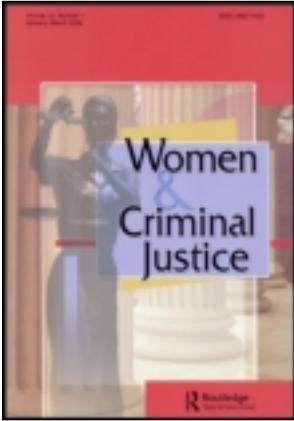


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Relationships Among Trauma Exposure, Familial Characteristics, and PTSD: A Case-Control Study of Women in Prison and in the General Population

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This study examines whether there are differential relationships among trauma exposure, familial risk and protective factors, substance abuse, and posttraumatic stress disorder (PTSD) among incarcerated and non-incarcerated women. A case-control method was used to match 100 incarcerated women with 100 women in the general population. Incarcerated women had a significantly higher risk of trauma exposure as compared with controls, with odds ranging from 1.7 to 3.7. When group was controlled, exposure to sexual or physical trauma significantly increased the odds of PTSD (odds ratio = 5.0; $p < .05$), as did substance use in response to traumatic distress (odds ratio = 8.9; $p < .001$). Family-related characteristics did not appear to moderate this relationship. The findings suggest that incarcerated women are at high risk for PTSD given their high rates of trauma exposure and apparent lack of appropriate coping mechanisms; the results support the use of trauma-specific interventions for this population.

KEYWORDS *case-control study, childhood and adult trauma, family risk and protective factors, posttraumatic stress disorder, substance abuse, women offenders*

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INTRODUCTION

Women involved with the criminal justice system are known to have a range of serious problems across multiple domains (e.g., educational, employment, family, legal, mental and physical health, substance abuse; Grella and Greenwell 2007). This is especially apparent in comparison with non-incarcerated women in the general population, including women who are in some form of treatment (Kubiak and Arfkin 2006). In particular, studies have shown that women offenders have higher rates of physical and sexual abuse than women in the general population (Browne, Miller, and Maguin 1999). Estimates are that from one quarter to one half of female inmates in state and federal correctional facilities have histories of childhood physical or sexual abuse (General Accounting Office 1999; Harlow 1999). One study of female offenders in a prison-based treatment program found that these women reported significantly higher rates of exposure to childhood abuse, neglect, and household dysfunction, leading to negative health outcomes, as compared with adult women sampled from a health maintenance organization (Messina and Grella 2006). Yet estimates of exposure to traumatic events, including both childhood and adult incidents, have not controlled for other factors that may influence exposure, such as sociodemographics and family-related characteristics, nor have they explored whether reactions to trauma exposure, including posttraumatic stress disorder (PTSD), differ between incarcerated and non-incarcerated women.

The present study compares the prevalence of trauma exposure among a sample of incarcerated women with a comparable sample of women in the general population using data from a national survey study. Furthermore, we were interested in assessing whether familial risk and protective factors differ between the incarcerated and non-incarcerated women and whether these factors moderate the relationship between trauma exposure and PTSD across the two groups.

Exposure to Trauma and Risk for PTSD Among the General Population

Among the general population, childhood experiences of abuse and trauma have been linked to later problems related to substance abuse, psychosocial functioning, HIV risk behaviors, physical health, and mental health (Chapman, Dube, and Anda 2007). Moreover, a cumulative effect of trauma exposure has been demonstrated, with greater trauma exposure increasing the odds of later problems (Felitti et al. 1998). In addition, having a parent or household figure with an alcohol, drug, or mental health problem significantly increases the risk for exposure to childhood trauma and abuse (Anda et al. 2002) as

well as for later psychological and substance use problems for the child (Merikangas, Dierker, and Szatmari 1998).

Studies of the general population have further shown that exposure to trauma leads to negative psychological outcomes. Data from a national survey study showed that the lifetime prevalence (\pm standard error) of PTSD was 6.4 percent \pm 0.18, with a higher prevalence among women (8.6 percent \pm 0.26) than men (4.1 percent \pm 0.19; Pietrzaka et al. 2011). When asked to identify their most stressful experience, individuals with PTSD most commonly reported the unexpected death of someone close, serious illness or injury to someone close, and sexual assault. PTSD was also associated with elevated lifetime rates of mood, anxiety, and substance use disorders and suicide attempts among individuals in the general population.

Exposure to Trauma and Risk for PTSD Among Women Offenders

In a review of the criminogenic needs of women offenders, Hollin and Palmer (2006) noted that although exposure to trauma and abuse may be associated with risk for offending for both men and women, women report more extensive and continuous histories of childhood and adult abuse. These experiences may be precursors to other factors that precipitate women's involvement in criminal behavior, such as risky sexual behavior and substance abuse. Numerous studies of women in the criminal justice system have shown that, as with women in the general population, childhood abuse and trauma exposure are associated with elevated levels of mental health, substance abuse, and other behavioral problems (El-Bassel et al. 1995; Messina and Grella 2006; Mullings, Hartley, and Marquart 2004; Mullings, Marquart, and Brewer 2000; Zlotnick 1997). One study conducted with women offenders in prison-based treatment showed that childhood abuse and trauma exposure were associated with adolescent conduct problems and later adult psychological distress and criminal behavior (Grella, Stein, and Greenwell 2005).

Rates of lifetime PTSD among samples of women offenders typically range from one quarter to one third (Hutton et al. 2001; Jordan et al. 1996; Teplin, Abram, and McClelland 1996). Incarcerated women may be particularly at risk for trauma reexposure and PTSD if they engage in prostitution to support their drug use, which makes them vulnerable to victimization (El-Bassel et al. 1997; Millay et al. 2009). Thus, exposure to childhood traumatic events may contribute to involvement in criminal behavior among women as well as to women's continued risk for subsequent trauma events (Raj et al. 2008) and associated negative health outcomes.

Family Risk and Protective Factors in Relation to Developmental Outcomes

Familial characteristics have been identified as risk factors for a range of subsequent developmental and behavioral problems (Hawkins, Catalano, and Miller 1992). These factors have most often been examined with regard to their effects on adolescent behavior and developmental outcomes (Vakalahi 2001). Family risk factors include exposure to abuse, neglect, and parental illicit drug use (Fergusson, Boden, and Horwood 2008). In particular, high levels of family conflict have been associated with conduct behavior problems among adolescents and the subsequent development of substance use problems (Skeer et al. 2009), especially among girls, for whom this effect is pronounced (Skeer et al. 2011). In a review of the field, the authors concluded that children raised in families characterized by conflict, dysfunction, abuse, or neglect create vulnerabilities and/or interact with genetically based vulnerabilities in offspring that produce disruptions in psychosocial functioning (specifically emotion processing and social competence) and poor health behaviors, including substance abuse (Repetti, Taylor, and Seeman 2002).

Conversely, other family-related characteristics may help to buffer the effects of trauma exposure and reduce the risk of negative developmental outcomes. Familial protective factors include having caring, trusting, and supportive emotional relationships; high levels of family bonding and connectedness; and high parental involvement and supervision (Sale et al. 2003). Extrafamilial protective factors have also been identified, including individual personality traits (e.g., resilience), low levels of behavioral problems, a high level of educational aspiration and higher grades, affiliation with peers and peer-group norms that do not support drug use (Bernat et al. 2012), and strong social connectedness with a school or neighborhood (Brooks et al. 2012).

The Current Study

The current study compares a sample of incarcerated women with a sample of women in the general population from a large-scale nationally representative epidemiological survey. The use of national survey data provided a unique opportunity to extract a subsample of women in the general population who were matched with the sample of incarcerated women and to compare their rates of exposure to trauma and abuse, controlling for sociodemographics and family characteristics that may influence their exposure to these events as well as their responses to them. Our goals were (a) to explore the prevalence of specific types of trauma exposure across groups and the association of trauma exposure with health-related outcomes, including a diagnosis of PTSD and substance abuse; and (b) to examine whether familial risk and protective factors moderate the risk for PTSD and, if so, whether this relationship differs across groups (i.e., incarcerated or general population).

METHOD

Trauma-Informed Substance Abuse Treatment (TI-SAT) Program

We obtained data from incarcerated women who were participating in the TI-SAT program at the Leo Chesney Community Correctional Facility in Live Oak, California. The program aims to address the complex treatment needs of women offenders with a history of substance abuse and trauma exposure. The program integrates gender-responsive treatment principles into all program practices. Bloom, Owen, and Covington (2003:75) defined *gender-responsive treatment* as “creating an environment through site selection, staff selection, program development, content, and material that reflects an understanding of the realities of women and girls and that addresses the issues of the participants.” Treatment follows the structured curriculum *Helping Women Recover: A Comprehensive Integrated Treatment Model* (Covington 2008). Participants engage in daily programming in a separate module on the prison premises; a well-established treatment provider is contracted to manage and staff the program within the context of the correctional environment.

In addition, the TI-SAT was designed to be trauma informed, which includes being sensitive to the effects of trauma in all aspects of the therapeutic process, including assessment, group and individual counseling, and staff training and proficiency (Morrissey et al. 2005). The TI-SAT has adopted *Seeking Safety* (Najavits 2002) and dialectical behavior therapy (Linehan and Dimeff 1997) as trauma-specific interventions within the context of trauma-informed service delivery; both provide cognitive-behavioral-based skills for dealing with the effects of trauma and PTSD, particularly as they relate to substance abuse. Issues related to grief and loss, self-esteem and empowerment, and healthy relationship dynamics are addressed in individual and group counseling sessions.

TI-SAT Evaluation Study Design

A pool of 218 TI-SAT participants volunteered to participate in a study evaluating the outcomes of treatment participation. Volunteers for study participation were solicited at information meetings presented by the research staff from November 2009 to August 2010. Out of this pool, 106 (48.6 percent) were randomly selected for inclusion in the study and completed a baseline assessment, 35 (16.1 percent) were not randomly selected for inclusion in the study, 69 (31.6 percent) were discharged from prison prior to entering the study, and 8 (3.7 percent) of those who volunteered for the study subsequently declined to participate. Institutional review board approvals for the TI-SAT study were obtained from both the University of California, Los Angeles (UCLA) institutional review board and the California Department of Health and Human Services Committee for the Protection of Human Subjects. In addition, a Certificate of Confidentiality

was obtained from the National Institute on Drug Abuse to protect the confidentiality of all data collected from TI-SAT participants in the outcome evaluation.

Assessments

EXPOSURE TO ABUSE AND TRAUMA

A baseline assessment was conducted with TI-SAT study participants (by UCLA research staff) at the time of study entry. Participants were asked about their exposure to 17 specific traumatic events that were derived from the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) study. Responses to these events were grouped into five categories of trauma exposure (based on Roberts et al. 2010): (a) *serious accident, illness, or disaster* (three items); (b) *someone close suddenly died* (one item); (c) *physical or sexual trauma* (six items: unwanted sexual activity, intimate partner violence, physically attacked, kidnapped, stalked, mugged); (d) *childhood trauma* (five items: witnessed domestic violence in home; victim of neglect, sexual abuse, physical abuse, or rape); and (e) *trauma to others* (two items: trauma to close friend or relative, witnessed someone badly injured or killed).

FAMILY RISK AND PROTECTIVE FACTORS

These variables were derived from the NESARC interview and included in the TI-SAT assessment. They were (a) whether a parent or household figure had ever been in jail or prison, had received treatment for a mental health problem, had attempted or committed suicide, or had an alcohol or drug problem; and (b) five items pertaining to familial support, which were summed.

RESPONSE TO TRAUMA

These two variables ascertained responses to traumatic events. First, participants were asked whether they had used alcohol and/or other drugs (AOD) when experiencing distress following a traumatic event. The use of AOD in response to traumatic distress was assessed with two questions also derived from NESARC: "Did you EVER drink alcohol to improve your mood or make yourself feel better when you were having some of these reactions to a stressful event?" and "Did you EVER take any drugs or medicine ON YOUR OWN, that is, without a prescription, in greater amounts or more often than prescribed to improve your mood or make yourself feel better when you were having some of these reactions to a stressful event?"

Second, both NESARC and TI-SAT included a diagnostic module for lifetime PTSD using *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* criteria. To qualify for a diagnosis of PTSD,

individuals had to identify a traumatic event that was associated with feelings of intense fear, helplessness, or horror and had to have experienced each of the following diagnostic criteria: (a) persistent reexperiencing of the event, (b) avoidance of stimuli associated with the event, and (c) symptoms of increased arousal or hypervigilance.

Matched Comparison Sample

Data on non-institutionalized women in the general population were obtained from the NESARC study. The 2001–2002 Wave 1 NESARC was a representative sample of the non-institutional household population aged 18 years and older residing in the United States. The sampling frame was the Census 2000/2001 Supplementary Survey for housing units and the Census 2000 Group Quarters Inventory for group quarters. The smallest primary sampling units were collapsed to ensure the confidentiality of respondents, resulting in a total of 435 primary sampling units in the final NESARC data file. Within the primary sampling units, non-Hispanic Black and Hispanic housing units were oversampled. Once a household was selected, one randomly selected person was interviewed, with young adults (aged 18–24 years) sampled at a higher rate than other members of the household. Trained lay interviewers conducted face-to-face assessments assisted by computer software. Informed consent was collected from all participants before the interview began.

The Wave 1 NESARC consisted of in-person household interviews with a total of 43,093 individuals, with an overall response rate of 81 percent. For Wave 2 NESARC, interviewers attempted to interview all eligible Wave 1 respondents (i.e., those who had not died, become incapacitated, been institutionalized, or left the country and those who were not in the military during the 2004–2005 Wave 2 NESARC interview period). The Wave 2 NESARC reinterview rate was 86.7 percent. This yielded a cumulative response rate across Waves 1 and 2 of 70.2 percent ($N = 34,653$). The sample data were adjusted for oversampling and household- and person-level non-response, and the weighted data were then adjusted to represent the U.S. civilian population based on the 2000 census. The Wave 2 interview included a detailed assessment of exposure to childhood and adult trauma and abuse and an assessment of PTSD based on *DSM-IV* criteria.

The matched sample was obtained from the Wave 2 sample using the SAS (Version 9.1.3) command [proc surveyselect] with the following variables (shown as categorized): age (continuous), race/ethnicity (White, African American, Asian, Hispanic), education status (less than high school or general equivalency diploma, high school diploma, some college, or college degree), marital status (married, widowed or divorced or separated, never married), and region (western United States). The characteristics of the TI-SAT and resultant matched NESARC samples are shown in Table 1.

TABLE 1 Background Characteristics of TI-SAT Study Sample and Matched Comparison Sample From NESARC

Characteristic	TI-SAT (N= 100)	NESARC (N= 100)
Race/ethnicity (<i>n</i>)		
White	45	45
African American	21	21
Hispanic	33	33
Asian	1	1
Marital status (<i>n</i>)		
Married	23	23
Widowed/divorced/separated	36	36
Never married	41	41
Education status ^a (<i>n</i>)		
Less than high school/GED	46	45
High school	30	31
Some college/college degree	24	24
Mean age (<i>SD</i>)	34.2 (8.3)	34.8 (10.1)
Age range	21–55	21–74

Note: TI-SAT = Trauma-Informed Substance Abuse Treatment program; NESARC = National Epidemiological Survey on Alcohol and Related Conditions study; GED = general equivalency diploma.

^aOne person in TI-SAT with a GED was matched with a person in NESARC with a high school diploma.

Statistical Methods

Descriptive statistics were used to describe the prevalence of trauma events, familial risk and protective factors, and rates of PTSD among the matched samples. The relative risk of the five categories of traumatic events was also calculated. Next a logistic regression model was constructed with PTSD as the dependent variable and the five trauma categories entered as predictors to determine their unique associations. Covariates included parent ever incarcerated, parent had mental health or alcohol or drug problem (MH/AOD), sum of family protective factors, respondent used AOD in response to most traumatic event, total number of traumatic events ever experienced, and group (TI-SAT = 1, NESARC = 0). Interaction terms were also entered for protective factors, incarcerated parent, or parent with MH/AOD problem by group (TI-SAT vs. NESARC). Variables were considered statistically significant at $p < .05$; adjusted odds ratios (ORs) and 95 percent confidence intervals (CIs) are reported. Analyses were conducted with SAS Version 9.2.

RESULTS

Comparative Prevalence of Trauma Events

Nearly all of the incarcerated women and a majority of the matched comparison sample had experienced at least one traumatic event (see Table 2). Incarcerated women had a significantly higher prevalence of four of the

TABLE 2 Lifetime Trauma Exposure Among TI-SAT Sample and Matched Comparison Sample From NESARC

Type of exposure	TI-SAT (<i>N</i> =100)	NESARC (<i>N</i> =100)
Ever experienced at least one traumatic event	97.0	73.0
Accident, illness, or disaster (any of below)***	69.0	34.0
Serious accident***	35.0	14.0
Serious illness	8.0	9.0
Natural disaster	13.0	12.0
Sudden death of close family or friend***	68.0	42.0
Physical or sexual trauma (any of below)***	83.0	31.0
Unwanted sexual activity***	55.0	13.0
Intimate partner violence***	59.0	15.0
Physically attacked***	25.0	5.0
Kidnapped***	21.0	0.0
Stalked***	38.0	7.0
Mugged**	24.0	10.0
Childhood trauma (any of below)***	53.0	17.0
Witness serious fights at home***	43.0	14.0
Childhood neglect***	22.0	5.0
Childhood sexual abuse	49.1	15.0
Childhood physical abuse**	23.0	6.0
Raped prior to age 18***	33.0	7.0
Trauma to others (either of below)	47.0	36.0
Serious trauma to someone close to her	38.0	32.0
Witness someone badly injured or killed***	47.0	13.0
Number of types of traumatic events***		
0–1	9.0	46.0
2–3	25.0	27.0
4–5	12.0	16.0
6–7	28.0	8.0
8 or more	26.0	3.0

Note: Data are percentages. TI-SAT = Trauma-Informed Substance Abuse Treatment program; NESARC = National Epidemiological Survey on Alcohol and Related Conditions study.

** $p < .01$, *** $p < .001$.

five categories of trauma exposure than matched controls in the general population. Similarly, incarcerated women had a higher odds of having experienced a serious accident, illness, or disaster ($OR = 2.1$, $CI = 1.5, 2.9$); physical or sexual trauma ($OR = 3.7$, $CI = 2.4, 5.7$); the sudden death of a family member or friend ($OR = 1.7$, $CI = 1.3, 2.4$); or childhood trauma ($OR = 1.7$, $CI = 1.3, 2.2$). There was no difference between groups in terms of the risk of witnessing trauma to others or having a close family member or friend experience a serious traumatic event, although at the item-specific level, a greater proportion of incarcerated women than non-incarcerated women had witnessed someone being injured or killed (47 percent vs. 13 percent, respectively). As expected from prior research, the incarcerated women had experienced more lifetime traumatic events, averaging 5.5 ($SD = 3.0$) events compared with 2.3 ($SD = 2.3$) for the comparison sample ($p < .0001$).

Prevalence of PTSD, Response to Trauma, and Family Risk and Protective Factors

The lifetime prevalence of PTSD was significantly higher among incarcerated women than women in the matched control group (40 percent vs. 12 percent, respectively; $p < .001$), and incarcerated women were also more likely to report having used drugs in response to their most traumatic event (64 percent vs. 6 percent, respectively; $p < .001$). There was no significant difference between the two samples on four out of five of the family-related protective factors, although a greater proportion of incarcerated women agreed that there was someone in their family who wanted them to succeed (see Table 3). Incarcerated women had higher rates of parental alcohol and drug problems and criminal justice involvement; overall rates of parental mental health problems (including suicidality) were low and did not differ significantly between groups.

Moderating Effects of Familial Risk and Protective Factors on Trauma Exposure and PTSD

Findings from the multivariate logistic regression model are shown in Table 4. When we controlled for the total number of traumatic events an individual had experienced, only exposure to physical or sexual trauma increased the odds of PTSD (OR = 4.99, CI = 1.4, 17.87; $p < .05$). Similarly, using alcohol or

TABLE 3 Familial Risk and Protective Factors Among TI-SAT Sample and Matched Comparison Sample From NESARC

Factor	TI-SAT ($N=100$)	NESARC ($N=100$)
Risk factors (re: parent or other adult living in home) ^a		
Was problem drinker or alcoholic***	50.0	20.0
Had drug problems***	39.0	6.0
Was in jail/prison**	30.0	13.0
Was treated for mental health problems	8.0	5.0
Attempted suicide	7.0	4.0
Committed suicide	1.0	1.0
Protective factors ^{a,b}		
There was someone in your family who wanted you to succeed*	85.0	77.0
There was someone in your family who helped you to feel important or special	76.0	85.0
Family was a source of strength and support	68.0	80.0
You were part of close-knit family	61.0	77.0
Someone in your family believed in you	78.0	85.0

Note: Data are percentages. TI-SAT = Trauma-Informed Substance Abuse Treatment program; NESARC = National Epidemiological Survey on Alcohol and Related Conditions study.

^aPertains to prior to age 18. ^bRated as "often true" or "very often true."

* $p < .05$, ** $p < .01$, *** $p < .001$.

TABLE 4 Logistic Regression Model Predicting Posttraumatic Stress Disorder in TI-SAT Sample and Matched Comparison Sample From NESARC

Variable	Odds ratio	95% confidence interval
Type of trauma exposure		
Accident, illness, or disaster	1.88	0.67, 5.26
Sudden death of close family or friend	1.59	0.64, 3.96
Physical or sexual trauma*	4.99	1.40, 17.77
Childhood trauma	0.44	0.15, 1.26
Trauma to others	0.69	0.29, 1.63
Total number of traumatic events	0.95	0.76, 1.19
Familial risk and protective factors		
Parent was incarcerated [†]	2.31	0.90, 5.91
Parent had AOD and/or mental health problem	0.61	0.24, 1.55
Sum of familial protective factors	0.92	0.71, 1.18
Used AOD in response to trauma**	8.89	2.54, 31.15
In TI-SAT (vs. NESARC)	0.66	0.19, 2.37

Note: Chi-square likelihood ratio = 60.7 ($df=11$), $p < .0001$. TI-SAT = Trauma-Informed Substance Abuse Treatment program; NESARC = National Epidemiological Survey on Alcohol and Related Conditions study; AOD = alcohol and/or other drugs.

[†] $p < .10$, * $p < .05$, ** $p < .001$.

drugs in response to trauma was strongly associated with PTSD (OR = 8.89, CI = 2.5, 31.2; $p < .001$). There was a trend for a higher odds of PTSD among those who had an incarcerated parent, with approximately twice the risk of PTSD among those with an incarcerated parent ($p < .08$). However, other familial risk and protective factors were unrelated to a diagnosis of PTSD. Moreover, when we controlled for the number and types of trauma events and familial risk and protective factors, the effect of group (TI-SAT or NESARC) on PTSD was not significant. Similarly, none of the interactions between group and family risk and protective factors were significant, indicating that these factors did not differ by group.

DISCUSSION

This study utilized similar instrumentation on trauma exposure and family-related risk and protective factors administered to women in prison (TI-SAT) and in the general population (NESARC). This approach enabled us to directly compare the prevalence of exposure to traumatic events; responses to traumatic events, including alcohol and drug use and PTSD; and whether the associations between trauma exposure and PTSD were differentially moderated by family risk and protective factors across the two samples. Thus, the study design represents an advancement over previous research that is limited to characterizing the rates of trauma exposure and its consequences among women either in the general population or in prison,

without consideration of covariates that may influence women's risk of exposure and subsequent outcomes.

As expected, the relative odds of trauma exposure were significantly higher among the incarcerated women than among the matched comparisons in the general population. Examination of the relative prevalence of specific types of trauma events demonstrated that trauma exposure was elevated among the incarcerated women for four out of the five categories of events examined, with odds ranging from 3.7 for physical or sexual trauma to 1.7 for the sudden death of a family member or friend and for childhood trauma.

The case-control method further allowed us to explore whether familial risk and protective factors moderated the responses to traumatic distress and development of PTSD across the matched samples after controlling for the type and amount of trauma exposure. It is noteworthy that only one of the five trauma categories, physical and sexual abuse, was significantly associated with PTSD after these other factors were controlled. Moreover, this relationship was not influenced by sample type (i.e., incarcerated vs. general population) and was not moderated by the familial risk and protective factors. Instead, the strongest factor associated with PTSD was the use of alcohol or drugs in response to the traumatic event.

Incarcerated women were significantly more likely to report substance use in response to a traumatic event, at rates much higher than women in the general population sample. A prior study conducted with the general NESARC sample found that approximately 20 percent of individuals with PTSD in the general population used AOD in response to PTSD symptoms (Leeies et al. 2010). Moreover, such individuals were at higher risk for several psychiatric disorders and suicidality and had poorer overall quality of life. In the current study, a majority of the incarcerated women (64 percent) reported alcohol or drug use in response to trauma, which suggests their higher use of maladaptive coping in response to traumatic events.

The mechanisms underlying the heightened relationship between PTSD and substance use among incarcerated women cannot be determined using these retrospective data. Incarcerated women may have maladaptive coping responses to trauma because of their greater genetic vulnerability to substance abuse (as seen in their higher rates of parental alcohol and drug problems), lack of social models and support for the use of adaptive coping strategies, and conditioned responses to stress in which substance abuse functions as a negative reinforcer (Heim et al. 2000; Stewart and Conrod 2003). Research with a general population sample has shown that often maladaptive responses to trauma stem from impaired affect regulation, which leads to suicidality, substance abuse, dissociation, and self-harming behaviors (Briere, Hodges, and Godbout 2010). It is possible that women offenders have more impaired affect regulation as a result of their higher rates and duration of trauma exposure, which may lead to their higher rates of substance abuse and other negative outcomes.

The strong relationship between substance misuse and PTSD in response to trauma among incarcerated women further supports the need for integrated treatment protocols that address both disorders concurrently (Najavits, Weiss, and Shaw 1997). This is particularly true for incarcerated women, given their higher rates of trauma exposure and PTSD, associated mental health and substance abuse problems (Green et al. 2005), and need for services (Carlson, Shafer, and Duffee 2010). Incarceration itself can have a traumatizing effect upon women, which makes it imperative that treatment provided to women offenders addresses both their past trauma exposure and subsequent retraumatization and equips women with strategies for coping with trauma reexposure upon their release to the community (Moloney, van den Bergh, and Moller 2009).

Several limitations to the interpretation of study findings should be noted. The sample of incarcerated women was specific to the particular treatment setting from which they were sampled. The observed rates of childhood trauma in this sample are similar to the rates reported in other studies of female offenders (Browne et al. 1999; General Accounting Office 1999; Harlow 1999); however, there is a wide range of methods for assessing and defining trauma and abuse exposure across studies, leading to the variable prevalence rates reported in the literature. For example, the women in this study averaged 5.5 lifetime traumatic events as compared with 6.8 among a recent study of incarcerated women in Arizona; however, the specific trauma events surveyed varied somewhat across the two studies (Carlson and Shafer 2010). It is interesting that approximately half of the incarcerated women in the current study and in the Carlson and Shafer (2010) study reported a history of childhood sexual abuse, although a smaller proportion of women in the current study reported childhood physical abuse (23 percent vs. 46.8 percent in Carlson and Shafer, 2010). Thus, drawing conclusions across studies is often hampered by methodological differences in assessment and sampling. The strength of the current study is the use of common instrumentation across both the NESARC and TI-SAT samples, which enabled us to compare one sample of incarcerated women against matched comparisons from a population-based data set.

Other study limitations pertain to common concerns associated with self-reported assessment, as well as limitations on variables available for analysis. The underreporting of trauma exposure is possible, although both the TI-SAT and NESARC interviews used strategies to ensure participants of their confidentiality and to encourage their accurate reporting of events. Moreover, although the same assessment instrument was used across the two samples, it is possible that differences may have arisen from the manner in which it was administered across study settings. Lastly, risk and protective factors were confined to family-related variables, yet research has shown that extrafamilial factors related to school, community, and peer group also have strong influences on developmental outcomes (Youngblade et al. 2007).

In sum, this study has several unique strengths that allowed us to examine whether the relationships among trauma exposure, familial risk and protective factors, and PTSD were similar across institutionalized and non-institutionalized women of comparable demographics. The salient relationship between physical and sexual abuse and a diagnosis of PTSD, regardless of sample setting, underscores the clinical importance of identifying types of trauma exposure and subsequent mental health and substance use problems that may stem from these experiences and the need for interventions that address these relationships. Moreover, future research should explore whether a broader range of protective factors may influence developmental outcomes among women with a history of trauma, including those in the criminal justice system.

REFERENCES

- Anda, Robert, Charles L. Whitfield, Vincent J. Felitti, Daniel Chapman, Valerie J. Edwards, Shanta R. Dube, and David F. Williamson. 2002. "Adverse Childhood Experiences, Alcoholic Parents, and Later Risk of Alcoholism and Depression." *Psychiatric Services* 53:1001–1009.
- Bernat, Debra H., J. Michael Oakes, Sandra L. Pettingell, and Michael Resnick. 2012. "Risk and Direct Protective Factors for Youth Violence: Results from the National Longitudinal Study of Adolescent Health." *American Journal of Preventive Medicine* 43(2 Suppl 1): S57–66.
- Bloom, Barbara, Barbara Owen, and Stephanie S. Covington. 2003. *Gender-Responsive Strategies: Research, Practice, and Guiding Principles for Women Offenders* (NIC018017). Washington, DC: U.S. Department of Justice, National Institute of Corrections.
- Briere, John, Monica Hodges, and Natacha Godbout. 2010. "Traumatic Stress, Affect Dysregulation, and Dysfunctional Avoidance: A Structural Equation Model." *Journal of Traumatic Stress* 23:767–774.
- Brooks, Fiona M., Josefine Magnusson, Neil Spencer, and Antony Morgan. 2012. "Adolescent Multiple Risk Behaviour: An Asset Approach to the Role of Family, School and Community." *Journal of Public Health* 34(Suppl. 1):i48–i56.
- Browne, Angela, Brenda Miller, and Eugene Maguin. 1999. "Prevalence and Severity of Lifetime Physical and Sexual Victimization Among Incarcerated Women." *International Journal of Law and Psychiatry* 22(3–4):301–322.
- Carlson, Bonnie E. and Michael S. Shafer. 2010. "Traumatic Histories and Stressful Life Events of Incarcerated Parents: Childhood and Adult Trauma Histories." *The Prison Journal* 90:475–493.
- Carlson, Bonnie E., Michael S. Shafer, and David E. Duffee. 2010. "Traumatic Histories and Stressful Life Events of Incarcerated Parents II: Gender and Ethnic Differences in Substance Abuse and Service Needs." *The Prison Journal* 90:494–515.
- Chapman, Daniel P., Shanta R. Dube, and Robert F. Anda. 2007. "Adverse Childhood Events as Risk Factors for Negative Mental Health Outcomes." *Psychiatric Annals* 37(5):359–364.

- Covington, Stephanie S. 2008. *Helping Women Recover: A Program for Treating Addiction*. Rev. ed. San Francisco, CA: Jossey-Bass.
- El-Bassel, Nabila, Andre Ivanoff, Robert F. Schilling, Louisa Gilbert, and Duan-Rung Chen. 1995. "Correlates of Problem Drinking Among Drug-Using Incarcerated Women." *Addictive Behaviors* 20:359–369.
- El-Bassel, Nabila, Robert F. Schilling, Kathleen L. Irwin, Sairus Faruque, Louisa Gilbert, Jennifer Von Bargen, Yolanda Serrano, and Brian R. Edlin. 1997. "Sex Trading and Psychological Distress Among Women Recruited From the Streets of Harlem." *American Journal of Public Health* 87:66–70.
- Felitti, Vincent J., Robert F. Anda, Dale Nordenberg, David F. Williamson, Alison M. Spitz, Valerie Edwards, Mary P. Koss, and James S. Marks. 1998. "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study." *American Journal of Preventive Medicine* 14:245–258.
- Fergusson, David M., Joseph M. Boden, and L. John Horwood. 2008. "The Developmental Antecedents of Illicit Drug Use: Evidence From a 25-year Longitudinal Study." *Drug and Alcohol Dependence* 96(1–2):165–177.
- General Accounting Office. 1999. *Women in Prison: Issues and Challenges Confronting U.S. Correctional Systems* (Report No. GAO/GGD-00-22). Washington, DC: Author.
- Green, Bonnie L., Jeanne Miranda, Anahita Daroowalla, and Juned Siddique. 2005. "Trauma Exposure, Mental Health Functioning, and Program Needs of Women in Jail." *Crime and Delinquency* 51(1):133–151.
- Grella, Christine E. and Lisa Greenwell. 2007. "Treatment Needs and Completion of Community-Based Aftercare Among Substance-Abusing Women Offenders." *Women's Health Issues* 17(4):244–255.
- Grella, Christine E., Judith A. Stein, and Lisa Greenwell. 2005. "Associations Among Childhood Trauma, Adolescent Problem Behaviors, and Adverse Adult Outcomes in Substance-Abusing Women Offenders." *Psychology of Addictive Behaviors* 19(1):43–53.
- Harlow, Caroline W. 1999. *Prior Abuse Reported by Inmates and Probationers* (Bureau of Justice Statistics Selected Findings NCJ 172879). Washington, DC: U.S. Department of Justice, Office of Justice Programs.
- Hawkins, J. David, Richard F. Catalano, and Janet Y. Miller. 1992. "Risk and Protective Factors for Alcohol and Other Drug Problems in Adolescence and Early Adulthood: Implications for Substance Abuse Prevention." *Psychological Bulletin* 112:64–105.
- Heim, Christine, Jeffrey Newport, Stacey Heit, Yolanda P. Graham, Molly Wilcox, Robert Bonsall, Andrew H. Miller, and Charles B. Nemeroff. 2000. "Pituitary-Adrenal and Autonomic Responses to Stress in Women after Sexual and Physical Abuse in Childhood." *Journal of the American Medical Association* 284: 592–597.
- Hollin, Clive R. and Emma J. Palmer. 2006. "Criminogenic Need and Women Offenders: A Critique of the Literature." *Legal and Criminological Psychology* 11:179–195.
- Hutton, Heidi E., Glenn J. Treisman, Wayne R. Hunt, Marc Fishman, Newton Kendig, Anthony Swetz, and Constantine G. Lyketsos. 2001. "HIV Risk Behaviors and

- Their Relationship to Posttraumatic Stress Disorder Among Women Prisoners." *Psychiatric Services* 52:508–513.
- Jordan, B. Kathleen, William E. Schlenger, John A. Fairbank, and Juesta M. Caddell. 1996. "Prevalence of Psychiatric Disorders Among Incarcerated Women: II. Convicted Felons Entering Prison." *Archives of General Psychiatry* 53: 513–519.
- Kubiak, Sheryl P. and Cynthia L. Arfkin. 2006. "Beyond Gender Responsivity: Considering Differences Between Community Dwelling Women Involved With the Criminal Justice System and Those Involved in Treatment." *Women & Criminal Justice* 17(2/3):75–94.
- Leeies, Murdoch, Jina Pagura, Jitender Sareen, and James M. Bolton. 2010. "The Use of Alcohol and Drugs to Self-Medicate Symptoms of Posttraumatic Stress Disorder." *Depression and Anxiety* 27:731–736.
- Linehan, Marsha M. and Linda A. Dimeff. 1997. *Dialectical Behavior Therapy Manual of Treatment Interventions for Drug Abusers With Borderline Personality Disorder*. Seattle: University of Washington.
- Merikangas, Kathleen, Lisa C. Dierker, and Peter Szatmari. 1998. "Psychopathology Among Offspring of Parents With Substance Abuse and/or Anxiety Disorders: A High-Risk Study." *Journal of Child Psychology and Psychiatry* 39:711–720.
- Messina, Nena and Christine E. Grella. 2006. "Childhood Trauma and Women's Health in a California Prison Population." *American Journal of Public Health* 96:1842–1848.
- Millay, Tamara A., Veena A. Satyanarayana, Catina C. O'Leary, Robert Crecelius, and Linda B. Cottler. 2009. "Risky Business: Focus-Group Analysis of Sexual Behaviors, Drug Use and Victimization Among Incarcerated Women in St. Louis." *Journal of Urban Health* 86:810–817.
- Moloney, Katherine P., Brenda J. van den Bergh, and Lars F. Moller. 2009. "Women in Prison: The Central Issues of Gender Characteristics and Trauma History." *Public Health* 123:426–430.
- Morrissey, Joseph P., Elizabeth W. Jackson, Alan R. Ellis, Hortensia Amaro, Vivian B. Brown, and Lisa M. Najavits. 2005. "Twelve-Month Outcomes of Trauma-Informed Interventions for Women With Co-Occurring Disorders." *Psychiatric Services* 56:1213–1222.
- Mullings, Janet L., Deborah J. Hartley, and James W. Marquart. 2004. "Exploring the Relationship Between Alcohol Use, Childhood Maltreatment, and Treatment Needs Among Female Prisoners." *Substance Use and Misuse* 39(2):277–305.
- Mullings, Janet L., James W. Marquart, and Victoria E. Brewer. 2000. "Assessing the Relationship Between Child Sexual Abuse and Marginal Living Conditions on HIV/AIDS-Related Risk Behavior Among Women Prisoners." *Child Abuse and Neglect* 24:677–688.
- Najavits, Lisa M. 2002. *Seeking Safety: A Treatment Manual for PTSD and Substance Abuse*. New York, NY: Guilford Press.
- Najavits, Lisa M., Roger D. Weiss, and Sarah R. Shaw. 1997. "The Link Between Substance Abuse and Posttraumatic Stress Disorder in Women: A Research Review." *American Journal on Addictions* 6:273–283.
- Pietrzaka, Robert H., Risè B. Goldstein, Steven M. Southwica, and Bridget F. Grant. 2011. "Prevalence and Axis I Comorbidity of Full and Partial Posttraumatic

- Stress Disorder in the United States: Results From Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions." *Journal of Anxiety Disorders* 25:456–465.
- Raj, Anita, Jennifer Rose, Michele R. Decker, Cynthia Rosengard, Megan R. Hebert, Michael Stein, and Jennifer G. Clarke. 2008. "Prevalence and Patterns of Sexual Assault Across the Life Span Among Incarcerated Women." *Violence Against Women* 14:528–541.
- Repetti, Rena L., Shelley E. Taylor, and Teresa E. Seeman. 2002. "Risky Families: Family Social Environments and the Mental and Physical Health of Offspring." *Psychological Bulletin* 128:330–366.
- Roberts, Andrea L., Bryn Austin, Heather L. Corliss, Ashley K. Vander Morris, and Karestan C. Koenen. 2010. "Pervasive Trauma Exposure Among US Sexual Orientation Minority Adults and Risk of Posttraumatic Stress Disorder." *American Journal of Public Health* 100:2433–2441.
- Sale, Elizabeth, Soledad Sambrano, J. Fred Springer, and Charles W. Turner. 2003. "Risk, Protection, and Substance Use in Adolescents: A Multi-Site Model." *Journal of Drug Education* 33(1):91–105.
- Skeer, Margie, Marie C. McCormick, Sharon-Lise T. Normand, Stephen L. Buka, and Stephen E. Gilman. 2009. "A Prospective Study of Familial Conflict, Psychological Stress, and the Development of Substance Use Disorders in Adolescence." *Drug and Alcohol Dependence* 104(1–2):65–72.
- Skeer, Margie R., Marie C. McCormick, Sharon-Lise T. Normand, Matthew J. Mimiaga, Stephen L. Buka, and Stephen E. Gilman. 2011. "Gender Differences in the Association Between Family Conflict and Adolescent Substance Use Disorders." *Journal of Adolescent Health* 49(2):187–192.
- Stewart, Sherry H. and Patricia J. Conrod. 2003. "Psychosocial Models of Functional Associations Between Posttraumatic Stress Disorder and Substance Use Disorder." Pp. 57–72 in *Trauma and Substance Abuse: Causes, Consequences, and Treatment of Comorbid Disorders*, edited by P. Ouimette and P. J. Brown. Washington, DC: American Psychological Association.
- Teplin, Linda A., Karen M. Abram, and Gary M. McClelland. 1996. "Prevalence of Psychiatric Disorders Among Incarcerated Women: I. Pretrial Jail Detainees." *Archives of General Psychiatry* 53:505–512.
- Vakalahi, Halaevalu F. 2001. "Adolescent Substance Use and Family-Based Risk and Protective Factors: A Literature Review." *Journal of Drug Education* 31(1): 29–46.
- Youngblade, Lise M., Christina Theokas, John Schulenberg, Laura Curry, I-Chan Huang, and Maureen Novak. 2007. "Risk and Promotive Factors in Families, Schools, and Communities: A Contextual Model of Positive Youth Development in Adolescence." *Pediatrics* 119(Suppl. 1):S47–S53.
- Zlotnick, Caron. 1997. "Posttraumatic Stress Disorder (PTSD), PTSD Comorbidity, and Childhood Abuse Among Incarcerated Women." *Journal of Nervous and Mental Disease* 185:761–763.