baumeister, Gailliot, DeWall, & Oaten, 2006 for review). As such, the intensive regulation of attention involved in mindfulness may strengthen general self-control ability (Masicampo & Baumeister, 2007).

Mindfulness may also have implications for offenders' moral emotions, particularly shame and guilt over the moral transgression involved in most crime. The distinction between guilt and shame is important; guilt refers to a negative evaluation of a specific behavior (i.e., "I *did* something bad") whereas shame refers to a negative evaluation of the self (i.e., "I am a bad person") (Lewis, 1971; Tangney & Dearing, 2002). Among criminal offenders, guilt appears to be a clear protective factor, whereas the relationship of shame to past, current, and future risk has been mixed (Tangney, Stuewig, Mashek, & Hastings, 2011; Tangney, Stuewig, & Martinez, 2014). Because mindfulness emphasizes non-judgment, it may serve to reduce negative, self-evaluative emotions such as shame and guilt. On the other hand, present awareness of the undeniable consequence of past transgressions along with increased emotional acceptance may allow offenders to fully experience reality-based shame and/or guilt, to grapple with the negative consequences of their actions, and importantly, to develop a reparative plan for the future.

Studies on MBIs during incarceration support improvements in mood, self-regulation, and problem behavior (for review, see Shonin, Van Gordon, Slade, & Griffiths, 2013). However, empirical research on mindfulness during incarceration is limited. First, many of these studies drew samples of inmates who elected to enroll in mindfulness treatments instead of more traditional treatment options. This self-selection process leaves unclear how general samples of treatment seeking inmates would respond to mindfulness practice. Second, we are aware of only three *randomized controlled* trials of mindfulness group interventions during incarceration. Two of these found favorable outcomes in behavioral tests of executive functioning in a sample of 264 male juvenile offenders (Leonard et al., 2013) and self-reported health, sleep and adjustment among 33 adult women probationers housed at a detention facility (Sumter, Monk-Turner, & Turner, 2009). However, Lee, Bowen, and An-Fu (2011) failed to find any significant between-group improvements in depression, drug expectancies, or abstinence self-efficacy in a sample of 24 Taiwanese inmates. None of these randomized studies employed assessment of behavior post-release. We are aware of only one *non-randomized* study that included a post-release follow up. In a sample of 87 inmates, Bowen et al. (2006) found that volunteers for a 10-day mindfulness meditation retreat reported less substance use during the three months post-release compared to inmates who elected not to participate. Urgently needed are studies that employ *both* randomization and post-release follow up assessments of important outcomes.

The Re-entry Values and Mindfulness Program (REVAMP) is a novel, manualized group intervention for jail inmates nearing release into the community (Youman, Malouf, Tangney, & Harty, 2010). REVAMP incorporates and adapts elements from several MBIs, including Acceptance and Commitment Therapy (ACT; Hayes, Luoma, Bond, Masuda, & Lillis, 2006), Mindfulness Based Relapse Prevention (MBRP; Bowen, Chawla, & Marlatt, 2010) and Dialectical Behavioral Therapy (DBT; Linehan, 1993). REVAMP begins with a focus on personal values identification to reduce defensiveness and increase motivation for treatment. Next, REVAMP utilizes a variety of exercises to reduce experiential avoidance and thereby alleviate psychological suffering. These exercises include metaphors from ACT, distress tolerance skills from DBT, and mindfulness meditation practices from MBRP. Treatment closes with a return to a focus on valued-living and participants are engaged in values clarification and goal identification exercises. Throughout REVAMP, mindfulness meditation practice is encouraged through centering exercises at the beginning and end of sessions in addition to mindfulness meditation homework assignments. See Malouf Youman, Harty, Schaefer and Tangney (2013) for a more detailed description of REVAMP.

This pilot RCT of the REVAMP was conducted in a jail setting. In the United States, prisons house inmates serving long sentences (i.e., more than one year) whereas jails house inmates who are awaiting trial, serving a short sentence, or completing the final portion of a longer sentence. Jail inmates are not isolated from mainstream society; the vast majority of inmates released to the community are released from jails, not prisons (Minton, 2011; West et al., 2010). Because of the proximity to the community, we believe that jail inmates represent a population ideal for re-entry interventions aimed at improving post-release outcomes. This study aimed to investigate the following hypotheses in a sample of male jail “general population” (i.e., the jail’s classification for inmates not in special housing such as solitary confinement or psychiatric housing) inmates:

Hypothesis 1 Feasibility & Acceptability

We hypothesized that the jail inmates would find REVAMP relevant and useful as evidenced by the participants' rates of attendance and their feedback on the program.

Hypothesis 2 Psychological Factors

We hypothesized that, compared to the control group, the REVAMP group would demonstrate improvements in both self-reported core mindfulness dimensions (i.e., acceptance/willingness, present awareness, non-judgment, quiet mind) and in mindfulness' proximal outcomes/mechanisms of action (i.e., emotion regulation, self-control, shame/guilt). Given that these proximal outcomes of mindfulness are highly related to symptoms of Borderline Personality Disorder, we similarly hypothesized that the REVAMP group would experience relative improvements in symptoms of Borderline Personality Disorder.

Hypothesis 3 Post-Release Risky Behavior

We hypothesized that compared to the control group, the REVAMP group would demonstrate reduced risky behavior post-release, including crime (Hypothesis 3a) and substance misuse (Hypothesis 3b). Together, these hypotheses were tested across seven variables of post-release risky behavior: self-reported crime at three months post-release, and official records of crime frequency and latency at three years post-release; as well as frequency of use and symptoms of misuse for alcohol and marijuana.

Method

Participants

Participants were 40 adult males incarcerated at a suburban jail in the mid Atlantic region of the United States. Inclusion criteria were assignment to the jail's general population (i.e. not solitary confinement), language proficiency in English, post-sentencing status, and a release date that would allow adequate time for study participation. Females were excluded due to the limited number of female inmates housed at the jail and the jail's gender segregation requirements. The sample was diverse in terms of race/ethnicity (48% African American, 27% Caucasian, 15% Hispanic/Latino, 10% Other). The average age was 37.2 (*SD*=15.7, range 18–81). On average, participants had completed 12.0 years of education (*SD*=2.5, range 8–18 years).

Procedures

Participants were enrolled in two cohorts; 19 participants were enrolled in cohort 1 during April of 2011, and 21 were enrolled in cohort 2 during June and July of 2011. Eligible inmates were informed that the study involved potentially participating in a program designed to "identify goals for the future and learn new ways to deal with strong emotions." Participants were informed that data are protected by a Certificate of Confidentiality from Department of Health and Human Services.

Data collection occurred at four time points: interview assessments at pre-treatment (Time 1), post-treatment (Time 2), three months post-release (Time 3) and a review of official criminal history record information at three years post-release (Time 4). Baseline interviews

were conducted in private rooms in secure areas of the jail that ensured privacy (i.e., "professional visiting" rooms). Some questionnaires were administered using touch-screen computers that read each item to participants and did not require computer literacy. Other questionnaires were administered by an individual interviewer who read all items to the participant. Post-release interviews were conducted over the phone. All data were collected by trained research assistants who were blind to treatment condition. We provided monetary compensation to participants for data collection at each time point ($20 for assessments during incarceration and $25 for post-release assessment). Care was taken to compensate participants at a level that was fair but not coercive. See Figure 1 for consort diagram.

Randomization and study conditions—After Time 1 assessment, participants were randomly assigned to either have access to normal jail treatment and services (treatment as usual: TAU) or to receive REVAMP in addition to access to normal jail treatment and services (REVAMP + TAU). Services normally available in this jail included anger management, financial planning, health education, GED preparation, religious services, substance abuse treatment, employability skills, and computer skills. Using a computerized random number generator, 21 participants were assigned to REVAMP+TAU and 19 participants were assigned to TAU. REVAMP was delivered twice a week for 90-minute over the course of four weeks.

Therapist training and treatment fidelity—Co-facilitators were an advanced clinical psychology doctoral student and a clinical psychology post-doctoral fellow. A licensed clinical psychologist provided supervision. Facilitators and supervisor had previous training in MBIs. This experience included participation in training workshops on mindfulness by national leaders in MBI (e.g., Stephen Hayes and Marsha Linehan), previous supervised provision of MBI, and personal meditation practice. An attempt was made to video record all sessions. In total, 74.6% of treatment was recorded; three sessions were missing entirely and three sessions were partially recorded (50%, 25% and 12.5%). Reasons sessions were not recorded included human error and technological error. A fidelity checklist of the treatment components of each session was created based on the treatment manual. Two trained bachelor's level research assistants watched session tapes and independently rated whether each treatment component was fully covered, partially covered, or absent. Independent ratings were consistent on 86.3% of items rated. The raters met to determine a consensus rating. In total, 84.5% of the treatment components were rated as "fully covered", 10.3% were "partial" and 5.2% were "absent". Items rated absent included centering practice at the end of the class (three occasions), discussion of curriculum (once), and verbal explanation of out of class assignment (once).

Measures

Time 1: Pre-Treatment

Demographics: ***Demographics*** assessment included participants' self-reported gender, age, and race.

Core Mindfulness: The Mindfulness Inventory: Nine Dimensions (MIND; Harty et al., 2009), is a 45- item measure of both mindfulness core components (present awareness,

metacognition, quiet mind, willingness/acceptance, non-judgment of self/others) and proximal outcomes of mindfulness related to emotion regulation (experiential avoidance, distress tolerance, emotion driven impulsivity). Research on the MIND in two large samples of college students found evidence of convergent validity with other measures of mindfulness (e.g., FFMQ, MAAS) as well as divergent validity with measures of anxiety and depression, and concurrent validity with satisfaction with life (Malouf et al., manuscript in preparation). Regarding core mindfulness, at Time 1, reliabilities were: Present Awareness (5 items, α=.61), Quiet Mind (5 items, α=.60), Non-Judgment of Self (4 items, α=.70), Non-Judgment of Others (5 items, α=.75), Willingness/Acceptance (8 items, α=.74). The Metacognition subscale was excluded from analyses due to very low reliability at all time points. We elected to retain Distress Intolerance and Quiet Mind as the reliability in a much larger sample was estimated to be α=.67 and .66 respectively (Malouf et al., manuscript in preparation). Reliability estimates in small samples such as the present one are vulnerable to greater error.

Emotion Regulation: The MIND includes three scales of proximal outcomes of mindfulness relevant to emotion regulation: Experiential Avoidance (5 items, α=.70), Emotion Driven Impulsivity (5 items, α=.83), and Distress Intolerance[1] (5 items, α=.57).

Self-control & Impulsivity: This study included both a measure of general self-control, along with a multidimensional measure of deficits in self-control (i.e., impulsivity). Both measures focus on general self-control processes (e.g., breaking a habit, working towards long term goals) rather than any specific behavioral outcome of self-control (e.g., budgeting money or regulating social behavior).

On the Brief Self-Control Scale (BSCS; Tangney, Baumeister, & Boone, 2004), participants rated how well statements described them (example item: “I am good at resisting temptation”) on a 5-point scale. The BSCS was reliable at Time 1 (13 items, α=.84).

Three subscales of the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001) were included. The Negative Urgency subscale measures the tendency to act impulsively when distressed (example item: “When I feel bad, I will often do things I later regret in order to make myself feel better now”). The Premeditation subscale assesses planning before taking action (example item: “I like to stop and think things over before I do them”). The Perseverance subscale measures the ability to persist on a task (example item: “I finish what I start”). The UPPS has been shown to be reliable and valid in a variety of samples (Whiteside & Lynam, 2001, 2003). These subscales demonstrated good reliability at Time 1: Negative Urgency (12 items; α=.92), Perseverance (10 items; α=.88) and Premeditation (11 items; α=.89).

Shame-proneness and Guilt-proneness: Test of Self-Conscious Affect - 4 (TOSCA-4; Tangney et al., 2008) includes four subscales that hone in on the key distinction between shame and guilt (i.e., focus on self vs. behavior), while also providing independent measures of “action tendencies” associated with shame vs. guilt (hiding vs. amending). The TOSCA-4 utilizes a scenario-based approach where respondents are asked to imagine themselves in a series of 15 situations likely to be encountered in daily life. Each scenario is followed by

responses that describe phenomenological aspects of shame and guilt with respect to the specific context. Respondents rate, on a 5-point scale ("not at all likely" to "very likely") their likelihood of responding in each manner indicated, allowing for the possibility that feelings of shame and guilt may co-occur in connection with a given situation. The two shame subscales (Negative Self Appraisal and Avoidance) (r=.64) and the two guilt subscales (Behavioral Remorse and Repair) (r=.77) were combined to create Shame (30 items, α = .91) and Guilt (30 items, α = .89) scales.

Borderline Personality Disorder (BPD) Features: Symptoms of BPD were assessed with the Personality Assessment Inventory (PAI; Morey, 1991), a well-validated measure of psychopathology, using T-scores based on the census standardization sample. The PAI measures symptoms of BPD in four domains: affective instability, identity problems, negative relationships, and impulsivity. This scale had excellent reliability at Time 1 (24 items; α = .92), consistent with reliabilities observed in the standardization samples (Morey, 1991).

Substance use disorder: Texas Christian University: Correctional Residential Treatment Form, Initial Substance Use Assessment (TCU-CRTF; Simpson & Knight, 1998). Participants reported frequency of substance use during the three months prior to incarceration ranging from 0 = "Never" to 8 = "More than once a day." Additionally, participants rated how often they experienced symptoms of substance abuse and dependence as specified by DSM-IV (American Psychiatric Association, 2000). For example, for the symptom of tolerance, participants answered the question "How often did you find that your usual number of drinks had much less effect on you or that you had to drink more in order to get the effect you wanted?"). Item responses ranged from 0 = "Never" to 4 = "7 or more times." For domains with multiple items, responses were averaged and a total score was computed by taking the mean across the seven domains (six in the case of marijuana because withdrawal was not considered part of the criteria in DSM-IV). Given very low rates of cocaine and opiate use in the current sample, analyses of cocaine and opiate use disorders were excluded. Scales were created for symptoms of alcohol abuse (4 items, α = .47) and dependence (7 items, α = .73) and marijuana abuse (4 items, α = .93) and dependence (6 items, α = .96). Intercorrelations between abuse and dependence symptoms were high for alcohol (r=.77) and marijuana (r=.75). To be consistent with DSM-5 conceptualization of substance use disorders, the average of all items for both abuse and dependence scales were taken as measures of alcohol and marijuana use disorder symptoms.

Time 2: Post-treatment prior to release—The following is measurement and reliability information from the Time 2 assessment:

Participant feedback: ***Participant feedback*** was assessed by anonymous questionnaires. Participants were able either to turn in the feedback or mail the feedback form (through the free jail-based mail system) to program facilitators. Participants used a 1 ("poor") to 4 ("excellent") scale to rate the intervention's quality and usefulness as well as their overall satisfaction with participation.

Core mindfulness **(MIND subscales; Harty et al., 2009):** Present Awareness (α=.61), Quiet Mind (α=.42), Willingness/Acceptance (α=.71), Non-Judgment of Self (α=.76), Non-Judgment of Others (α=.75).

Emotion Regulation **(MIND subscales; Harty et al., 2009):** Distress Intolerance (α=.76), Experiential Avoidance (α=.77), Emotion Driven Impulsivity (α=.88).

Self-control & Impulsivity **(BSCS; Tangney et al., 2004) (α=.91). (UPPS; Whiteside & Lynam, 2001):** Urgency (α=.93), Perseverance (α=.90), Premeditation (α=.88).

Shame/Guilt **(TOSCA-4; Tangney et al., 2008):** Shame (α = .95) Guilt (α = .96).
Borderline Features (PAI; Morey, 1991) (α=.93).

Time 3: Three Months Post-Release—The following is measurement and reliability information from the Time 3 assessment:

Core Mindfulness (MIND subscales; Harty et al., 2009): Present Awareness (α=.54), Quiet Mind (α=.64), Willingness/Acceptance (α=.80), Non-Judgment of Self (α=.74), Non-Judgment of Others (α=.72).

Emotion Regulation **(**MIND subscales; Harty et al., 2009): Distress Intolerance (α=.41), Experiential Avoidance (α=.70), Emotion Driven Impulsivity (α=.80).

Self-control (BSCS; Tangney et al., 2004) (α=.85)

Substance use disorder (TCU-CRTF; Simpson & Knight, 1998). Participants reported frequency of substance use during the three months post-release ranging from 0 = “Never” to 8 = “More than once a day.” Symptoms of alcohol abuse and dependence (*r*=.53) and marijuana abuse and dependence (*r*=.65) were combined to form scales of alcohol use disorder symptoms and marijuana use disorder symptoms.

Recidivism Participants reported how many times they had been arrested for 16 different categories of crime (e.g. theft, assault, drug offenses, etc.) or had committed those crimes without being arrested, during the 3 months after their release. This measure yielded variables of total number of arrests and undetected offenses. Undetected offenses for simple possession of substances were excluded from analysis. Given low rates of crime and high levels of skew, these variables were dichotomized into whether or not the participant had been arrested or committed an undetected offense. In short, this was a dichotomous variable of any criminal behavior (arrests or undetected) during the three months post-release.

Time 4: Review of official records of recidivism—At three years post-release, jail officials provided information from participants’ criminal records, including whether participants were arrested during four time periods: the first three months, three months to one year, one to two years, and two to three years post-release. Data were coded into two variables:

Arrest Frequency: ***Arrest Frequency*** reflects the number of yearlong time periods in which a participant was arrested. Scores ranged from "0" if a participant was not arrested at all during the three year time period to "3" if they were arrested during each of the three year long time periods.

Arrest Latency: ***Arrest Latency*** reflects how soon post-release participants were arrested, with a larger score reflecting later recidivism. Scores were coded so "0" means they were first arrested during the three months post-release, "1" if their first arrest came three months to one year post-release, "2" if first arrest was between one year and two years post-release, "3" if first arrest occurred between two years and three years post-release, and "4" if a participant was not arrested during the three years post-release.

Results

Random assignment was successful. No significant group differences were found for 15 substantive variables at Time 1, nor for age and education (see Table 1). In addition, there were no significant differences in racial composition ($\chi^2(2)=2.04$, $p=.36$). Twelve REVAMP participants were African American (57.1%), four were Caucasian (19%), and five were of other racial background (23.8%). Seven TAU participants were African American (36.8%), seven were Caucasian (36.8%), and five were of other racial background (26.4%).

REVAMP Feasibility and Acceptability

Of the 21 participants randomized to REVAMP, 10 (47.6%) attended all eight sessions, five (23.8%) attended seven, one (4.8%) attended six, and five (23.8%) attended five or fewer sessions; 71.4% of the sample missed no more than one session. On average, participants attended 6.9 sessions ($SD=1.5$). Reasons that participants missed treatment included medical procedures, partial lock down of the facility, and schedule conflict with other programs and jail-based employment. Over the course of treatment, two inmates were transferred, causing one to miss four sessions and the other to miss five sessions. Eleven REVAMP participants who were not transferred (61%) completed an anonymous feedback form. On a 1–4 scale, participants rated the quality ($M=3.3$, $SD=.78$) and usefulness ($M=3.5$, $SD=.69$) and overall satisfaction with the program ($M=3.6$, $SD=.51$). In short, the intervention was both feasible and highly acceptable.

Psychological Factors (Core Mindfulness and Mechanisms of Action)

Due to the small sample size we present and focus on measures of effect size (e.g., Cohen's d), in addition to statistical significance, employing conventions specified by Cohen (1988) for small ($d=.20$), medium ($d=.50$) and large ($d=.80$) effect. At Time 2 (post-treatment), REVAMP participants' scores were statistically significantly lower than TAU participants on Non-Judgment of Self ($d=.77$) and marginally significantly higher (of medium effect size) on Willingness/Acceptance ($d=.59$) and Premeditation ($d=.60$) (see Table 1). Results from ANCOVA, co-varying Time 1, showed that REVAMP resulted in significant medium effect size increases in Willingness/Acceptance ($d=.72$) and decreases in Non-Judgment of Self ($d=.73$) and marginally significant increases in Shame ($d=.44$) compared to TAU (see Table

2). At 3 months post-release, only significant group differences in Willingness/Acceptance persisted (d = 1.05).

Risky Behavior Post-release

This study examined seven risky behavioral outcomes in the domains of crime and substance misuse. Out of the 25 participants contacted at Time 3, seven self-reported criminal activity (arrest or undetected offense) during the first three months post-release. Three of the TAU participants (21.4 %) reported arrests compared to none of the REVAMP (0%) participants ($\chi^2(2)=2.68$, $p=.10$). Four participants reported having engaged in undetected offenses (committing a crime without being caught; range 1–76 times). Of these, three were in the TAU group (21.4%) and one was in the REVAMP group (9.1%) ($\chi^2(2)=.70$, $p=.40$). No participant endorsed both arrests and undetected offenses. In total, there was a marginally significant trend for fewer REVAMP participants to have reported engaging in any criminal behavior (arrests or undetected offenses) compared to TAU participants ($\chi^2(2)=3.48$, $p=.06$).

Official records of arrest information at three years post-release (Time 4) were available for 31 participants (77.5%: 15 TAU and 16 REVAMP). Out of these 31 participants, 22 were arrested at least once during the three-year time period. Regarding frequency of arrests, 12 participants were arrested only one of the years, seven participants were arrested during two of the three years and three participants were arrested each of the three years. Regarding the latency to recidivism, four participants were arrested during the first three months, nine were first arrested between three months and one year post-release, and eight were first arrested between the first and second years post-release.

Overall, 12 of the 15 participants in the control group (80%) were re-arrested at least once, while 10 of the 16 participants who received REVAMP (62.5%) were re-arrested. Regarding arrest frequency across the three years post-release (see Figure 2), arrest frequency for the TAU group ($M=1.47$, $SD=1.06$) was nearly double that of the REVAMP group ($M=.81$, $SD=.75$), a medium effect size ($d=-.73$) difference that approached statistical significance using a t-test ($t=1.99$, $p=.06$). Given the non-normal distribution of the dependent variable, we also ran a negative binomial regression. There was a marginally significant trend for participation in REVAMP to be associated with fewer arrests during the year-long time periods ($Wald=2.85$, $p=.09$). Regarding arrest latency (time to first arrest or offense, with lower scores reflecting earlier recidivism) across the three years post-release, the TAU group ($M=1.6$, $SD=1.45$) recidivated earlier than the REVAMP group ($M=2.47$, $SD=1.36$), a difference that approached statistical significance ($t=1.69$, $p=.10$) representing a medium effect size ($d=-.62$). We also ran negative binomial regression. Results found a marginally significant trend for the participation in the treatment group to be associated with longer latency to arrest ($Wald=2.82$, $p=.09$).

T-test and ANCOVA analyses of substance misuse outcomes found no statistically significant between-group differences at 3 months post-release (Time 3) (see Table 3). In the case of all substance misuse variables, the treatment group demonstrated a greater (although not statistically significant) reduction compared to the control group. The effect sizes of the relative improvement made by the treatment group (Cohen's d) were in the small to medium range.

Discussion

Our first question concerned the feasibility and acceptability of REVAMP, a values-based mindfulness group intervention designed for "general population" jail inmates. Support for the feasibility and acceptability of REVAMP were derived from participant attendance and feedback. Regarding feasibility, by targeting post-sentence inmates nearing release, only two (9.5%) of 21 inmates assigned to REVAMP were transferred prior to treatment completion. Regarding acceptability, participants provided highly positive evaluations when asked to anonymously rate the quality and usefulness of the program as well as their overall satisfaction with REVAMP. Such positive feedback is especially notable because participants did not specifically self-select participation in a mindfulness program, which is in contrast to many previous studies of mindfulness interventions during incarceration. Treatment retention is also an index of treatment acceptability, given that participation in the program was voluntary, and at the host institution, inmates have a substantial choice in whether or not to attend a program. In this pilot RCT, none of the 21 REVAMP participants withdrew from treatment and 71.4% missed no more than one class. In most cases, non-attendance was due to factors beyond the inmate participants' control (e.g., partial lock down of the facility, illness).

We next investigated if REVAMP would affect 14 psychological constructs associated with adaptive behavior change. We included five measures of core mindfulness (i.e., present awareness, quiet mind, acceptance/willingness, and non-judgment of self and others) as well as measures of mindfulness mechanisms of action: emotion regulation (three measures), self-control (four measures), shame/guilt (two measures). The strongest and most consistent finding was that the REVAMP group increased in willingness/acceptance compared to TAU at both post-treatment (Time 2) and post-release (Time 3). These were substantial increases, with effect sizes ranging from medium at Time 2 to large at Time 3. These findings are particularly compelling given the strong empirical evidence that willingness/acceptance is related to less psychopathology and greater well-being (for review, see Hayes, et al., 2006). Theorists argue that willingness/acceptance is an essential component to positive behavior change (Linehan, 1993; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). As many problematic behaviors (e.g., addiction, aggression) are at their core maladaptive attempts to avoid distress, positive behavior change likely requires growth in the ability and willingness to accept difficult experiences.

The REVAMP group experienced increases in self-judgment (medium effect size) and shame (small effect size). These findings may appear counter-intuitive because mindfulness emphasizes non-judgment and self-compassion. On the other hand, this may be the natural ramification of increased willingness/acceptance in a population facing difficult, typically self-imposed, circumstances. All study participants were incarcerated for serious (i.e., felony) charges, a consequence that not only impacts their own lives but also the lives of their family members. Although this situation is likely to evoke self-judgment and shame, it is also likely that – absent intervention – many inmates are unwilling to experience the discomfort associated with self-judgment, prompting experiential avoidance and outright denial. Researchers have observed high rates of denial and externalization of blame among criminal offenders (e.g., Maruna, 2001). For REVAMP participants, enhanced willingness/

acceptance may have allowed them to overcome this defensiveness in order to openly reflect on past behavior and take a good hard (somewhat negative) look at the self. And in fact, recent results from our longitudinal study of 508 jail inmates charged with felonies (Tangney et al., 2014) showed that shame (assessed upon incarceration) exerted a significant indirect *positive* effect on subsequent recidivism, fostering re-offense via its relation to externalization of blame. Importantly, there remained a marginally significant direct effect of shame on recidivism in the opposite direction. Shame unimpeded by defensive externalization of blame *inhibited* recidivism. An intriguing possibility is that willingness/acceptance, enhanced by MBIs, may allow inmates (and others more generally) to make the most of shame in service of adaptive behavioral change going forward, rather than getting mired in experiential avoidance, externalization of blame, and denial. In addition, other components of the REVAMP curriculum may have shifted participants' perceptions of the consequences of shame-inducing acts as more vs. less reparable (see Gausel & Leach, 2011; Leach & Cidam, 2015), providing a more constructive future-oriented means of using and resolving feelings of shame. In sum, REVAMP may concurrently increase the tendency to experience and to tolerate shame and self-judgment.

We did not find expected improvements in measures of self-control and emotion regulation (distress intolerance, experiential avoidance, emotion-driven impulsivity). This is surprising given that studies of similar interventions in non-incarcerated samples have found improvements in these constructs (e.g., Zarling, Lawrence, & Marchman, 2015). We believe that several factors may explain these null findings. In most other RCTs of MBI, individuals receive mindfulness interventions while in the context of their day-to-day life where they are presumably able to practice self-regulation skills in response to their personal life stressors and temptations. In contrast, the jail inmates who participated in our study received MBI while they were isolated from their typical life context. Immediately following release, inmates are often faced with a variety of interpersonal (e.g., re-negotiating family roles), financial (e.g., finding employment) and legal (e.g., negotiating probation) stressors as well as many temptations (e.g., substances of abuse). It may be that our two study time points (just before and after release) were ill-placed to record any meaningful changes in our participants' general perception of their abilities to regulate emotions and behavior. Additionally, the mindfulness exercises involved in REVAMP may have served in increase self-awareness of deficits in self-control and emotion regulation while also reducing defensiveness, as described above. As such, any improvements in actual self-regulation may have been masked by increased willingness to acknowledge deficits. In this context, a focus on specific behavioral outcomes may provide a more meaningful portrait of any self-regulatory changes resulting from the intervention.

REVAMP ultimately aimed to decrease post-release risky behavior among inmates returning to the community. A key strength of this study was the post-release follow up that included participants' self-reported crime and substance use as well as information from official criminal records. Although most differences were not statistically significant, all seven risky behavioral outcomes (alcohol use, alcohol symptoms, marijuana use, marijuana symptoms, self-reported crime, official record crime frequency, official record crime latency) favored the REVAMP group, a pattern unlikely to be observed by chance according to a simple sign test ($p = .02$).

There was evidence that REVAMP was associated with reduced recidivism in this sample. According to official records of arrest, on average participants in REVAMP were arrested later and during fewer time periods than the control group. Although only marginally statistically significant, effect sizes were in the medium to large range. Of note, these outcome measures are objective (from official arrest records) and distal (covering three years post-release). Similarly, self-reports of criminal behavior at three-month post-release were lower among REVAMP participants, with marginal statistical significance and a medium effect size. The consistency between self-report and official records results further supports the validity of these findings.

No differences in post-release substance use across treatment condition were statistically significant. There was consistency, however, in the direction of effects. In all comparisons, relative to TAU, REVAMP participants reported less substance misuse post-release, with effect sizes ranging from small to medium. These results suggest that substance misuse may be an important outcome to consider in future research employing larger sample sizes. Nonetheless, as a general re-entry program, REVAMP was not specifically focused on treating inmates' substance use disorder. The small to medium effect sizes suggest that more could be done to target substance use disorders. When substance misuse is a primary concern, it may be beneficial to supplement REVAMP with other empirically supported interventions.

Limitations and Future Directions

A key limitation of this study was the small sample size. We enrolled a sample of 40 participants into the RCT, and while 38 completed post-treatment (Time 2) measures, only 25 individuals completed the self-report post-release assessment (Time 3) due to limited resources for follow-up. This sample size provided limited statistical power to detect meaningful effects. As such, null findings may either be due to lack of actual effect or to limited statistical power. Future research employing larger sample sizes would provide a more meaningful test of the effect of MBI in this population. Larger sample sizes would also allow direct empirical tests of the theoretical mechanisms of action of MBI. Although participants in both conditions had access to a broad range of programs and services, it is possible that the REVAMP+TAU group received more treatment hours than TAU only. Future RCTs should include a comparison condition similar in format and time spent engaged. Additionally, the specific nature of this study's sample must be considered: a high-risk sample of male jail inmates who were diverse in terms of race/ethnicity and age. While we believe that this is a highly important sample, findings may not generalize to other populations, for example female inmates or adolescent offenders or those not involved in the criminal justice system.

This study's use of measures was limited in several ways. First, significant targets of the REVAMP intervention (e.g., values-based living) and aspects of the intervention (e.g., homework completion) were not formally assessed. Future research would benefit from more comprehensive measurement of treatment targets. A second limitation was the use of self-report measure of the majority of outcomes, which can be contaminated by social desirability bias and lack of insight. These limitations should be kept in mind when

interpreting findings from self-reported outcomes. Regarding recidivism results, similar effects were observed using self-report and official records, which lends more confidence in the validity of these self-report results.

To our knowledge, this is the first study of an MBI during incarceration to employ both random assignment and a post-release follow up. These results suggest that REVAMP is a promising brief intervention for jail inmates nearing re-entry into the community. The application of MBIs during incarceration represents a promising area of research and clinical practice, with the potential to improve lives and public safety.

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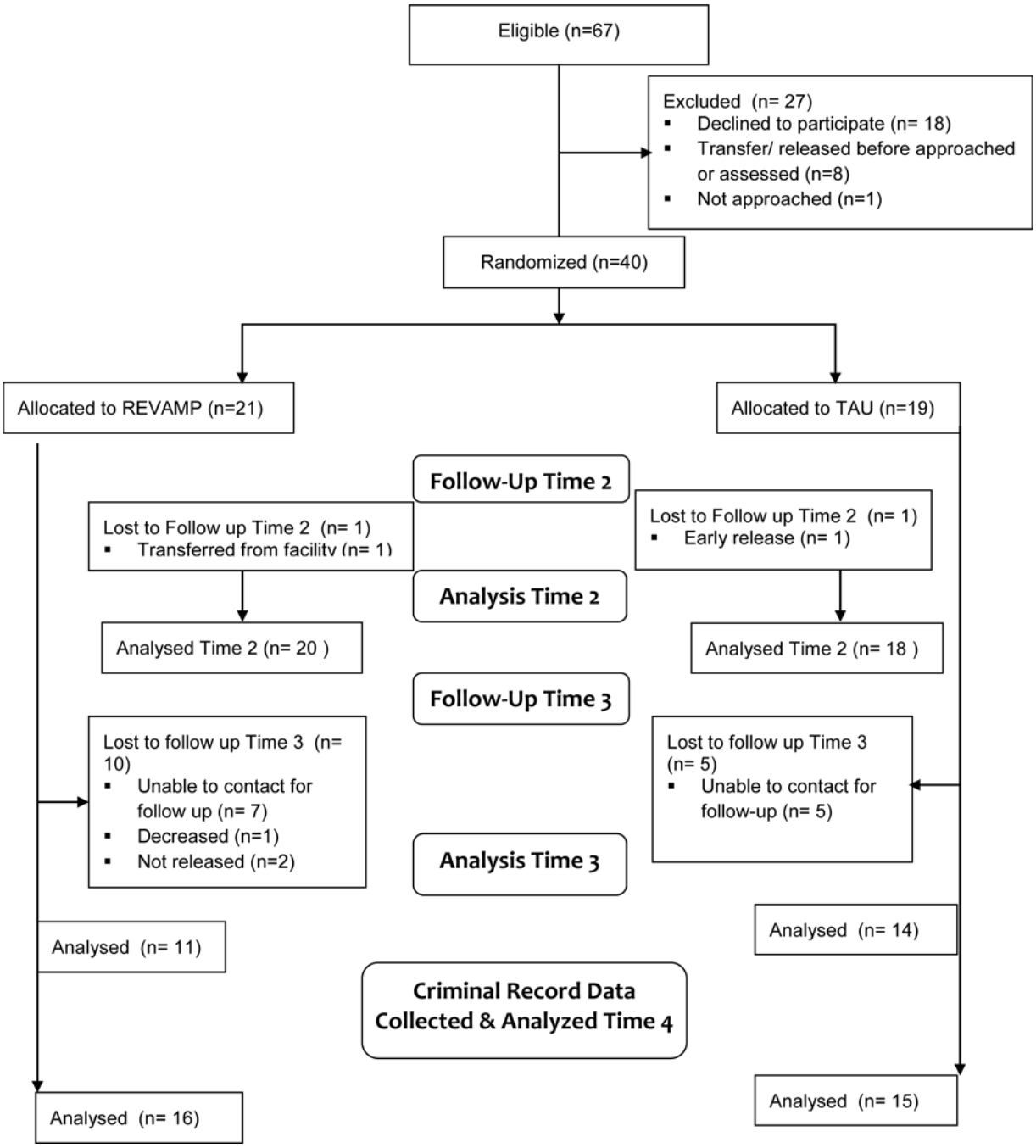

Figure 1.
Consort Diagram

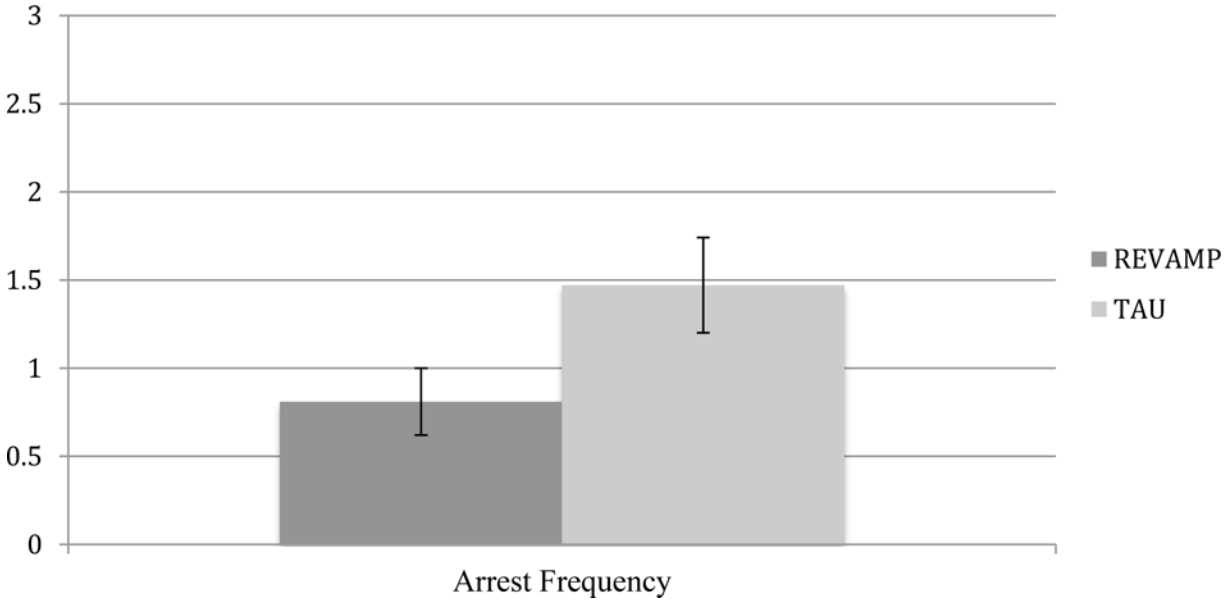

Figure 2.
Arrest frequency and standard errror by treatment condition

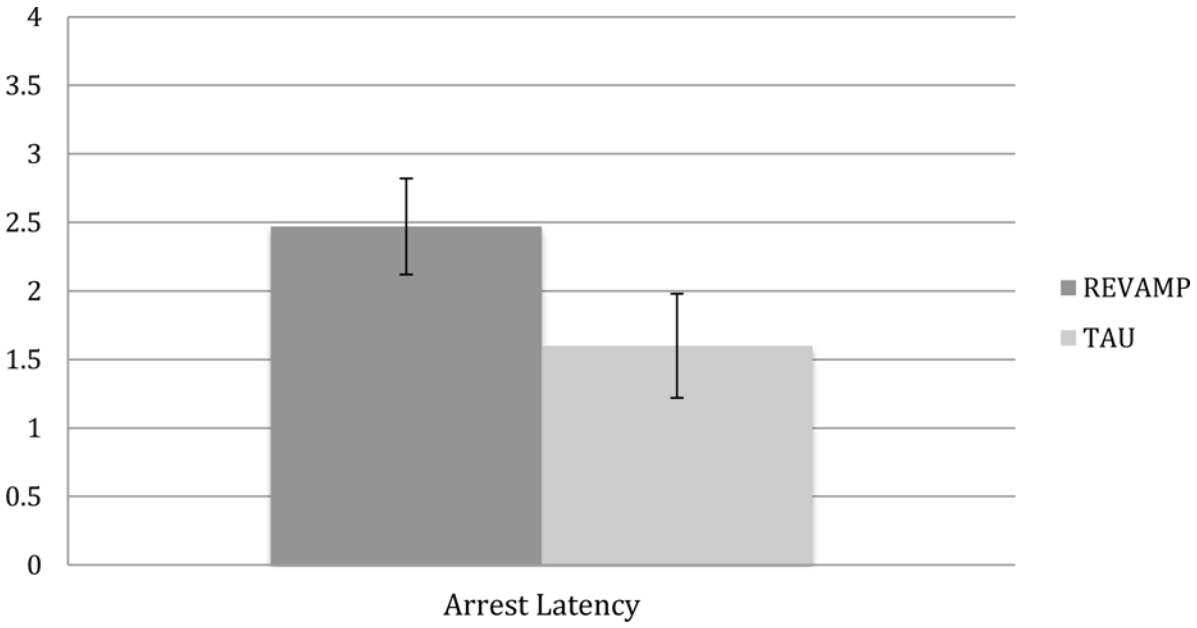

Figure 3.
Arrest latency and standard error by treatment condition

Table 1

T-tests comparing REVAMP vs. TAU on psychological outcomes (mechanisms of action) at Times 1, 2, and 3

	Pre-Treatment- Time 1			Post Treatment- Time 2			3 Months Post Release- Time 3		
	REVAMP	TAU	Diff.	REVAMP	TAU	Diff.	REVAMP	TAU	Diff.
Scale	***M (SD)***	***M (SD)***	***t***	***M (SD)***	***M (SD)***	***t***	***M (SD)***	***M (SD)***	***t***
Core Mindful									
Present aware.	3.14 (.49)	3.08 (.59)	.29	3.08 (.58)	2.88 (.53)	1.07	3.42 (.46)	3.13 (.64)	1.26
Quiet Mind	2.39 (.54)	2.32 (.63)	.36	2.36 (.35)	2.31 (.60)	.34	2.58 (.61)	2.36 (.79)	.78
Willing/Accept.	2.77 (.57)	2.95 (.53)	−1.02	2.99 (.54)	2.70 (.42)	1.83 ^	3.26 (.33)	2.72 (.72)	2.49 *
Non-judge. Self	2.41 (.51)	2.64 (.82)	−1.01	2.37 (.48)	2.97 (.79)	−2.83 **	2.77(.73)	3.09 (.75)	−1.06
Non-judge. Others	2.96 (.67)	3.02 (.54)	−.31	2.96 (.65)	3.08 (.63)	−.58	3.05 (.72)	3.24 (.59)	−.72
Emotion Reg.									
Distress Intolerance	1.81 (.54)	1.70 (.46)	.67	1.85 (.69)	1.92 (.60)	−.32	2.09 (.42)	2.12 (.34)	−.22
Experiential Avoid.	2.53 (.61)	2.53 (.81)	.01	2.39 (.64)	2.34 (.73)	.22	2.55 (.76)	2.24 (.69)	1.04
Emo. Impulsivity	2.22 (.76)	2.30 (.81)	−.31	2.21 (.80)	2.13 (.86)	.30	1.71 (.58)	1.96 (.81)	−.86
Self-Control									
Self-Control	3.07 (.71)	2.93 (.77)	.61	3.25 (.71)	3.00 (.99)	.92	3.71 (.56)	3.31 (.87)	1.30
Urgency	2.17 (.56)	2.37 (.86)	−.80	2.24 (.60)	2.31 (.90)	.28	–	–	–
Premeditation	2.92 (.60)	2.80 (.52)	.64	3.05 (.54)	2.73 (.50)	1.90 ^	–	–	–
Perseverance	3.21 (.48)	3.20 (.56)	.03	3.09 (.51)	2.99 (.67)	.50	–	–	–
Shame/Guilt							–	–	–
Shame	1.91 (.60)	2.04 (.63)	−.65	2.01 (.94)	1.96 (.60)	.21	–	–	–
Guilt	4.16 (.54)	4.18 (.52)	−.08	4.05 (.67)	4.00 (.93)	.19	–	–	–
BPD							–	–	–
Borderline	31.4 (10.8)	33.6 (16.4)	−.50	30.7 (10.7)	32.9 (18.7)	−.46	–	–	–
Demographics									
Age	37.8 (15.7)	36.4 (16.1)	.03						
Years of Education	12.4 (2.4)	11.5 (2.6)	1.14						

^ $p < .10$,

* $p < .05$,

** $p < .01$

Table 2

ANCOVAs comparing REVAMP vs. TAU on psychological outcomes (mechanisms of action) at Times 2 and 3 controlling for Time 1 (baseline)

	Time 2 controlling Time 1		Time 3 controlling Time 1	
	F	***Cohen's d***	***F***	***Cohen's d***
Core Mindful				
Present aware.	.97	.28	1.47	.32
Quiet Mind	.00	.02	.38	.24
Willing/Accept.	7.04*	.72	6.35*	1.05
Non-Judge. Self	7.11*	−.73	.49	−.24
Non-Judge. Others	.21	−.12	1.54	−.40
Emotion Reg.				
Distress Intolerance	.65	−.19	.03	−.08
Experiential Avoid.	.46	−.13	1.01	.37
Emo. Impulsivity	1.46	.21	.34	−.24
Self-Control				
Self Control	.07	.04	.00	.01
Urgency	.04	.04	–	–
Premeditation	2.24	.43	–	–
Perseverance	.28	.16	–	–
Borderline personality disorder				
Borderline	.68	.12	–	–
Shame/Guilt				
Shame	4.10^	.44	–	–
Guilt	.01	.01	–	–

^ $p < .10$,

* $p < .05$

Table 3

T-tests and ANCOVAs on substance use disorder (SUD) by treatment condition at Time 3 (3-months post release)

	Time 1			Time 3			Time 3 controlling for Time 1	
	REVAMP	TAU	Diff.	REVAMP	TAU	Diff.		Cohen's
	M (SD)	*M (SD)*	*t*	*M (SD)*	*M (SD)*	*t*	*F*	*d*
Alcohol								
Frequency	4.24 *(2.76)*	3.47 *(2.59)*	.90	2.36 *(2.73)*	2.71 *(2.09)*	−.36	1.07	−.37
SUD Symptoms	1.01 (.81)	1.02 (.69)	−.05	.23 (.28)	.32 (.49)	−.53	.41	−.38
Marijuana								
Frequency	2.90 *(3.79)*	3.63 *(3.96)*	−.59	.45 *(1.21)*	1.50 *(2.74)*	−1.18	1.28	−.46
SUD Symptoms	1.11 (.77)	1.26 (.59)	−.48	.60 (.21)	.77 (.22)	−.93	.90	−.38

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