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Trauma Experiences and Mental Health Among Incarcerated Women

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Objective: Female offenders have different risk factors for offending than do male offenders, and elevated rates of interpersonal victimization such as physical, emotional, and sexual abuse, and family and community violence, are common in histories of incarcerated women. We used factor analysis to examine patterns of traumatic events experienced by women in jail and explored how these patterns were associated with 4 psychiatric disorders (posttraumatic stress disorder [PTSD], major depression, bipolar disorder, and substance use disorder) observed in this sample. ***Method:*** A total of 464 women from 9 jails in 4 geographic regions in the United States comprised the sample. Women participated in diagnostic interviews to assess trauma exposure and psychiatric disorders. ***Results:*** Three factors described the observed patterns of trauma exposure: *family dysfunction* (FD), *interpersonal violence* (IPV), *and external events* (EE). Life events were analyzed as a separate group of items. FD and IPV each contributed independently to the odds of having each of the 4 mental disorders studied; significant odds ratios were in the range of 1.38–2.05. All 3 factors contributed to the diagnosis of bipolar disorder. The only diagnosis to which stressful life events made a unique contribution was to the likelihood of having PTSD. ***Conclusion:*** This work provides further support for the importance of assessing trauma exposure of women in jail, especially the family context, as well as mental health. Implementation and testing of evidence-based treatment approaches that address trauma-related distress in correctional settings are warranted.

Keywords: incarcerated women, trauma exposure, psychiatric disorders

Rates of jail incarceration among women have risen sharply in the past several years, with a dramatic increase of 31% between 2000 and 2011 (Minton, 2012). In addition, several key studies have suggested specific risk factors for girls and women entering the justice system. First, a multidisciplinary group of experts convened by the Department of Justice noted consistent findings of high rates of victimization among girls and women involved in the criminal justice system; they concluded that trauma exposure is a clear risk factor for offending for women (Zahn et al., 2010). In particular, it is clear that incarcerated women report elevated rates of interpersonal victimization such as physical, emotional, and sexual abuse, as well as family and community violence (Green, Miranda, Daroowalla, & Siddique, 2005; Lynch, Fritch & Heath, 2012; McDaniels-Wilson & Belknap, 2008).

Next, several studies have identified high incidence of mental health problems and serious mental illness in women in custody

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(James & Glaze, 2006; Steadman, Osher, Robbins, Case, & Samuels, 2009; Trestman, Ford, Zhang, & Wiesbrock, 2007) and high rates of substance dependence (James & Glaze, 2006). Not surprisingly, posttraumatic stress disorder (PTSD) is four to 10 times more prevalent among incarcerated women than in community samples (Boşgelmez, Aker, Köklük, & Ford, 2010; Green et al., 2005; Trestman et al., 2007; Wolff et al., 2011). PTSD often co-occurs with other psychiatric disorders (Browne, Miller, & Maguin, 1999; Jordan, Schlenger, Fairbank, & Caddell, 1996). A recent study of incarcerated women in a maximum-security state prison (Harner, Budescu, Gillihan, Riley, & Foa, 2015) indicated high rates of self-reported PTSD (45%) and co-occurrence of PTSD with symptoms of depression, anxiety, and personality disorders.

Given the prevalence of exposure to multiple forms of violence, along with PTSD and other mental illnesses in this population, it is important to consider whether specific types of exposure present greater risk of specific disorders. Early research in this area with a community sample by Kessler, Sonnega, Bromet, Hughes, and Nelson (1995) demonstrated that different types of trauma exposure were associated with different rates of PTSD in men and women. For example, rape was associated with very high rates of PTSD in both men and women, whereas accidents and disasters were associated with much lower rates. More recently, Krupnick, Green, Stockton, Goodman, Corcoran, and Petty (2004) compared different types of traumatic events and their relationships with different diagnostic outcomes among a large group of college women from six campuses. They found that single episode sexual assault contributed to the diagnosis of PTSD. However, experiencing multiple events contributed to lifetime major depressive disorder (MDD). *Ongoing* sexual and/or physical abuse contributed significantly to lifetime PTSD, MDD, and substance abuse, compared with no trauma, traumatic bereavement, and single episode physical assault, suggesting the potency of repeated exposure to interpersonal violence. Briere, Kaltman, and Green (2008) found a linear relationship between the number of trauma types experienced by participants before 18 and trauma-related symptom *complexity* in the screening sample of that same study; the effect remained even when controlling for specific traumatic events, suggesting a generalized effect of cumulative trauma.

These relationships between traumatic exposure and psychological outcomes have been noted in incarcerated populations as well. Wolff and Shi (2012) studied a large sample of incarcerated men and demonstrated that sexual, physical, and emotional traumatic experiences were associated with symptoms of anxiety, depression, and substance abuse, as well as having been treated for these symptoms, in nearly all cases. Lynch et al. (2012) found that experiencing multiple and chronic forms of interpersonal trauma experiences was associated with self-reported depression, PTSD, and general psychiatric distress among incarcerated women. Aday, Dye, and Kaiser (2014), in a nationally representative sample of female inmates, found that women who indicated previous sexual abuse were more likely to have been diagnosed with depression, manic depression, schizophrenia, PTSD, or other anxiety disorder, as well as to have symptoms of depression, compared with women without sexual abuse histories. Sexually abused women also reported more treatment for these conditions, as well as more chronic medical conditions. Gunter and colleagues (Gunter, Chibnall, Antoniak, McCormick, & Black, 2012) compared men and women with and without trauma exposure in state prisons, and found exposure to be significantly associated with mood disorder, anxiety disorder, psychosis, borderline personality characteristics, and marginally with substance use disorders (SUDs) as well.

Brewin, Andrews, and Valentine (2000) did a meta-analysis of 14 different risk factors for PTSD based on 77 articles comprising studies of both veteran and civilian populations. While the largest effects were associated with factors occurring during or after the trauma, trauma was not the only risk factor for these psychiatric disorders. The processing of a traumatic event takes place in the context of both individual and social/environmental factors. Individual characteristics include the person's exposure to other traumatic events, mental health history, demographic factors, genetics, and so forth. Social factors include the disruption caused by the events, the recovery environment, other nontrauma-related stressors, and resources available after an event (e.g., Brewin et al., 2000; Green, 1998).

Although experiences of domestic violence and traumatic abuse in childhood and adulthood are strong predictors of mental disorders, including PTSD, Belknap and Holsinger (2006) suggest a need to expand conceptualizations of childhood trauma in theories of girls' and women's pathways to offending. Such an expansion would not only focus on experiences of interpersonal violence, but other adverse events such as parental abandonment, parental incarceration, and parental mental illness to better understand the range of events affecting young women's entry into the criminal justice system. This suggestion also fits with increasing recognition of the impact of adverse childhood events (ACEs) and negative health outcomes in community samples (Felitti & Anda, 2009).

The multisite study presented in this paper examined the prevalence of serious mental illness (MDD, bipolar disorder, and psychotic spectrum disorders), PTSD, and SUDs among women in nine jails in four regions of the United States. We were interested in exploring pathways to jail among women with and without serious mental illness, with a specific focus on how different forms of traumatic and stressful life experiences were associated with mental health and crime-related behavior. In earlier papers, we reported very high rates of lifetime PTSD in the sample (53%), with high comorbidity (Lynch et al., 2014), noted relationships between trauma exposure and later criminal behavior (DeHart, Lynch, Belknap, Dass-Brailsford, & Green, 2014), and risk factors for the high comorbidity of serious mental illness with SUDs (Nowotny, Belknap, Lynch, & DeHart, 2014). In this report, we conducted a detailed examination of the patterns of traumatic events experienced by women in jail and how these patterns were associated with major psychiatric disorders observed in the sample.

Previous studies of the relationships between trauma and mental health in corrections samples have usually focused on specific types of traumatic experience (e.g., childhood sexual abuse), not addressing interactions among various traumas or cumulative effects of multiple trauma types. In addition, the impact of nontraumatic but stressful life events on mental illness has been understudied in combination with trauma experiences. Here we conduct trauma patterns analysis to explore the extent to which each trauma factor contributes, over and above the demographic factors and the other trauma factors, to the prevalence of lifetime disorders of PTSD, MDD, bipolar disorder, and SUDs. We also examine

whether stressful life events make an additional contribution. This type of analysis may better reflect the relationships among cumulative trauma history, stressful life events, and psychiatric outcomes. Because few studies have examined trauma patterns this way, especially in this population, we did not have formal hypotheses. However, we expected that compared to noninterpersonal trauma types, interpersonal trauma events would make the strongest contribution to each psychiatric disorder (e.g., Breslau, Peterson, Poisson, Schultz, & Lucia, 2004). We were unsure whether recent life events would play a unique role once the analysis accounted for these other variables.

Method

Participants

A total of 491 women in nine different jails located in Colorado, Idaho, South Carolina, and metropolitan Washington DC (Maryland and Virginia) completed interviews. There were no significant differences by age or type of crime between participants and individuals who declined. Participants who declined to participate ($N = 142$; 22%) differed significantly by ethnicity, with American Indians declining at higher rates than the other ethnic groups (e.g., White/Caucasian, African American/Black, and Latina). Participation also varied by type of compensation offered, with women who either received a contribution to their canteen fund or a candy bar/snack accepting at higher rates, compared to women in jails where compensation was limited to a donation to a general fund (e.g., to purchase books). Fifteen women were excluded due to threat of violence, acute distress at the time of the invitation to interview, or local institutional review board (IRB) restrictions (Lynch et al., 2014). Of the 491 women interviewed, those with 3 or more missing values in the set of trauma variables ($n = 27$) were excluded from the analysis, resulting in a final sample size of 464 for this paper.

This sample of 464 women ranged in age from 17 to 62, with an average age of 35 ($SD = 11$). About three-quarters (77%) had children (Table 1). Prior to their incarceration, 33% were employed full time, 12% part-time, and 7% indicated they received Social Security Income (SSI)/disability support; 46% had been unemployed. Approximately a quarter (29%) reported some high school, 35% had completed high school, and 37% attended at least some college. Women identified as White/Caucasian (37%), African American/Black (38%), Latina (16%), and other racial identities (10%). Nearly half were single (48%), 30% were married or living with a partner, and 17% were divorced or widowed. One quarter of the women (25%) were first time offenders. Violent crimes constituted 9% of the offenses, while 33% were drug-related.

Table 1
Basic Demographic Characteristics of the Participants ($N = 464$)

Demographics	*N* (percentage of participants)
Age	35 (11)[a]
Income over last 12 mos. ($N = 399$)	20,316 (52,184)[a]
Income over last 12 mos. ($N = 399$)	15,000 (0–1million)[b]
Ethnicity	
African American	175 (38)
White	171 (37)
Hispanic	72 (16)
Other	46 (10)
Region	
Colorado	184 (40)
DC Metropolitan area	90 (19)
Idaho	108 (23)
South Carolina	81 (18)
Education	
<High school	134 (29)
High school	160 (35)
Some college	135 (29)
College or higher	35 (8)
Have children	357 (77)
Lifetime major depressive disorder	131 (28)
Lifetime posttraumatic stress disorder	248 (54)
Lifetime bipolar disorder	67 (14)
Alcohol abuse/dependence	300 (65)
Drug abuse/dependence	319 (69)
≥1 mental health disorder (range = 1–4)	311 (67)
≥1 substance abuse disorder (drug or alcohol)	385 (83)

[a] *M* (*SD*). [b] median (range).

Measures

The semistructured interview included sociodemographic data (age, education, income, race/ethnicity), a psychiatric diagnostic interview, and incarceration-related factors (e.g., current charges, number of prior incarcerations), in addition to detailed questions about trauma history. An American Translators Association-certified translator translated the interview into Spanish for Spanish-speaking participants, and local bilingual and bicultural interviewers who had worked with local populations made minor refinements to the interview for cultural suitability (e.g., Central American immigrants). Only five women chose to have the interview conducted in Spanish.

The *Composite International Diagnostic Interview* (CIDI) is a structured interview protocol assessing lifetime and 12-month occurrence of psychiatric disorders mapping to *International Classification of Diseases, 10th revision* (ICD-10) and Diagnostic and Statistical Manual of Mental Disorders (4th ed., *DSM–IV*) diagnostic criteria. We screened participants for MDD and bipolar disorder with the CIDI screening items; participants who screened positive completed the entire respective modules. The PTSD, illegal substance, and alcohol use modules were administered to all participants.

Trauma and stressful life event exposure were assessed through 46 items that asked participants whether they had experienced different types of trauma or adverse events (yes/no responses). These 46 items were derived and modified from four different scales. We included seven items from the CIDI that normally precede the PTSD assessment and qualify as Criterion A events (e.g., "Were you ever kidnapped or held captive?"). Thirty-one items were added from the Life Stressor Checklist-Revised (Wolfe & Kimerling, 1997), which comprised 20 trauma exposure items (e.g., "After age 16, did you ever see violence between family members?") and 11 adverse events items (e.g., "Did your parents ever separate or divorce while you were living with them?). We differentiated incidence of childhood trauma from adult trauma exposure for some items (e.g. physical and sexual abuse). Two items from the Turner and associates' adversity scale (Turner et

al., 2006) captured caregivers' major illnesses and alcohol/drug problems (e.g., "Has there ever been a time that a family member drank or used drugs so often that it caused problems?"). Finally, we included six items based on frequent experiences reported by female juvenile offenders in previous qualitative work by one of the authors, for example, "Before age 16, was there ever a time that your parent or caregiver asked you or told you to steal something?" (DeHart, 2008).

Procedures

For detailed study procedures see the article by Lynch and colleagues (2014). Inmate names and charges were obtained from participating facilities and updated regularly. Offenders were randomly selected, and invited to participate in a study of women's pathways to jail, mental health, and life experiences. They were selected either using simple randomization by computer generation, or in an unbiased manner (e.g., every fifth offender, depending upon jail census) after a random start. Informed consent and interviews were completed in a private room at the jail. Participants received incentives (e.g., $10, snacks, general fund donation), depending upon specific jail and IRB policies. Duration of the interviews ranged from one to six hours ($M = 1.95$, $SD = .91$). Interviewers were clinical psychology and sociology graduate students, project coordinators with extensive research interviewing experience, a physician retooling for a family medicine residency, and project faculty with extensive experience in conducting interviews of clinical and/or incarcerated populations. All interviewers received extensive training in general interviewing techniques, and in the CIDI, which is designed for use by trained nonclinician interviewers. Interviewers began by reviewing a training DVD on the CITI developed for this project and discussed all aspects of the interview. They then observed experienced investigators conducting interviews, followed by conducting the interviews themselves with an experienced investigator present. Interviewers were not permitted to interview alone until the experienced investigators deemed them sufficiently prepared. We held regular supervision meetings to assure standardization within and across sites. IRB approval was obtained for each site from the associated universities and from community/state IRBs as appropriate.

Statistical Analysis

Stata/IC 11.0 for Windows (StataCorp LP, College Station, TX) was used to conduct all analyses. A total of 34 out of 46 trauma/stressor items were the pool for the trauma factors. Four items were dropped from further analysis, one because of very low frequency ($n = 3$), and three because of loadings below .2 on any factor in a preliminary analysis. Eight of the 46 items were preselected as representing *Life Events* that were not deemed to be trauma (e.g., serious money problems, caring for a disabled person), but that might be expected to contribute to psychiatric difficulties. The sum of the positive responses to these items was computed to create the "Life Events" variable and assigned to one of three categories, where 1 indicated 0–2 events, 2 indicated 3–5 events and 3 indicated 6–8 events.

Associations among trauma patterns, psychiatric disorders, and demographic and lifestyle variables were examined across tertiles of each factor using means ± *SD*s for continuous variables or frequencies (percentages) for categorical variables. The first tertile represents participants with the lowest score on a given pattern; the third tertile represents those with the highest scores. Bivariate relationships were evaluated using χ^2 tests for categorical variables and a nonparametric trend test by the tertiles of each trauma pattern ("nptrend" in Stata), an extension of the Wilcoxon's rank sum test for trends across ordered groups. Relationships between psychiatric outcomes and trauma factors plus life events were examined using multivariate logistic regression models adjusted for demographic characteristics and hierarchical (mixed-effect) models for binary outcomes with random effects at the regional level. A p value of $<.05$ was deemed statistically significant. Area under the curve (AUC) is also reported.

Results

Baseline demographic characteristics are presented as means and standard deviations for continuous variables and as frequencies and percentages for categorical variables. Participants' responses indicated a high prevalence of several disorders in the sample. First, 67% of the women had at least one lifetime mental disorder and 83% had at least one SUD (Table 1). Rates for the most common diagnoses examined in this paper included: lifetime MDD (28%), lifetime PTSD (54%), and bipolar disorder (14%).

There were no significant differences in serious mental illness, PTSD, or SUDs among participants in rural and urban locations. There were also few differences among individuals in different jails within the same regions. We did find significant regional differences, with participants in the metropolitan D.C. area (i.e., jails in Virginia and Maryland) meeting criteria for serious mental illness significantly less frequently than those in Idaho and Colorado. Idaho participants also met criteria for PTSD and an SUD more often than participants in the metropolitan D.C. area. These findings are consistent with findings from other studies that show similar differences in mental illnesses by state (Substance Abuse and Mental Health Services Administration, 2011).

Trauma Factors

Factor analysis was applied to the 34 trauma items, using the principal component factoring method (Stata, 2005) to compute a factor score for each trauma factor. Factors were rotated by an orthogonal transformation method (Varimax) to achieve a simpler structure with greater interpretability. The number of factors to be retained was decided by applying the Kaiser-Guttman rule (eigenvalue >1) and evaluating the scree plot. Three factors with an eigenvalue >1 were retained as the final solution. Total variance explained was 81%. The first factor accounted for 57% of the variance, with the remaining two factors accounting for 14% and 10%. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.83. KMO takes values between 0 and 1; small values mean that overall the variables have too little in common to warrant a factor analysis. According to KMO classification, 0.83 indicates that the factor analysis was appropriate for the 34 items.

The rotated factor loadings for the 34 trauma items appear in Table 2. One item loaded approximately equally on two factors; we chose the factor that seemed to fit the item best (i.e., other

Table 2
Rotated Factor Loadings

Trauma items	$N = 464$	Family dysfunction	Interpersonal violence	External events
Combat experience	9	−.033	−.017	**.212**
Civilian in region of terror	9	.109	−.046	**.265**
Witnessed atrocities	29	.138	.069	**.417**
Toxic chemical exposure	54	.108	.106	**.312**
Been in serious disaster	107	.071	.144	**.302**
Seen a serious accident	235	.171	.151	**.398**
Seen robbery, mugging, or attack (pre-16)	110	.274	.032	**.475**
Seen robbery, mugging, or attack (post-16)	195	.129	.186	**.542**
Had a serious accident	217	.074	.190	**.204**
Been robbed, mugged, or attacked	174	.042	.311	**.411**
Kidnapped	90	.071	**.431**	.216
Life-threatening illness	124	.038	**.208**	.160
Separated from child	202	.223	**.289**	.014
Abused or attacked by date (pre-16)	87	.266	**.302**	.041
Abused or attacked by date (post-16)	310	.211	**.332**	.084
Sexual touch (pre-16)	195	.251	**.560**	.110
Sexual touch (post-16)	137	.034	**.641**	.051
Sex due to force or threat of force (pre-16)	142	.199	**.568**	.090
Sex due to force or threat of force (post-16)	192	.025	**.679**	.055
Caregiver sells you sexually (pre-16)	15	.214	**.263**	.063
Family member sent to jail	336	**.458**	−.087	.070
Foster care or adoption	159	**.384**	.214	−.008
Emotion abuse/neglect (pre-16)	232	**.449**	.444	.070
Physical neglect (pre-16)	119	**.440**	.335	.159
Seen family violence (pre-16)	300	**.627**	.112	.081
Seen family violence (post-16)	196	**.499**	.107	.204
Abused or attacked by family (pre-16)	187	**.465**	.372	.090
Abused or attacked by family (post-16)	105	**.371**	.317	.150
Family drinking or drug abuse	283	**.517**	.080	.074
Caregiver gave you alcohol (pre-16)	140	**.454**	.155	.162
Caregiver gave you drugs (pre-16)	62	**.415**	.149	.244
Caregiver asked you to sell drugs (pre-16)	18	**.326**	.126	.241
Caregiver asked you to steal (pre-16)	23	**.298**	.179	.231
Family received financial assistance	247	**.422**	.032	−.033

Note. Items on their respective factors are in boldface. Life events (LE) items: parents separated/divorced; self separated or divorced; serious money problems, abortion; child with disability; caring for disabled person; someone died naturally; harassed.

similar items). For our analyses, *Factor 1* (Cronbach's alpha = .81) was labeled *Family Dysfunction* (FD; violence among family members, family drinking or drug abuse, family gave subject drugs before age 16, etc.). *Factor 2* ($\alpha = .73$) was labeled *Interpersonal Violence* (IPV; directly experienced violence like rape or kidnapping). *Factor 3* ($\alpha = .63$) was labeled *External Events* (EE; witnessed violence, atrocities, etc.). These factors were divided into tertiles for the remaining analyses to categorize participants into ordered groups. Life events were analyzed as a separate group of items. Twenty-five percent of women endorsed fewer than two life events, 63% reported three to five events, and 12% reported six to eight events. There was a consistent and significant "dose-response" relationship between each trauma category and diagnosis. Those with the highest "dose" of any particular trauma factor were more likely to have the particular lifetime diagnosis. For example, 54% of the women in the full sample had a lifetime diagnosis of PTSD. However, within the highest tertile of FD, 67% had the diagnosis, and within the highest tertile of IPV, 75% had the diagnosis.

Trauma Factors and Mental Health

Table 3 shows the final mixed effect regression models with all variables in the equation, so that the unique contribution of each trauma factor and life events could be determined, taking into account the demographic factors and correlation among the participants who were in the same region. Being married or cohabiting and having children did not contribute significantly to any of the psychiatric disorders in the multivariate model. In all cases, when the trauma factors contributed significantly to the odds of the diagnoses, more trauma exposure was associated with a higher likelihood of having the diagnosis.

For lifetime *MDD* (present in 28% of the sample), being older, Latina, White, or other (compared with Black), was associated with the diagnosis. After accounting for these variables, both IPV and FD were associated with MDD, with a total AUC for all variables of .71.

In the associations with *PTSD* (54% of sample), neither age nor ethnicity affected the odds of the diagnosis, but those with lower education were *less* likely to have PTSD, while those who had

Table 3
Mixed-Effect Models for Binary Outcomes With All Trauma Factors (Adjusted for Demographics and Within-Site Correlation)

Variable	Odds ratio (95% confidence interval)			
	Depression	Posttraumatic stress disorder	Bipolar	Substance abuse
Demographics				
Age	1.04 (1.02–1.07)**	.98 (.96–1.01)	1.00 (.97–1.04)	1.03 (1.00–1.06)*
Race[a]	1.00	1.00	1.00	1.00
Hispanic	1.70 (.82–3.51)	.78 (.39–.53)	.57 (.18–1.87)	1.20 (.53–2.71)
Other	3.26 (1.46–7.24)**	1.19 (.53–2.65)	2.32 (.95–5.67)	2.13 (.69–6.63)
White	1.46 (.78–2.73)	1.14 (.65–2.02)	1.56 (.77–3.16)	1.84 (.81–4.16)
<HS education	.71 (.42–1.21)	.65 (.40–1.04)	.07 (.02–.30)**	.97 (.54–1.71)
FTE/PTE	.89 (.57–1.40)	.61 (.40–.93)*	.66 (.37–1.19)	.55 (.32–.93)*
Married/co-habit	.93 (.57–1.50)	.95 (.60–1.50)	1.04 (.56–1.93)	1.29 (.71–2.35)
Have children	1.18 (.65–2.14)	1.06 (.63–1.78)	1.07 (.52–2.21)	.73 (.38–1.41)
Trauma Factors				
FD	1.42 (1.04–1.92)*	1.45 (1.10–1.91)**	1.69 (1.13–2.53)**	1.47 (1.03–2.10)*
IPV	1.38 (1.03–1.85)*	2.05 (1.55–2.70)**	1.67 (1.13–2.47)**	1.65 (1.15–2.36)**
EE	1.11 (.84–1.47)	1.17 (.89–1.53)	1.57 (1.09–2.26)*	1.24 (.88–1.76)
LE	1.37 (.89–2.11)	1.61 (1.07–2.43)*	.89 (.52–1.52)	1.09 (.65–1.83)
AUC	.71	.75	.80	.72

Note. FTE/PTE = full-time/part-time employment; FD = family dysfunction; IPV = interpersonal violence; EE = external trauma events; LE = life events; AUC = area under the curve (based on logistic regression models for the same set of variablesConfidence intervals are at the 95% level.
[a] In relation to African American racial group.
* Significant at $p < .05$. ** Significant at $p < .01$.

been employed were *more* likely. Again, as for MDD, both IPV and FD independently contributed to having the diagnosis. Life Events score was independently associated with PTSD as well. AUC for PTSD was .75.

Bipolar disorder was the least common disorder, 14% of the sample. Those with less than a high school education were *less* likely to have bipolar disorder. All three trauma factors contributed uniquely to the odds of bipolar disorder—FD, IPV, and EE—with AUC being .80.

Finally, for SUD, the most common diagnosis (83%), being older and not employed prior to incarceration contributed to the odds of meeting SUD criteria. Both IPV and FD contributed significantly as well, with more exposure associated with higher odds of the SUD diagnosis. AUC for SUD was 0.72.

To summarize *across* disorders, FD and IPV each contributed *independently* to the odds of having each of the four mental disorders studied; significant odds ratios were in the range of 1.38–2.05. EE contributed significantly to three of the four diagnoses (not to MDD) when it was entered *separately*, as expected. However, with all of the trauma factors and life events in the equation, EE contributed further only to the odds of having a bipolar diagnosis. The only diagnosis to which stressful life events contributed independently was to the odds of having PTSD. While these findings provide useful information about the unique contribution of the various types of trauma to the diagnoses in this sample, it is also important to note that the area under the curve, a measure of statistical prediction accuracy for logistic regression, was only in the moderate range, ranging from .71 to .80. Thus, other factors also contributed to this sample of incarcerated women having these diagnoses.

Discussion

This report grows out of a multisite study examining women's pathways to jail, with an emphasis on examining intersections among trauma, PTSD, and serious mental disorders. The present report examined a wide array of adverse experiences that could put women at risk for mental disorders. We utilized factor analyses to create categories of types of events that were used to examine associations with lifetime history of specific disorders, and we also included additional adverse life events. The IPV and FD factors were strong and independent contributors to each mental disorder studied. EE was associated with bipolar disorder, and nontraumatic life events independently contributed to having PTSD. Our strategy in grouping commonly studied events into conceptually and statistically coherent patterns to further understand influences on development of psychopathology in this and potentially other populations at risk, was therefore useful.

The more "external" events were the least potent of the three factors, independently contributing only to bipolar disorder. However, this event type, which appears to describe mostly being in dangerous places or situations, *was* associated with the outcomes when entered separately; it should therefore not be seen as unimportant in its contribution to mental health. The FD factor is less likely to be assessed in typical trauma/PTSD studies, but it was strongly associated with developing a mental disorder. Even controlling for demographic factors, both IPV and FD were significantly associated with each disorder studied, suggesting that the family context should be more often assessed and included in studies of at risk populations (Belknap & Holsinger, 2006). Treatments that solely target symptom improvement may not be sufficient to address women's distress. The range of adverse experi-

ences and family dysfunction suggest the need to identify and test interventions that would address skill deficits and vulnerabilities created by the variety of adverse experiences as well.

We found a "dose-response" relationship between the exposure variables and the mental disorders, consistent with the association between trauma severity and PTSD and other diagnoses in the general population (e.g., Breslau et al., 2004; Kessler et al., 1995; Kilpatrick, Ruggiero, Acierno, Saunders, Resnick, & Best, 2003; Krupnick et al., 2004), as well as incarcerated populations (Aday et al., 2014; Gunter et al., 2012; Lynch et al., 2012; Wolff & Shi, 2012). We did not expect that bipolar disorder would be associated with *all three* of the trauma factors. While bipolar disorder has a strong genetic/familial component (e.g., Kelsoe, 2003), recent work shows that individuals with bipolar disorder have relatively high levels of traumatic exposure (Etain, Henry, Bellivier, Mathieu, & Leboyer, 2008). Trauma may influence the *manifestation* of bipolar disorder, a gene-environment interaction, and thus may be an important environmental factor to be studied in this regard (Etain et al., 2008).

PTSD was the only diagnosis independently associated with adverse life events. A meta-analysis of risk factors for PTSD (Brewin et al., 2000) found that life stress following exposure to trauma was associated with PTSD across multiple samples. Maes, Mylle, Delmeire, and Janca (2001) showed a similar effect of accumulated life events following two human-made traumas (fire and motor vehicle accidents), with both the number and severity of events contributing to PTSD. Pietrzak and colleagues (2013) found that life events were associated with the development and course of PTSD, including a chronic course, in older survivors of large-scale disasters. These events may serve as irritants, reminders, or additional stressors that exacerbate or prolong illness course.

There are several limitations of the study. We did not conduct a diagnostic interview for personality disorders and it is likely that some of the women had these disorders (Trestman et al., 2007). We examined each disorder separately rather than in combination, even though comorbidity was high in the sample (Lynch et al., 2014). The study also relies on retrospective accounts of trauma. While the overall findings are similar to other studies, and the reporting of trauma did not have any benefit to the women, it is possible they could have exaggerated these events. Conversely, they may have underreported events because they had difficulty remembering or reporting all past events in their lives, or because the face-to-face format may have been experienced as stigmatizing. The results may not generalize to women in other corrections settings like prisons, although findings from a recent study of women in a maximum-security facility were consistent with our findings (Harner et al., 2015). While incarcerated men have trauma as well (Gunter et al., 2012; Wolff & Shi, 2012), their pathways to offending are likely to be different from those of women (Brennan, Breitenbach, Dieterich, Salisbury, & Van Voorhis, 2012; DeHart & Lynch, 2012).

It is difficult to know the impact of using multiple interviewers across the different sites, with different clinical and nonclinical backgrounds. We were also not able to do formal reliability studies. We chose the CIDI because it is designed for lay interviewers and requires little clinical judgment. This format likely partially compensated for multiple interviewers, along with the training and ongoing supervision. The differences in how the jails allowed compensation affected participation rates (although these were not region specific; Lynch et al., 2014). American Indian women participated at lower rates than other ethnic groups, thus our findings may not apply to this group.

The levels of association in this study were only moderate. Much of the variance remained unexplained, suggesting that other risk and protective factors are at play. For example, we did not measure social support and internal resources that may have helped women cope with trauma. Nevertheless, given the relatively high prevalence of these diagnoses, and the fact that they overlapped to some extent, the associations are noteworthy.

Clearly, the lifetime and particularly current disorders among the women suggest that evaluation/assessment of disorders is needed, along with appropriate treatment. As Trestman and colleagues (2007) pointed out, many of these disorders are unrecognized, and by extension, untreated. Notably, some programs are beginning to acknowledge the high levels of trauma among incarcerated women, and the need to address this, both during and after incarceration. For example, Welle, Falkin, and Jainchill (1998) described programs in jails, prisons and community outreach programs that addressed the victimization of female offenders. Such programs recognize that because punishment and abuse are lifelong experiences for many women in jail, verbal abuse, physical force, and body searches on the part of staff are likely to trigger emotional reactions that may lead to negative encounters and limit a woman's willingness to participate in programs and treatment (Moloney, van den Bergh, & Moller, 2009).

The effectiveness of interventions for trauma-related psychiatric disorders is also beginning to be tested. A recent study by Ford, Chang, Levine, and Zhang (2013) tested a new intervention focused on trauma, PTSD, and affect dysregulation (TARGET) among incarcerated women and found it to be effective in decreasing PTSD symptoms, as was a trauma-focused supportive group intervention that was also tested. Lynch, Heath, Matthews, and Cepeda (2012) and Wolff, Frueh, Shi, and Schumann (2012) demonstrated the feasibility and the effectiveness of a Seeking Safety intervention for PTSD and SUD for incarcerated women. More such studies are needed. Increasingly, trauma-focused education and treatment are seen not only as important, but also as a *right* of women in jail/prison, although more often at the federal rather than at the local level (Moloney & Moller, 2009). Because these programs address some of the reasons for substance abuse and criminal activity, they are more likely to influence future behavior, and potentially to help break the cycle of violence (Greene, Haney, & Hurtado, 2000; Gunter et al., 2012; Moloney et al., 2009; Welle et al., 1998).

Conclusion

Rates of trauma exposure and psychiatric disorders are high among women in jail. Our larger study replicated this finding, as well as the link between trauma and psychiatric outcomes in this population. In the current analysis, our approach to examining a diverse range of such events, identifying clusters/patterns that cohere statistically and rationally, and exploring their separate and unique contribution to psychiatric outcomes, adds to our general knowledge of women's pathways to offending/incarceration, and supports a broader view of trauma within this female population, to include family variables that are not usually assessed (Belknap & Holsinger, 2006; Felitti & Anda, 2009). This work supports the

importance of continuing to develop treatment approaches that address trauma, the role of family dysfunction, and other adverse life events in women's pathways to jail.

References

Aday, R. H., Dye, M. H., & Kaiser, A. K. (2014). Examining the traumatic effects of sexual victimization on the health of incarcerated women. *Women & Criminal Justice, 24,* 341–361. http://dx.doi.org/10.1080/08974454.2014.909758

Belknap, J., & Holsinger, K. (2006). The gendered nature of risk factors for delinquency. *Feminist Criminology, 1,* 48–71. http://dx.doi.org/10.1177/1557085105282897

Boşgelmez, S., Aker, T., Köklük, Ö. A., & Ford, J. D. (2010). Assessment of lifetime history of exposure to traumatic stressors by incarcerated adults with the Turkish version of the Traumatic Events Screening Instrument for Adults (TESI-A): A pilot study. *Journal of Trauma & Dissociation, 11,* 407–423. http://dx.doi.org/10.1080/15299731003783212

Brennan, T., Breitenbach, M., Dieterich, W., Salisbury, E. J., & Van Voorhis, P. (2012). Women's pathways to serious and habitual crime: A person-centered analysis incorporating gender responsive factors. *Criminal Justice and Behavior, 39,* 1481–1508. http://dx.doi.org/10.1177/0093854812456777

Breslau, N., Peterson, E. L., Poisson, L. M., Schultz, L. R., & Lucia, V. C. (2004). Estimating post-traumatic stress disorder in the community: Lifetime perspective and the impact of typical traumatic events. *Psychological Medicine, 34,* 889–898. http://dx.doi.org/10.1017/S0033291703001612

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68,* 748–766. http://dx.doi.org/10.1037/0022-006X.68.5.748

Briere, J., Kaltman, S., & Green, B. L. (2008). Accumulated childhood trauma and symptom complexity. *Journal of Traumatic Stress, 21,* 223–226. http://dx.doi.org/10.1002/jts.20317

Browne, A., Miller, B., & Maguin, E. (1999). Prevalence and severity of lifetime physical and sexual victimization among incarcerated women. *International Journal of Law and Psychiatry, 22,* 301–322. http://dx.doi.org/10.1016/S0160-2527(99)00011-4

DeHart, D. D. (2008). Pathways to prison: Impact of victimization in the lives of incarcerated women. *Violence Against Women, 14,* 1362–1381. http://dx.doi.org/10.1177/1077801208327018

DeHart, D., & Lynch, S. (2012). Gendered pathways to crime: The relationship between victimization and offending. In C. Renzetti, S. Miller, & A. Gover (Eds.), *Handbook of gender and crime studies* (pp. 120–133). New York, NY: Routledge. http://dx.doi.org/10.4324/9780203832516.ch6

DeHart, D., Lynch, S., Belknap, J., Dass-Brailsford, P., & Green, B. (2014). Life history models of female offending: The roles of serious mental illness and trauma in women's pathways to jail. *Psychology of Women Quarterly, 38,* 138–151. http://dx.doi.org/10.1177/0361684313494357

Etain, B., Henry, C., Bellivier, F., Mathieu, F., & Leboyer, M. (2008). Beyond genetics: Childhood affective trauma in bipolar disorder. *Bipolar Disorders, 10,* 867–876. http://dx.doi.org/10.1111/j.1399-5618.2008.00635.x

Felitti, V., & Anda, R. (2009). The relationship of adverse childhood experiences to adult medical disease, psychiatric disorders, and sexual behavior: Implications for healthcare. In R. Lanius & E. Vermetten (Eds.), *The hidden epidemic: The impact of early life trauma on health and disease* (pp. 1–18). Cambridge, MA: Cambridge University Press.

Ford, J. D., Chang, R., Levine, J., & Zhang, W. (2013). Randomized clinical trial comparing affect regulation and supportive group therapies for victimization-related PTSD with incarcerated women. *Behavior Therapy, 44,* 262–276. http://dx.doi.org/10.1016/j.beth.2012.10.003

Green, B. L. (1998). Psychological responses to disasters: Conceptualization and identification of high-risk survivors. *Psychiatry and Clinical Neurosciences, 52* (Suppl.), 567–573. http://dx.doi.org/10.1046/j.1440-1819.1998.0520s5S67.x

Green, B. L., Miranda, J., Daroowalla, A., & Siddique, J. (2005). Trauma exposure, mental health functioning and program needs of women in jail. *Crime & Delinquency, 51,* 133–151. http://dx.doi.org/10.1177/0011128704267477

Greene, S., Haney, C., & Hurtado, A. (2000). Cycles of pain: Risk factors in the lives of incarcerated mothers and their children. *The Prison Journal, 80,* 3–23. http://dx.doi.org/10.1177/0032885500080001001

Gunter, T. D., Chibnall, J. T., Antoniak, S. K., McCormick, B., & Black, D. W. (2012). Relative contributions of gender and traumatic life experience to the prediction of mental disorders in a sample of incarcerated offenders. *Behavioral Sciences & the Law, 30,* 615–630. http://dx.doi.org/10.1002/bsl.2037

Harner, H. M., Budescu, M., Gillihan, S. J., Riley, S., & Foa, E. B. (2015). Posttraumatic stress disorder in incarcerated women: A call for evidence-based treatment. *Psychological Trauma: Theory, Research, Practice, and Policy, 7,* 58–66. http://dx.doi.org/10.1037/a0032508

James, D., & Glaze, L. (2006). *Mental health problems of prison and jail inmates. Bureau of Justice Statistics Special Report*. Washington, DC: United States Department of Justice.

Jordan, B. K., Schlenger, W. E., Fairbank, J. A., & Caddell, J. M. (1996). Prevalence of psychiatric disorders among incarcerated women. II. Convicted felons entering prison. *Archives of General Psychiatry, 53,* 513–519. http://dx.doi.org/10.1001/archpsyc.1996.01830060057008

Kelsoe, J. R. (2003). Arguments for the genetic basis of the bipolar spectrum. *Journal of Affective Disorders, 73,* 183–197. http://dx.doi.org/10.1016/S0165-0327(02)00323-3

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52,* 1048–1060. http://dx.doi.org/10.1001/archpsyc.1995.03950240066012

Kilpatrick, D. G., Ruggiero, K. J., Acierno, R., Saunders, B. E., Resnick, H. S., & Best, C. L. (2003). Violence and risk of PTSD, major depression, substance abuse/dependence, and comorbidity: Results from the National Survey of Adolescents. *Journal of Consulting and Clinical Psychology, 71,* 692–700.

Krupnick, J. L., Green, B. L., Stockton, P., Goodman, L., Corcoran, C., & Petty, R. (2004). Mental health effects of adolescent trauma exposure in a female college sample: Exploring differential outcomes based on experiences of unique trauma types and dimensions. *Psychiatry: Interpersonal and Biological Processes, 67,* 264–279. http://dx.doi.org/10.1521/psyc.67.3.264.48986

Lynch, S. M., Dehart, D. D., Belknap, J. E., Green, B. L., Dass-Brailsford, P., Johnson, K. A., & Whalley, E. (2014). A multisite study of the prevalence of serious mental illness, PTSD, and substance use disorders of women in jail. *Psychiatric Services, 65,* 670–674. http://dx.doi.org/10.1176/appi.ps.201300172

Lynch, S., Fritch, A., & Heath, N. (2012). Looking beneath the surface: The nature of incarcerated women's experiences of interpersonal violence, treatment needs, and mental health. *Feminist Criminology, 7,* 381–400. http://dx.doi.org/10.1177/1557085112439224

Lynch, S. M., Heath, N. M., Mathews, K. C., & Cepeda, G. J. (2012). Seeking safety: An intervention for trauma-exposed incarcerated women? *Journal of Trauma & Dissociation, 13,* 88–101. http://dx.doi.org/10.1080/15299732.2011.608780

Maes, M., Mylle, J., Delmeire, L., & Janca, A. (2001). Pre- and post-disaster negative life events in relation to the incidence and severity of post-traumatic stress disorder. *Psychiatry Research, 105,* 1–12. http://dx.doi.org/10.1016/S0165-1781(01)00325-0

McDaniels-Wilson, C., & Belknap, J. (2008). The extensive sexual violation and sexual abuse histories of incarcerated women. *Violence Against Women, 14,* 1090–1127. http://dx.doi.org/10.1177/1077801208323160

Minton, T. D. (2012). *Jail inmates at midyear 2011—Statistical tables*. Washington, DC: United States Department of Justice.

Moloney, K. P., & Moller, L. F. (2009). Good practice for mental health programming for women in prison: Reframing the parameters. *Public Health, 123,* 431–433. http://dx.doi.org/10.1016/j.puhe.2009.04.007

Moloney, K. P., van den Bergh, B. J., & Moller, L. F. (2009). Women in prison: The central issues of gender characteristics and trauma history. *Public Health, 123,* 426–430. http://dx.doi.org/10.1016/j.puhe.2009.04.002

Nowotny, K. M., Belknap, J., Lynch, S., & DeHart, D. (2014). Risk profile and treatment needs of women in jail with co-occurring serious mental illness and substance use disorders. *Women & Health, 54,* 781–795. http://dx.doi.org/10.1080/03630242.2014.932892

Pietrzak, R. H., Van Ness, P. H., Fried, T. R., Galea, S., & Norris, F. H. (2013). Trajectories of posttraumatic stress symptomatology in older persons affected by a large-magnitude disaster. *Journal of Psychiatric Research, 47,* 520–526. http://dx.doi.org/10.1016/j.jpsychires.2012.12.005

Stata. (2005). *Stata multivariate statistics reference manual*. College Station, TX: Stata Press Publication.

Steadman, H. J., Osher, F. C., Robbins, P. C., Case, B., & Samuels, S. (2009). Prevalence of serious mental illness among jail inmates. *Psychiatric Services, 60,* 761–765. http://dx.doi.org/10.1176/ps.2009.60.6.761

Substance Abuse and Mental Health Services Administration. (2011). *The NSDUH Report: State estimates of adult mental illness*. Rockville, MD: Author.

Trestman, R. L., Ford, J., Zhang, W., & Wiesbrock, V. (2007). Current and lifetime psychiatric illness among inmates not identified as acutely mentally ill at intake in Connecticut's jails. *Journal of the American Academy of Psychiatry and the Law, 35,* 490–500.

Turner, H. A., Finkelhor, D., & Ormrod, R. (2006). The effect of lifetime victimization on the mental health of children and adolescents. *Social Science & Medicine, 62,* 13–27. http://dx.doi.org/10.1016/j.socscimed.2005.05.030

Welle, D., Falkin, G. P., & Jainchill, N. (1998). Current approaches to drug treatment for women offenders. Project WORTH. Women's Options for Recovery, Treatment, and Health. *Journal of Substance Abuse Treatment, 15,* 151–163. http://dx.doi.org/10.1016/S0740-5472(97)00135-9

Wolfe, J., & Kimerling, R. (1997). Gender issues in the assessment of posttraumatic stress disorder. In J. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 192–238). New York, NY: Guilford Press.

Wolff, N., Frueh, B. C., Shi, J., Gerardi, D., Fabrikant, N., & Schumann, B. E. (2011). Trauma exposure and mental health characteristics of incarcerated females self-referred to specialty PTSD treatment. *Psychiatric Services, 62,* 954–958. http://dx.doi.org/10.1176/ps.62.8.pss6208_0954

Wolff, N., Frueh, B. C., Shi, J., & Schumann, B. E. (2012). Effectiveness of cognitive-behavioral trauma treatment for incarcerated women with mental illnesses and substance abuse disorders. *Journal of Anxiety Disorders, 26,* 703–710. http://dx.doi.org/10.1016/j.janxdis.2012.06.001

Wolff, N., & Shi, J. (2012). Childhood and adult trauma experiences of incarcerated persons and their relationship to adult behavioral health problems and treatment. *International Journal of Environmental Research and Public Health, 9,* 1908–1926. http://dx.doi.org/10.3390/ijerph9051908

Zahn, M., Agnew, R., Fishbein, D., Miller, S., Winn, D., Dakoff, G., . . . Chesney-Lind, M. (2010). *Girls Study Group: Understanding and responding to girls' delinquency*. Washington, DC: USDOJ.

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