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**Brief Motivational Intervention for Substance Use may Decrease Violence among Heavy Alcohol Users in a Jail Diversion Program**

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### **Biography Statements**

**Imogen Catterall, B.A.** is currently studying for a degree in Child Nursing at the University of Leeds, UK. The current study is based on her undergraduate dissertation, which was written during her undergraduate degree in Criminology with Psychology at Leeds Beckett University, U.K.

**Sean M. Mitchell, Ph.D.** is an Assistant Professor in the Department of Psychological Sciences at Texas Tech University. He earned his Ph.D. in Clinical Psychology at Texas Tech University in 2018. He completed a postdoctoral fellowship in suicide prevention research at the University of Rochester Medical Center in 2019.

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**Marc T. Swogger, Ph.D.** is an Associate Professor in the Department of Psychiatry at the University of Rochester Medical Center. His research focuses on substance use treatment, harm reduction, and self- and other-directed violence among people in psychiatric and criminal justice systems.

### **Abstract**

Rates of harmful alcohol use are high among justice-involved individuals and may contribute to violent recidivism. Robust treatments for alcohol-related violence in criminal justice systems are thus a public health priority. In this analysis of existing randomized controlled trial data ( $N = 105$ ), we examined the impact of a brief motivational intervention (BMI) for harmful substance use on violent recidivism among individuals in a pretrial jail diversion program. Results indicated that, after controlling for violence history, the intervention's impact on violent recidivism was moderated by baseline harmful alcohol use. Specifically, among people with severe alcohol problems at baseline, the BMI+standard care group had less violent recidivism at a 1-year follow-up than participants randomized to standard care alone. This finding was unchanged when we accounted for psychopathic traits. Our study provides preliminary evidence that a BMI may be useful for decreasing violent recidivism among heavy drinkers in criminal justice systems.

*Keywords:* brief motivational intervention, violence, alcohol, substance use, aggression

## **Brief Motivational Intervention for Substance Use may Decrease Violence among Heavy Alcohol Users in a Jail Diversion Program**

### **Alcohol Use and Violence**

The complicated relation between alcohol consumption and violence has been acknowledged since at least the 4<sup>th</sup> Century BC (Bellis & Hughes, 2011), and this has now been corroborated in numerous, disparate populations (Graham & Livingston, 2011). Alcohol's causal and indirect relations to violence are now well-established (Duke et al., 2018). Binge drinking leads to disinhibition and narrowed attention, which may result in violence among at-risk individuals (Giancola et al., 2012). Moreover, harmful alcohol use is related to reduced serotonergic function, which also underlies tendencies toward negative emotionality and violence (Comai et al., 2016; Driscoll et al., 2017; Heinz et al., 2011). Alcohol consumption increases the occurrence of general and intimate partner violence and can lead to escalating severity in already violent situations (Cafferky et al., 2018; Shorey et al., 2014; Swogger et al., 2010), making harmful alcohol use a key, modifiable risk factor that can be targeted in violence prevention efforts (Leonard & Quigley, 2017; Testa et al., 2014). In the present study, we tested the hypothesis that, for people with harmful alcohol use, a brief motivational intervention (BMI) will reduce violent recidivism.

### **Alcohol Use and Violent Offending and Recidivism**

Alcohol consumption may, in part, account for high violent recidivism rates among people involved in criminal justice systems; nearly 70% of individuals released from incarceration are re-arrested within 3 years (Bronson et al., 2017). In the U.S., approximately 20% of individuals released from prison are re-arrested for violent crimes within 3 years (Alper et al., 2018). Rates of harmful alcohol use are significantly higher within criminal justice samples than in general population samples (United Nations Office on Drugs and Crime, 2017). Between 55% and 75% of justice-involved people in the U.S. and U.K. screen

positive for an alcohol use disorder (Newbury-Birch et al., 2016; Orr et al., 2015; Parkes et al., 2011) compared to 5% to 25% in general adult community samples (Fazel et al., 2006; Newbury-Birch et al., 2009). Approximately 37% of individuals who are incarcerated in jail who were arrested for violent crimes report that they used alcohol at the time of their offense (Snyder et al., 2010). It is clear that harmful alcohol use is a relevant problem and treatment target for reducing violence among individuals involved in criminal justice systems. Without treatment, justice-involved individuals with harmful alcohol use often repeat the same behaviors that resulted in their prior involvement with criminal justice systems (Felson & Staff, 2010). This highlights the importance of creating and testing treatments for justice-involved people who engage in harmful alcohol use in order to break the alcohol – violence – incarceration cycle.

### **Brief Motivational Intervention for Alcohol Use among Justice-Involved People**

There are several evidence-based treatments for individuals with harmful alcohol use. Twelve-step facilitation therapy, which aims to overcome barriers to participation in abstinence-based groups (e.g., Alcoholics Anonymous) has empirical support (Kaskutas et al., 2009). Many behavioral therapies, including contingency management, cognitive-behavioral therapy, and third-wave behavioral therapies (e.g., Acceptance and Commitment Therapy) have amassed support for decreasing alcohol use (Byrne et al., 2019; Carroll & Kiluk, 2017; Shelton et al., 2011; Tomlinson, 2018). However, such interventions often require considerable time and training, hindering their application in forensic settings (Berzins & Trestman, 2004). As Kazdin and Blase (2011) note, the real-world impact of these more intensive behavioral interventions may well be moderated by their cost-effectiveness. These more intensive behavioral treatments are sometimes mandated in criminal justice systems, potentially leading to coerced treatment among individuals with little motivation to change. It is becoming increasingly evident that low motivation to change is a primary

obstacle to substance-related rehabilitation, indicating the importance of addressing justice-involved individuals' engagement and readiness to change within rehabilitative programs (Anstiss et al., 2011; Shaul et al., 2016; Walters et al., 2013).

Motivational Interviewing (MI)-based, brief motivational interventions (BMIs) have been used to decrease harmful alcohol use in numerous adolescent and adult populations, including primary care, college samples, individuals undergoing inpatient treatment, and people in criminal justice systems (Foxcroft et al., 2016; Woodall et al., 2007). BMIs are MI-based interventions that combine normative-based feedback with MI-principles and client-centered behavioral strategies to quickly enhance motivation for change (Bernstein et al., 2005; Miller & Rollnick, 2012), and they have shown efficacy at a low dose of one to four sessions (Burke et al., 2003; Swogger et al., 2016). This makes BMIs feasible for use within criminal justice settings, where resources are often scarce, and longer treatments are difficult to implement. In a randomized controlled trial (RCT) with 83 individuals who were alcohol-dependent and incarcerated in a federal prison, Ginsburg (2000) found that individuals who had received a BMI session evidenced greater problem recognition and consideration of change relative to a random-allocation control group. Another RCT found that a treatment program incorporating MI principles resulted in a reduction in drinking from baseline levels and decreased the driving while under the influence recidivism relative to an incarcerated control group without treatment (Woodall et al., 2007). More recently, a pilot intervention study of 40 men with lifetime alcohol use disorders who received a one-session BMI before release from jail found non-significant but promising, small-to-medium effects over an active, education-only condition for increasing all substance abstinence and decreasing number of substance users in their social networks at a 1-month follow-up interview (Owens & McCrady, 2016).

This evidence notwithstanding, the scant literature on BMIs in criminal justice settings has yielded mixed findings. Several well-conducted studies evaluating BMI have yielded few significant differences between BMI and standard care comparison conditions. Carroll et al. (2006) found that a BMI+Cognitive Behavioral Therapy (CBT) intervention for marijuana-dependent justice-involved individuals performed worse than contingency management and individual drug counseling for reducing positive marijuana-urine screens (although BMI+CBT did outperform individual drug counseling alone). Miles, Duthiel, Welsby, and Haider (2007) evaluated a substance abuse treatment program for incarcerated individuals with mental disorders in a secure unit. The intervention consisted of BMI, education, and relapse prevention, followed by a support group. The BMI did not contribute to longer-term abstinence, which was instead predicted by involvement in a community support group. Utter et al. (2014) conducted a single-session randomized controlled trial with first time DWI arrestees at a county jail, examining whether the BMI would decrease self-reported drinking or other drug use treatment engagement after 90 days relative to individuals who did not receive the BMI session. Results indicated no benefit of BMI for either outcome.

Variation in BMI efficacy may be, in part, due to individual-level moderators. Psychopathy, a personality disorder related to both harmful substance use and violence, is one such potential moderator that is important to assess in treatment studies among justice-involved people (Swogger et al., 2017), due to its potential to interfere with treatment (see Reidy et al., 2013; Salekin et al., 2010). Psychopathy, as assessed by the Psychopathy Checklist-Revised (PCL-R; Hare, 2003), is comprised of two distinct dimensions: Factor 1 (F1) consists of interpersonal and affective traits reflecting a callous and manipulative interpersonal style. Factor 2 (F2) reflects an impulsive, irresponsible lifestyle and antisocial behavior. For fine-grained analyses, these dimensions can be further subdivided into correlated lower-order dimensions: the Interpersonal, Affective, Lifestyle, and Antisocial



Facets. The Affective facet of psychopathy may be particularly crucial in intervention studies. This facet reflects deficient emotionality that manifests as a lack of guilt, lack of empathy, shallow affect, and a failure to accept responsibility (Hare, 2003). Theoretically, these traits interfere with treatment response, and there is significant evidence to support this contention (Kosson et al., 2016; Olver et al., 2013; Olver et al., 2011). In an RCT, Swogger et al. (2016) examined the impact of a BMI plus standard care (BMI+SC) versus standard care (S.C.) alone on harmful substance use in a pretrial jail diversion program. Consistent with *a priori* hypotheses and replicating the above findings, the effect of BMI was moderated by PCL-R Affective facet scores, such that individuals with low scores who received BMI had increased days abstinent at a 6-month follow-up relative to people in S.C. Individuals with medium-to-high scores on the Affective facet did not benefit from BMI.

### **The Present Study**

Whereas different substances of abuse have widely varying effects on the potential for violence (Stuart et al., 2009), there are strong documented links between alcohol use and violent crime. This suggests that identifying and treating individuals with harmful alcohol use within criminal justice systems has the potential to reduce the risk of further violent offenses (Coulton et al., 2012). We thus hypothesized a treatment by harmful alcohol use interaction such that a BMI+SC, relative to S.C. alone, would decrease violent recidivism during the follow-up period among people who reported high baseline-levels of harmful alcohol use.

This is a secondary analysis of the Swogger et al. (2016) RCT data, wherein only individuals without high Affective traits of psychopathy decreased substance use in response to BMI+SC. Moreover, in the primary analysis, Affective traits of psychopathy (along with Interpersonal traits) were positively related to study treatment attendance and negatively related to treatment engagement outside of the study (Swogger et al., 2016). For these reasons, we took the potential moderating effect of the Affective facet of psychopathy on

BMI efficacy into account. To our knowledge, this is the first RCT to formally test the effect of a BMI for substance use on violent recidivism among individuals in a criminal justice system.

## **Method**

### **Participants**

Participants were 105 adults (68 men and 37 women) in an urban pretrial jail diversion program in Upstate New York, recruited between 2009 and 2014, after being charged with a crime. To be included in the RCT, individuals were required to score  $\geq 3$  on the Drug Abuse Screening Test-10 (DAST-10; Cocco & Carey, 1998), indicating a significant substance use problem. Table 1 describes the sample and provides group comparisons between the BMI+SC and S.C. groups.

### **Measures**

#### ***Demographics***

Participants completed a demographic questionnaire. They reported employment status, age, race, and education (years completed) during baseline assessments. These variables were examined as potential covariates in our analyses.

#### ***Violent Charges***

Violent charges at baseline and violent recidivism during the 1-year follow-up period were assessed using a countywide database for criminal charges, supplemented with participant self-report data. At each study session, participants were asked whether they had been charged with a new crime and, if so, the specific charge. Self-report data and database data were combined for maximum sensitivity. Charges (e.g., rape, assault, battery, etc.) were denoted as “violent” based on criteria developed by Walsh, Swogger, and Kosson (2004). Eighty participants (76.2%) had a history of violent charges at baseline. Due to the relatively low number of new violent charges, a binary variable was created: individuals with a new

violent charge during the 1-year follow-up (coded 1;  $n = 21$ , 20%) versus individuals with no new charge for violent behavior (coded 0;  $n = 84$ , 80%) during follow-up.

### ***Drug Use Screening***

The DAST-10 (Cocco & Carey, 1998) is a reliable and valid 10-item estimate of harmful substance use. The DAST was administered during the screening session. Scores can range from 0 to 10. The DAST-10 was used during screening for inclusion in this study, but it was not included in the analyses below. Internal consistency for the present study was good ( $\alpha = .86$ ), and scores ranged from 3 to 10.

### ***Alcohol Use Screening***

The AUDIT is a 10-item measure that provides a screen for alcohol consumption and alcohol-related symptoms and problems over the prior 12 months (Babor et al., 2001; Saunders et al., 1993). Scores can range from 0 to 40. The AUDIT was administered at the baseline time point. Accumulated research shows that scores of 8 or above on the AUDIT indicate heavier alcohol consumption with the potential for alcohol-related problems, where scores of 8 to 15 are generally in the range of hazardous drinking, and scores of 16 or higher indicate a more severe population that is consistent with clinical substance use treatment samples (Babor & Robaina, 2016) who may be presumed to meet diagnostic criteria for alcohol use disorder (American Psychiatric Association, 2013). Although the AUDIT was developed as a screening measure, in research, it has been widely used as a continuous measure of alcohol consumption and related problems, the approach taken in the current analysis. Internal consistency was excellent ( $\alpha = .92$ ) and scores ranged from 0 to 39.

### ***Alcohol Percent Days Abstinent***

The Timeline Follow-Back (TLFB; Sobell & Sobell, 1996) was used to gather daily alcohol use data during follow-up. The TLFB interview uses a calendar that serves as a cue for participants to recall daily drinking. At 6 months after baseline, participants viewed

calendars representing the previous 90 days. We chose this time period because all BMI sessions were completed within the first 3 months; thus, brief and transitory effects of the intervention would not impact on the data. During the interview, assessors highlighted major holidays over the 3 months, and then assessors asked the participant to identify personal days of importance. Assessors also prompted participants' recall by identifying extended abstinent periods and recording regular patterns around weekends or pretrial appointment days. Time spent in controlled environments, including incarceration and inpatient treatment, was recorded. Scores at follow-up were used for individuals who had at least 1 month out of a controlled environment (of the 3 months assessed) and yielded percent days abstinent (PDA) from alcohol.

### ***Psychopathy***

The Psychopathy Checklist-Revised (PCL-R; Hare, 2003), a diagnostic rating scale designed for use within forensic populations, was administered during the baseline assessment. Psychopathy, as defined by the PCL-R, refers to a constellation of personality traits and behaviors, with items of the PCL-R forming four first-order factors: Interpersonal (e.g., superficial and deceitful interpersonal style), Affective (e.g., deficient emotional experiences, including superficial relationships, failure to accept responsibility for actions, and lack of guilt and empathy), Lifestyle (e.g., impulsivity; irresponsibility), and Antisocial Facets (e.g., poor behavioral controls, criminal versatility; Cleckley, 1976; Hare, 1991, 2003). The measure is completed following an intensive psychosocial interview and file review. Twenty items, rated on a 3-point scale (i.e., 0 = *does not apply*, 1 = *partially applies*, 2 = *applies*), are scored with higher scores being indicative of prototypical psychopathic features. A cut-score of 30 is typically used for psychopathy (Hare, 2003). Extensive research attests to the strong psychometric properties and validity of the PCL-R within prison populations, both in America and Europe (Bishopp & Hare, 2008; Cooke et al., 2005; Hare, 2003; Hare, 2006;

Hicks & Patrick, 2006; Lynam & Widiger, 2007). The PCL-R scores include assessment of failure on conditional release, and the PCL-R has amassed considerable predictive validity for criminal recidivism and institutional misconduct (e.g., Hare, 2003; Olver & Wong, 2015).

The PCL-R was completed based on information from an extensive psychosocial interview, file review, and review of the criminal history database. One rater scored all PCL-R interviews, and a second rater scored a subset of interviews ( $n = 12$ ). In the present study, interrater reliability was good to excellent for PCL-R total and facet scores (single-rater absolute agreement intraclass  $r = .86 - .91$ ).

### **Procedure**

Following an announcement about the study in the waiting area of the program, interested individuals met with a member of the research team one-on-one for a detailed description of the study. Consenting volunteers completed self-report measures and were compensated for their time. We chose a relatively low harmful substance use threshold to meet in order to enroll subjects with a broad range of substance use, operationalized as the use of an illicit substance at least once per week during the past 6 months along with a score of 3 or more on the DAST-10 (Cocco & Carey, 1998). Exclusion criteria were observable and significant psychotic symptoms or cognitive difficulties, which would impact one's ability to understand the study and consent to participation. No interested individuals were excluded from the study based on these exclusion criteria.

Of 569 volunteers, 155 participants met eligibility criteria and were invited for a baseline assessment. Of those who attended this session, 105 participants were enrolled in the study, completed a psychosocial interview and additional measures (e.g., AUDIT and PCL-R), and provided detailed locator information to facilitate follow-up interviews. They were then randomly assigned to either BMI+SC or S.C. using a random number generator.

Individuals who were incarcerated during the follow-up period were assessed in jail after re-consenting to continue in the study.

### ***Ethical Considerations***

Data collection was conducted with the approval of the local Institutional Review Board. A Federal Certificate of Confidentiality was obtained in order to provide further participant protection. Approval for this secondary data analysis was granted by the Institutional Review Boards of two participating Universities.

### ***Intervention and Control Conditions***

The psychosocial intervention consisted of up to four sessions of individual BMI targeting all harmful substance use. The BMI was based upon a detailed manual provided by Bernstein et al. (2005), adapted for justice-involved individuals (Swogger & Walsh, 2009), and delivered by two different doctoral-level therapists with training in MI. Participants in each intervention condition met with the same therapist for the initial BMI session, averaging 40.9 ( $SD = 7.9$ ) minutes, and up to three booster sessions that averaged 30 ( $SD = 6.4$ ) minutes. The booster sessions were designed to be responsive to individuals' needs and motivation to change and were conducted according to MI principles. Successes and failures regarding participant-identified goals established in the previous session were reviewed. Individuals in the intervention condition attended a mean of 2.5 ( $SD = 1.1$ ) sessions. Treatment dose (i.e., number of sessions attended) was related to PCL-R F1 ( $r = .33, p < .001$ ), indicating that people with higher levels of core psychopathic traits attended more treatment sessions than those without such traits. Dose was unrelated to PCL-R F2 ( $r = .14, p = .40$ ). All sessions were completed within 3 months of a baseline assessment.

Sessions were delivered according to MI principles (Miller & Rollnick, 2012) in order to enhance motivation to change and consisted of the following components:

1. The therapist worked to rapidly establish rapport with the participant, making

clear to participants that they would not make judgments regarding their behavior; instead, they were interested in hearing their stories.

2. Participants were encouraged to explore the pros and cons of their use of each substance for which they screened positive at baseline.
3. Normative feedback was provided on substance-use frequency, and substance-use consequences were discussed. Participants were encouraged to explore links between symptoms of mental health issues and substance use.
4. Readiness to change was assessed and enhanced by discussing prior instances of successful change and the method used in the past by the participant to facilitate this change.
5. With the participant's consent, an action plan was completed (e.g., what changes they wanted to make, steps they plan to take to achieve this, things that could interfere with the participant making these changes).

The therapists' fidelity to principles of MI was assessed by a trained non-therapist researcher using the MI treatment integrity coding system (MITI 3.0; Moyers et al., 2007). A random selection of 20 audio recorded BMI sessions were coded on a 1 (low) to 5 (high) scale across evocation, collaboration, autonomy support, direction, and empathy. Scores averaged from 4.5 to 4.7 (*S.D.s* ranged from 0.5 to 0.6), indicating excellent fidelity to principles of MI (Swogger et al., 2016.)

To control for assessment reactivity (Maisto et al., 1990), each participant in the S.C. condition met with study personnel for substance-use assessment at 2, 4, and 6 weeks, as well as at 6 months. Consistent with the BMI+SC condition, each follow-up session was conducted by the same research team member. Participants in both BMI+SC and S.C. groups were able to engage with non-study treatments, and they were given intake numbers for potentially relevant treatment programs and a list of local Alcoholics Anonymous or

Narcotics Anonymous meetings after baseline assessment. All participants were compensated with \$50 for their time after each non-screening session.

### **Data Analysis Plan**

We conducted logistic regression analyses using SPSS version 25 to test the hypothesis that the intervention's impact on violent recidivism would be moderated by harmful alcohol use. Specifically, we hypothesized that higher mean-centered AUDIT scores, indicative of greater alcohol consumption and alcohol-related problems at baseline, would be associated with a decreased likelihood of a violent charge(s) at a 1-year follow-up among individuals assigned to BMI+SC (coded as 1) compared to S.C. (coded as 0). This is consistent with the idea that the BMI intervention would be more beneficial to those showing higher alcohol consumption and alcohol-related problems. We adjusted for previous violence in all of the models and mean-centered all continuous variables before analysis. In Step 1, we entered previous violent charges. In Step 2, we entered the treatment condition variable (BMI+SC versus S.C.) and the baseline mean-centered AUDIT scores. In Step 3, we entered the interaction term between the mean-centered AUDIT score and treatment condition. For the significant interaction, we implemented the Johnson-Neyman technique (using the PROCESS MACRO; Hayes, 2018) to identify how the relation between BMI+SC and violent charges during follow-up changed at different levels of unstandardized and standardized ( $z$ -score transformed) AUDIT scores.

We also conducted supplemental analyses. In these supplemental analyses, we used separate regressions to determine whether there was a treatment condition by the Affective facet of psychopathy interaction in the prediction of follow-up violent charges and whether the pattern of results remained consistent after we adjusted for the Affective facet and previous violent charges. That is, the mean-centered Affective facet scores were included as a



main effect and in the corresponding two- and three-way interactions when predicting follow-up violent charges.

## Results

### Preliminary Analyses

#### *Sample Characteristics Severity*

Analyses describe a sample with significant levels of violence and substance use. At baseline, 76.2% of the sample had prior violent charges ( $M_{\text{number of violent charges}} = 3.30$ ,  $SD = 3.63$ ). All participants had DAST scores  $\geq 3$  ( $M = 6.42$ ,  $SD = 2.11$ ) and AUDIT scores averaging 13.16 ( $SD = 11.06$ ), indicating high levels of hazardous drinking among justice-involved people with harmful drug use. Total psychopathy scores ( $M = 21.94$ ,  $SD = 8.43$ ) indicate moderate psychopathy consistent with other criminal justice samples.

#### *Attrition*

Of the 105 participants, 78 (74.3%) were retained through a 6-month follow-up session designed to gather substance use data; however, five were incarcerated or in other controlled environments at the time of follow-up. To search for selective attrition, we compared individuals lost to follow-up at 6-months to those retained; there were no differences on any of the 16 baseline variables. Fifty-two (66.7%) of the remaining individuals reported participation in non-study treatments during the study, including outpatient drug and alcohol counseling. The BMI+SC and S.C. groups did not differ on non-study treatment participation (26 per condition). Data on violent charges after a 1-year follow-up period were available for all 105 participants.

#### *Missing Data and Outliers*

Missing data were imputed using expectation maximization (Tabachnick & Fidell, 2013). Only 1.7% of the data were missing, and Little's Missing Completely at Random (MCAR) test supported that the data were MCAR ( $\chi^2 [131, N = 105] 146.33, p = .170$ ). There

was only one univariate outlier score for the PCL-R Affective facet scale, which was winsorized. However, the Mahalanobis Distance test revealed no multivariate outliers.

### ***Covariate Selection and Bivariate Associations***

No demographic variables (i.e., gender, age, race, education, income) were significantly associated with the criterion variable (violent charge at 1-year follow-up); therefore, demographic variables were not included as covariates in the analyses. Additionally, none of the PCL-R scores were strongly or significantly associated with the criterion variable (bivariate correlations ranging from  $r = -.03$  to  $.09$ ). Therefore, we only included the Affective facet of the PCL-R in our supplemental analyses given previous findings (Swogger et al., 2016). Only previous violent charges (coded 1 = previous violent charges, 0 = no previous violent charges) was significantly associated with follow-up violent charges ( $\phi = .22, p = .022$ ), and thus, was adjusted for in our models. See Table 2 for bivariate associations.

### **Primary Analyses**

#### ***The Relation Between Treatment Condition, Alcohol Use, and Follow-up Violent Charges***

Binary logistic regression analyses were used to test the hypothesis that BMI+SC would predict decreased follow-up violent charges in people with increased baseline AUDIT scores. As seen in Table 3, previous violent charges were significantly associated with follow-up violent charges ( $OR = 8.00, p = .048$ ). Thus, we maintained prior violent charges as a covariate. After adjusting prior violent charges, there were no significant main effects of AUDIT scores or BMI+SC on follow-up violent charges. When the two-way interaction between AUDIT scores and treatment condition was added to the model, this interaction was significant ( $OR = .90, p = .046$ ; Table 3).

To interpret the significant two-way interaction, the Johnson-Neyman Technique was employed to identify the regions of significance (i.e., the levels of baseline alcohol use at

which treatment condition was significantly associated with follow-up violent charges). These results indicated that there was a significant negative association between treatment condition and follow-up violent charges when baseline AUDIT raw scores were greater than 27 (or greater than 1.16 *SD* above the mean; Table 4). Therefore, individuals higher ( $> 1.16$  *SD*) in harmful alcohol use at baseline, which is in the “possible dependence” range (see Babor & Robaina, 2016), were less likely to obtain future violent charges if they were in the BMI+SC condition than the S.C. condition.

### **Supplemental Analyses Testing the Role of the Affective Facet of Psychopathy**

As described above, due to prior findings in this sample that indicate decreased efficacy for BMI+SC among individuals high in the Affective facet of psychopathy (Swogger et al., 2016), supplemental analyses were conducted again including the PCL-R Affective facet scores as a main effect variable, and then including the corresponding two-way interactions (PCL-R Affective facet x treatment condition; PCL-R Affective facet x AUDIT scores; treatment condition x AUDIT scores) and the three-way interaction (PCL-R Affective facet x treatment condition x AUDIT scores). As seen in Table 5, there were no significant interactions ( $p < .05$ ) between the Affective facet and the predictor variables in relation to follow-up violent charges; it should be noted that we might have been underpowered to detect such interaction effects. However, even after adjusting for the PCL-R Affective facet scores, the significant interaction between treatment condition and AUDIT scores remained ( $OR = .99, p = .030$ ).

As a supplemental analysis, we examined the correlation between treatment condition and percent of days abstinent from alcohol at the 6-month follow-up time point. This correlation was not significant ( $r_{pb} = -.10, p = .380$ ). Therefore, our moderation finding is not related to the impact of the treatment condition on later alcohol use.

## **Discussion**

In a secondary analysis of RCT data (Swogger et al., 2016), we examined the efficacy of BMI+SC versus S.C. for reducing prospective violence among justice-involved individuals in a pretrial jail diversion program. The hypothesis that the impact of our intervention for harmful substance use on violent recidivism would be moderated by higher scores on a baseline measure of harmful alcohol use was corroborated; BMI+SC for harmful substance use, relative to S.C., predicted fewer violent charges at a 1-year follow-up as baseline AUDIT scores increased. These results were retained after rigorously controlling for the Affective facet of psychopathy.

Our supplemental analysis indicated that BMI+SC vs. S.C. was not significantly associated with the percentage of days abstinent from alcohol at the 6-month follow-up. Whereas our data indicated an important effect of the intervention on subsequent violence, they raise questions about *how* this effect was achieved, pointing to the importance of replication and additional study of the mechanisms that underlie the efficacy of MI. Increases in self-efficacy and self-control are potential mechanisms in the effectiveness of MI (Felson & Burchfield, 2004; Giancola, 2002). BMI may, therefore, promote behavior change through these mechanisms regardless of patterns of alcohol use by invoking increases in self-awareness and behavioral regulation among individuals with harmful alcohol use. Even if the frequency and amount of alcohol consumption do not decrease, protective behavioral strategies that are part of BMI action plans might decrease future violence and violent charges. Examples of such participant-generated strategies are the avoidance of potentially dangerous conflicts, other heavy drinkers, or the police while drinking, or being around a trusted friend when drinking while angry. These methods may lead to fewer altercations (Felson & Burchfield, 2004).

### **Clinical Implications**

The results of this study may have implications for forensic and correctional treatment and the conceptualization of substance use interventions in justice-involved people. Though our sample size was modest, testing our hypotheses in a secondary analysis of longitudinal RCT data enabled ecologically-valid results in support of BMI as a treatment option for reducing violent behavior. Whereas traditional behavioral rehabilitation programs for justice-involved individuals require up to 300 hours of engagement to achieve measurable results (Polaschek et al., 2010b), our findings demonstrated that 2 to 3 sessions of a brief and potentially cost-effective BMI reduced violent recidivism among people who enter treatment with harmful levels of alcohol use.

The Risk-Need-Responsivity Model provides a lens through which our findings can be viewed (see Taxman, 2006). This matching-to-treatment model states that justice-involved people differ in their risk for poor outcomes and in their treatment needs. Thus, indicated treatments would differ based on the needs of individuals. Whereas MI has received significant empirical support as a stand-alone treatment for alcohol use (Burke et al., 2003; Lundahl et al., 2010; Rubak et al., 2005; Vasilaki et al., 2006), our results suggest that a BMI may be a particularly efficacious treatment option for justice-involved individuals charged with violent crimes who screen positive for harmful alcohol use. Implementing BMI as a preliminary intervention may increase general insight, self-regulation, and readiness to change, thereby reducing risk for subsequent violent offending while increasing engagement with more intensive alcohol use treatments. If these results are replicated, research should focus on how justice-involved individuals change. This will allow for a better understanding of the processes and mechanisms of change in brief intervention relevant to this population, including emotional and behavioral self-regulation, engagement in specific harm reduction strategies, and motivation to change. Our findings are unique in that they suggest benefit in using BMI to decrease violent behavior among justice-involved alcohol users, even if alcohol

intake remains high. Counselors and criminal justice personnel (e.g., probation officers) should be aware that, among people at risk for violence who do not respond to BMI with decreased substance use, continued use of Motivational Interviewing techniques may be of value.

In the RCT that preceded this secondary analysis, the Affective facet of psychopathy moderated the efficacy of BMI on substance use (Swogger et al., 2016). Informed by the Risk-Need-Responsivity model, we took into account the potential moderating effect of the Affective facet of psychopathy on BMI efficacy. In the present study, psychopathic traits did not moderate the treatment's relation to violent recidivism, and results were stable after we adjusted for the PCL-R Affective facet, indicating that the BMI may have had a benefit on subsequent violence even among people with emotional deficits associated with psychopathy.

### **Limitations**

This study should be considered in light of several limitations. This is a secondary analysis with a modest sample size, and we consider results preliminary. Replication will be necessary to establish their stability. We caution against the broad generalization of these results to non-criminal justice samples, or youth. The multi-method measurement of violent recidivism across objective (i.e., criminal charges database) and subjective (self-report) data enables confidence in the sensitivity of the outcome; however, we note that criminal charges are the result of a multifactorial process that involves many more variables than individual violence and is subject to policing biases. Moreover, the follow-up period of 1 year limited information on violent recidivism. These limitations are offset by the RCT design in which potential confounding variables were balanced across conditions, the nuanced assessment of relevant psychopathic traits, multiple methods of assessment of violence, including objective (criminal charges) and subjective (self-report) measures of violence during follow-up, and the careful measurement of treatment fidelity among study therapists.

**Conclusion**

This study indicates the promise of a BMI targeting harmful substance use for reducing violence risk in justice-involved people with harmful alcohol use. Additional research is warranted to replicate this effect and determine mechanisms by which BMI decreases violence as the intervention may be a cost-effective treatment with significant public health implications. It may also be beneficial for future studies to explore the violence-reducing role of alcohol screening and intervention within criminal justice systems.

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**Table 1**

*Sample Descriptive Statistics for the Full Sample, Treatment Condition (BMI+SC), and Standard Care (S.C.) Contrition, and Between-Group Comparisons between BMI+SC and S.C.*

Sample Characteristic	Full Sample	BMI+SC	SC	BMI+SC and S.C. Comparisons
<i>N</i>	105	53	52	---
% Men	64.8	56.6	73.1	Sex: $\chi^2(1, N = 105) = 3.12, p = .077, \phi = .22$
% White	52.4	52.8	51.2	Race: $\chi^2(2, N = 105) = 3.87, p = .144, \phi = -.19$
% Black	45.7	45.3	46.2	---
% Other race	1.9	1.9	1.9	---
% Unemployed	76.2	75.5	76.3	Employment: $\chi^2(4, N = 105) = 5.80, p = .215, \phi = .24$
Age in Years <i>M</i> ( <i>SD</i> )	33.44 (10.88)	33.08 (10.03)	33.81 (11.77)	$t(103) = 0.34, p = .732, d = 0.07$
Highest Grade Completed <i>M</i> ( <i>SD</i> )	11.84 (1.70)	11.94 (1.85)	11.73 (1.54)	$t(103) = -0.64, p = .524, d = 0.12$
% Days Abstinent from Alcohol at Baseline <i>M</i> ( <i>SD</i> )	71.31 (31.55)	71.07 (36.41)	71.55 (35.02)	$t(103) = 0.07, p = .945, d = 0.01$
% Days Abstinent from Alcohol at 6 months <i>M</i> ( <i>SD</i> )	84.71 (27.59)	81.77 (30.56)	88.31 (23.5)	$t(58) = 0.91, p = .365, d = 0.13$
AUDIT <i>M</i> ( <i>SD</i> )	13.16 (11.06)	12.68 (9.62)	13.65 (12.43)	$t(96.02) = 0.45, p = .656, d = 0.09$
DAST <i>M</i> ( <i>S.D.</i> )	6.42 (2.11)	6.17 (2.04)	6.67 (2.18)	$t(103) = 1.22, p = .224, d = 0.24$

PCL-R Total <i>M (SD)</i>	21.94 (8.43)	21.04 (8.16)	22.86 (8.69)	$t(103) = 1.12, p = .271, d = 0.22$
PCL-R Factor 1 <i>M (SD)</i>	8.55 (4.34)	8.14 (4.26)	8.97 (4.42)	$t(103) = 0.98, p = .327, d = 0.19$
PCL-R Factor 2 <i>M (SD)</i>	10.96 (3.64)	10.59 (3.40)	11.33 (3.86)	$t(103) = 1.04, p = .303, d = 0.20$
PCL-R Interpersonal Facet <i>M (SD)</i>	4.31 (2.28)	4.01 (2.17)	4.63 (2.36)	$t(103) = 1.39, p = .167, d = 0.27$
PCL-R Affective Facet <i>M (SD)</i>	4.24 (2.42)	4.14 (2.51)	4.35 (2.34)	$t(103) = 0.45, p = .657, d = 0.09$
PCL-R Lifestyle Facet <i>M (SD)</i>	6.51 (1.97)	6.38 (1.75)	6.65 (2.18)	$t(103) = 0.69, p = .491, d = 0.14$
PCL-R Antisocial Facet <i>M (SD)</i>	5.28 (2.60)	5.00 (2.61)	5.56 (2.59)	$t(103) = 1.10, p = .272, d = 0.22$
Previous Violent Charges <i>M (SD)</i>	3.30 (3.63)	3.62 (4.36)	2.98 (2.70)	$t(86.93) = -0.91, p = .366, d = 0.18$
% with Previous Violent Charges at Baseline	76.2	67.9	84.6	$\chi^2(1, N = 94) = 1.53, p = .216, \phi = -.13$
Non-violent Charges <i>M (SD)</i>	15.97 (16.32)	17.40 (19.28)	14.52 (12.65)	$t(89.97) = -0.90, p = .368, d = 0.18$
% with new Violent Charges at 1 year	20	15.1	25	$\chi^2(1, N = 105) = 1.61, p = .205, \phi = -.12$

*Note.* AUDIT = Alcohol Use Disorders Identification Test; DAST = Drug Abuse Screening Test; PCL-R = Psychopathy Checklist-Revised total and facet Scores; Violent Charges = the number of official violent charges; % with Violent Charges = the number of individuals who had official and/or self-reported violent charges at baseline.

**Table 2**

*Correlations and Descriptive Statistics*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1. AUDIT</b>	----				
<b>2. Affective Facet</b>	-.11	----			
<b>3. Condition</b>	-.04	-.04	----		
<b>4. Previous Violent Charges</b>	-.09	.18	-.20*	----	
<b>5. Follow-up Violence</b>	.06	-.01	-.12	.22*	----
<i>M</i>	13.16	4.24	----	----	----
<i>SD</i>	11.06	2.42	----	----	----
<b>Observed Range</b>	0-39	0-8	----	----	----

*Note.* AUDIT: Alcohol Use Disorders Identification Test scores; Affective Facet = mean-centered scores from the Affective facet of the Psychopathy Checklist-Revised; Condition: Treatment = 1; standard care = 0; Previous Violent Charges: Previous violent charge(s) = 1, no previous violent charge = 0; Follow-up Violence: Follow-up violence = 1, no violence = 0; Correlations between two dichotomous variables are Phi Coefficients. \*  $p < .05$

**Table 3**

*Logistic Regression Analyses of the Main Effects of and Interaction between Alcohol Use and Treatment Condition Predicting Follow-up Violence, after Adjusting for Previous Violence*

Step	Variables	Logit	SE	Wald $\chi^2$	df	p	OR	OR 95%CI		Nagelkerke R <sup>2</sup>
								Lower Limit	Upper Limit	
1	Intercept	-3.18	1.02	9.70	1	.002	0.04			.10
	Previous Violent Charges	2.08	1.05	3.90	1	.048	8.00	[1.02	62.98]	
2	Intercept	-2.98	1.07	7.77	1	.005	0.05			.12
	Previous Violent Charges	2.07	1.07	3.76	1	.052	7.89	[0.98	63.56]	
	Condition	-0.44	0.52	0.73	1	.392	0.64	[0.24	1.77]	
	AUDIT	0.02	0.02	0.71	1	.400	1.02	[0.98	1.07]	
3	Intercept	-3.29	1.09	9.08	1	.003	0.04			.18
	Previous Violent Charges	2.36	1.09	4.70	1	.030	10.53	[1.25	88.46]	
	Condition	-0.48	0.55	0.77	1	.382	0.62	[0.21	1.82]	
	AUDIT	0.05	0.03	3.29	1	.070	1.05	[1.00	1.11]	
	Condition x AUDIT	-0.11	0.06	3.99	1	.046	0.90	[0.80	0.99]	

*Note.* Previous Violent Charges: Previous violent charge(s) = 1, no previous violent charge = 0; Condition: Treatment = 1; standard care = 0; AUDIT: Alcohol Use Disorders Identification Test mean-centered scores.

**Table 4**

*Johnson-Neyman Regions of Significance of the Relation between Treatment Condition and Follow-up Violence at Different Standardized Alcohol Use Scores*

AUDIT score	AUDIT z-score	Logit	S.E.	p	Logit 95% CI		OR
					Lower Limit	Upper Limit	
19.46	0.57	-1.19	0.70	.091	[-2.56	0.19]	0.31
21.45	0.75	-1.40	0.78	.071	[-2.93	0.12]	0.25
23.44	0.93	-1.62	0.86	.059	[-3.30	0.06]	0.20
25.32	1.10	-1.84	0.94	.052	[-3.69	0.01]	0.16
25.98	1.16	-1.91	0.98	.050	[-3.82	0.00]	0.15
<b>27.31</b>	<b>1.28</b>	<b>-2.05</b>	<b>1.04</b>	<b>.047</b>	<b>[-4.08</b>	<b>-0.03]</b>	<b>0.13</b>
<b>29.30</b>	<b>1.46</b>	<b>-2.27</b>	<b>1.13</b>	<b>.044</b>	<b>[-4.48</b>	<b>-0.06]</b>	<b>0.10</b>
<b>31.18</b>	<b>1.63</b>	<b>-2.49</b>	<b>1.23</b>	<b>.042</b>	<b>[-4.89</b>	<b>-0.09]</b>	<b>0.08</b>
<b>33.17</b>	<b>1.81</b>	<b>-2.70</b>	<b>1.32</b>	<b>.041</b>	<b>[-5.30</b>	<b>-0.11]</b>	<b>0.07</b>
<b>35.05</b>	<b>1.98</b>	<b>-2.92</b>	<b>1.42</b>	<b>.040</b>	<b>[-5.71</b>	<b>-0.13]</b>	<b>0.05</b>
<b>37.04</b>	<b>2.16</b>	<b>-3.14</b>	<b>1.53</b>	<b>.040</b>	<b>[-6.13</b>	<b>-0.15]</b>	<b>0.04</b>
<b>39.03</b>	<b>2.34</b>	<b>-3.36</b>	<b>1.63</b>	<b>.039</b>	<b>[-6.54</b>	<b>-0.17]</b>	<b>0.03</b>

*Note.* AUDIT: Alcohol Use Disorders Identification Test; AUDIT z-score: The z-score

transformed mean-centered scores from the AUDIT; Bolded numbers indicate the region of statistically significant simple slopes between treatment condition and follow-up violence at higher levels of alcohol use scores.



**Table 5**

*Logistic Regression Analyses of the Main Effects of and Interaction between Alcohol Use and Treatment Condition Predicting Follow-up*

*Violence when Including the Main Effects and Interactions Terms for the Affective Facet of Psychopathy, after Adjusting for Previous Violence*

Step	Variables	Logit	SE	Wald $\chi^2$	df	p	OR	OR 95%CI		Nagelkerke $R^2$
								Lower Limit	Upper Limit	
1	Intercept	-3.22	1.03	9.87	1	.002	0.04			.10
	Previous Violent Charges	2.13	1.06	4.06	1	.044	8.44	[1.06	67.19]	
	Affective Facet	-0.05	0.10	0.25	1	.617	0.95	[0.78	1.16]	
2	Intercept	-3.01	1.07	7.91	1	.005	0.05			.12
	Previous Violent Charges	2.11	1.07	3.89	1	.049	8.26	[1.01	67.25]	
	Affective Facet	-0.05	0.11	0.20	1	.652	0.95	[0.78	1.17]	
	Condition	-0.45	0.52	0.76	1	.382	0.64	[0.23	1.75]	
	AUDIT	0.02	0.02	0.63	1	.429	1.02	[0.97	1.07]	
3	Intercept	-3.61	1.17	9.47	1	.002	0.03			.20
	Previous Violent Charges	2.67	1.18	5.14	1	.023	14.36	[1.44	143.81]	
	Affective Facet	-0.09	0.16	0.34	1	.558	0.91	[0.67	1.24]	
	Condition	-0.53	0.56	0.91	1	.341	0.59	[0.20	1.75]	
	AUDIT	0.05	0.03	3.39	1	.065	1.05	[1.00	1.11]	
	Condition x AUDIT	-0.12	0.06	4.72	1	.030	0.88	[0.79	0.99]	
	Condition x Affective Facet	0.01	0.23	0.00	1	.964	1.01	[0.65	1.57]	
	AUDIT x Affective Facet	-0.01	0.01	1.36	1	.244	0.99	[0.97	1.01]	

## BMI FOR SUBSTANCE USE DECREASES VIOLENCE

	Intercept	-3.30	1.13	8.47	1	.004	0.04			.22
4	Previous Violent Charges	2.37	1.13	4.39	1	.036	10.71	[1.17	98.44]	
	Affective Facet	-0.08	0.15	0.29	1	.588	0.92	[0.68	1.24]	
	Condition	-0.80	0.64	1.53	1	.216	0.45	[0.13	1.59]	
	AUDIT	0.05	0.03	3.16	1	.075	1.05	[1.00	1.11]	
	Condition x AUDIT	-0.15	0.07	5.04	1	.025	0.86	[0.76	0.98]	
	Condition x Affective Facet	-0.06	0.24	0.05	1	.823	0.95	[0.59	1.53]	
	AUDIT x Affective Facet	0.00	0.01	0.01	1	.907	1.00	[0.97	1.03]	
	AUDIT x Condition x Affective Facet	-0.03	0.02	1.61	1	.205	0.97	[0.93	1.02]	

*Note.* Previous Violent Charges: Previous violent charge(s) = 1, no previous violent charge = 0; Affective Facet: The Affective facet of

psychopathy subscale mean-centered scores from the Psychopathy Checklist-Revised; Condition: Treatment = 1; standard care = 0; AUDIT:

Alcohol Use Disorders Identification Test mean-centered score.