PSYCHOLOGICAL DISTRESS AND SUBSTANCE USE AMONG COMMUNITY-RECRUITED WOMEN CURRENTLY VICTIMIZED BY INTIMATE PARTNERS: A LATENT CLASS ANALYSIS AND EXAMINATION OF BETWEEN-CLASS DIFFERENCES

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Abstract

Latent class analysis was used to examine patterns of victimization among a community sample of 212 women experiencing intimate partner violence (IPV). Results identified three classes of women characterized by victimization history (recent IPV, childhood victimization); classes were further differentiated by IPV-related PTSD symptoms, other indicators of psychological distress, and substance use. Differentiating levels of victimization and their associated patterns of psychosocial functioning can be used to develop intervention strategies targeting the needs of different subgroups of women so that mental health and substance use problems can be reduced or prevented altogether. Implications for treatment and future research are presented.

Keywords

Intimate partner violence; childhood abuse and neglect; women; psychological distress; substance use; posttraumatic stress

Results of the National Violence Against Women Survey (NVAWS; Tjaden & Thoennes, 2000) confirm that intimate partner violence (IPV), whereby women are physically and sexually assaulted, psychologically victimized, controlled, intimidated, and dominated by current or former husbands, cohabitating partners, boyfriends, and/or dates, represents the primary form of violence against women. Findings from the NVAWS revealed that one in three U.S. women reported being physically assaulted, raped, and/or stalked as an adult, and of those, 64% were victimized by an intimate partner (Tjaden & Thoennes, 2000). Thus IPV presents a serious threat to public health and the functioning of women. However, prevention and intervention efforts targeted to women who are experiencing IPV are complicated by the increasing realization that (a) there are significant and overlapping relationships among IPV, psychological distress, and substance use (Coker, Weston, Creson, Justice, & Blakeney, 2005; Golder & Logan, 2010; Logan, Walker, Jordan, & Leukefeld,

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2006) and (b) that this is a heterogeneous group of women (Bogat, Levendosky, & Eye, 2005).

Compared to their non-victimized peers, women who experience IPV are disproportionately affected by psychological distress such as PTSD and depression. A meta-analysis of psychological disorders among women with a history of IPV found rates of PTSD as high as 84% (weighted mean 64%) and rates of depression as high as 69% (Golding, 1999; Logan, et al., 2006). These prevalence rates are even more striking when compared to the general population of women where lifetime prevalence of PTSD and depression are 10% and 21%, respectively (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Finally, the co-occurrence of PTSD and depression is often noted among women with histories of victimization (e.g., IPV, rape); major depression rarely occurs in the absence of PTSD (Resick, 2001; Resnick, 2004).

Like the prevalence of PTSD and depression, rates of substance use among women who have experienced IPV are higher than those found in the general population (Golding, 1999; Kessler, et al., 1995). Golding's meta-analysis (1999) found that between 7% and 44% (weighted mean: 19%) of women victimized by IPV experienced alcohol abuse or dependence, and 7% to 25% (weighted mean: 9%) experienced drug abuse or dependence (Golding, 1999). In comparison, estimates of lifetime substance abuse or dependence for women in the general population range from 9% to 14% and 4% to 7% for alcohol and drugs, respectively (Kessler, et al., 1995).

Understanding the relationships among women's experiences of IPV, psychological distress, and substance use remains challenging. Evidence has supported a number of competing explanations: (1) women's experiences of victimization contribute to mental health problems (e.g. PTSD; depression) that, in turn, are regulated by the use of drugs (i.e. the "self-medication" hypothesis); (2) the combination of mental health problems and substance use contribute to victimization; and (3) substance use itself indirectly causes mental health problems by placing drug-involved women at risk for victimization (Logan, et al., 2006). It also has been argued that, for many women, the relationship between these factors is interactive and reciprocal (Gutierres & Puymbroeck, 2006; Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997; Logan, et al., 2006). Thus women who have experienced repeated victimization and/or multiple types of victimization show greater prevalence of substance use and mental health problems than women who have experienced a single episode of victimization (Messman-Moore & Long, 2000). In fact, in regard to mental health, research among recent rape survivors has demonstrated that the severity of PTSD symptomology post-assault is a function of the cumulative effect of lifespan victimization (Nishith, Mechanic, & Resick, 2000). Similarly, research among substance-involved women has also established the particularly damaging effect of cumulative victimization on psychological distress with findings showing that it is the combination of high levels of IPV and childhood victimization that is associated with the greatest amount of psychological distress (Golder & Logan, 2010, In Press).

Regardless of support for various hypotheses regarding the overlap of IPV, psychological distress, and substance use, it is clear that IPV is not a homogenous phenomenon. Findings from research using qualitative methods represent heterogeneity well, especially as women's voices so effectively communicate the variability in their lived experiences ("WHO Multi Country Study on Women's Health and Domestic Violence Against Women: Summary Report of Iinitital Results on Prevalence, Health Outcomes, and Women's Responses," 2005). [1] An emerging body of quantitative research also documents the heterogeneity of IPV. This research strongly suggests that patterns of comorbity among IPV, psychological distress, and substance use are shaped by the type (i.e., psychological, physical, sexual, and/or some

combination thereof), frequency, duration, and intensity of the victimization experienced (Bogat, et al., 2005; Brewin, Andrews, & Valentine, 2000; Cloitre, Koenen, Cohen, & Han, 2002; Cloitre, Miranda, Stovall-McClough, & Han, 2005; Cloitre, Stovall-McClough, & Levitt, 2004; Coker et al., 2002; Coker, Derrick, Lumpkin, Aldrich, & Oldendick, 2000; Mullings, Marquart, & Hartley, 2003; Ozer, Best, Lipsey, & Weiss, 2003). However, findings in this area are far from conclusive and understanding the relationship among these factors and how they affect women's lives remains challenging. Research that helps to elucidate (a) the complexities of IPV and its' relationship to psychological distress and substance use, as well as prior victimization, and (b) the heterogeneity of women who experience IPV is needed to provide adequate guidance for the development of tailored intervention and prevention strategies.

To date, the majority of research on IPV, psychological distress, and substance use has employed a variable-centered approach. The variable-centered approach and associated methodologies (e.g., ANOVA, structural equation modeling, regression, etc.) are, by definition, focused on the relationship between variables (Bogat, et al., 2005). For example, results of variable-centered analyses indicate that women who experience psychological IPV alone are more likely to report heavy alcohol use than women who experience physical or sexual IPV (Coker, et al., 2002). Variable-centered approaches are valuable in that they highlight overarching relationships among variables in the general population but they do not provide information about important differences or patterns/experiences that may exist within a population (Bogat, et al., 2005). In contrast, person-centered approaches and methodologies (e.g., traditional cluster analysis, latent class/profile analysis, etc.) focus on individual or subgroup differences among members of a population. Person-centered analyses provide a way of grouping individuals into categories on the basis of patterns of shared characteristics that distinguish members of one group from those of another (Herman et al., 2007). Importantly, a person-centered approach can facilitate the ability to identify and understand which groups of women experiencing IPV are at greatest risk of problems such as substance use and which groups may be most amenable to given approaches and interventions (Bogat, et al., 2005). Thus it has been argued that both person- and variable-centered strategies are necessary to fully understand and adequately address the complexities of IPV (Bogat et al., 2005).

The current study applies person-centered analytic methods to gain insight about the way IPV, childhood abuse and neglect, psychological distress, and substance use differentially influence women's lives. Specifically, latent class analysis (LCA) is used to uncover meaningful subgroups of community-recruited women who have reported current IPV. The study goals are (a) to determine the number of classes that best characterize women based on indicators of IPV and childhood victimization, and (b) to examine and validate differences across the identified classes on measures of psychological distress (i.e., IPV-related PTSD symptoms, depression, self-harming behavior, and coping) and substance use in order to further contextualize the meaning of the classes and enhance the utility of this research for future intervention and prevention development.

The ability to differentiate levels of current and prior victimization history and their associated patterns of psychosocial functioning is valuable. Ultimately, this information can help "designers and implementers of intervention programs understand which groups of women will be most amenable to which approaches to intervention" (Bogat, et al., 2005, p. 65).

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[1]Readers interested in further information about qualitative research on IPV are referred to: (World Health Organization, "WHO multi country study on women's health and domestic violence against women: Summary report of initital results on prevalence, health outcomes, and women's responses," 2005).

METHODS

Sample

The present sample consisted of 212 women recruited from an urban community in New England; detailed description of recruitment and interview procedures can be found in (Sullivan & Holt, 2008). Briefly, recruitment flyers that advertised the "Women's Relationship Study" were placed in various public locations (e.g., grocery stores, nail salons, agencies such as the Department of Adult Education, and two primary care clinics). Interested women were asked to call the project to learn about the study and determine their eligibility. The final sample was comprised of women who met the following inclusion criteria: she reported experiencing at least one act of physical victimization within the past six months by her current male partner; was currently in an intimate relationship of at least six months duration; had contact with her partner at least twice a week and had not been apart from him for more than two weeks in the last six months; and finally, had a monthly household income no greater than $4,200 (determined a priori to methodologically control for differential utilization of resources associated with income). Each participant completed a two-hour, semi-structured, computer-assisted interview administered by a trained master's or doctoral-level female research associate. At the completion of interviews, women were debriefed, compensated $50 for participating, and provided with a list of community resources such as those for domestic violence, employment, food, and benefits assistance, mental health therapy, and substance abuse treatment.

In regard to the sociodemographic variables, for the sample as a whole, 59.4% of the women resided with their intimate partner. Respondents were on average 36.6 years old (sd = 10.45 years); 67% were Black, 20.3% were white, and 12.7% were of "other" race/ethnicity. On average the women had 12.1 years of education, 34.9% were working, they had an average of 2.3 children, and an average monthly household income of approximately $1,104.

Data Analysis

Latent class analysis (LCA) was used to identify discrete subgroups (i.e., classes) of women based on measures of current IPV and childhood abuse and neglect. LCA is a person-centered multivariate approach that is used to detect unobserved heterogeneity in a given population and to identify meaningful subgroups based upon similarity of responses to measured variables (Nylund, Asparouhov, & Muthén, 2007). Among the advantages of LCA over alternative approaches to identifying subgroups of a population such as traditional cluster analysis (e.g., k-means) are the following: (a) a model-based method for estimating population characteristics derived from sample data; (b) adjustment of estimates for measurement error; (c) formal statistical procedures for determining the number of classes; (d) use of probabilities as the basis for interpretation of results; and (e) flexible treatment of variance among classes (Magidson & Vermunt, 2001; Muthen & Muthen, 1998–2007; Nylund, et al., 2007).

Measures

Ten latent class indicators reflecting current IPV and childhood victimization were used to identify the latent class model. These classes then were compared across sociodemographic characteristics and three domains of psychosocial functioning (IPV-related PTSD symptoms, other indicators of psychological distress, and substance use) in order to examine and validate differences across the identified classes and further contextualize the usefulness of this approach as a guide for thinking about intervention strategies; none of these variables were used to identify the latent classes. Alpha reliabilities, where appropriate, are reported for the present sample.

Latent class indicators

Current IPV[2]: Four latent class indicators were used to assess different types of IPV that may have occurred in the past six months: frequency of physical IPV; occurrence of sexual IPV; frequency of psychological IPV; and frequency of IPV-related injury. Frequency of physical IPV in the past six months was measured by 12 items from the Conflict Tactics Scale-2 (Straus, Hamby, & Warren, 2003); items comprised the subscales measuring minor and severe assault; possible range: 0–300; α = .89). Frequency of sexual and psychological IPV were measured by the Sexual Experiences Survey (SES; Koss, Gidycz, & Wisniewski, 1987) and the Psychological Maltreatment of Women Inventory (PMWI; Tolman, 1989), respectively, because these measures assess their respective domains more comprehensively than the CTS-2. Instructions for the SES were modified so that items were queried specific to unwanted sexual experiences by women's current intimate partners. All 10 items of the SES (α = .89; Koss, Gidycz, & Wisniewski, 1987) were used to create a dichotomous indicator assessing sexual IPV; an affirmative response to any of the ten items was indicative of sexual victimization in the past six months (*yes* = 1; *no* = 0). Psychological IPV was measured with the total scale score from the Psychological Maltreatment of Women Inventory (PMWI; Tolman, 1989; possible range: 58–290; α = .96); higher scores reflect greater levels of reported psychological victimization. Six items from the Conflict Tactics Scale-2 measuring minor and severe injury were used to create a variable reflecting the frequency of IPV-related injury (Straus, et al., 2003).

Childhood Abuse and Neglect (CAN): Five variables assessed the experience of emotional, physical, and sexual childhood abuse as well as emotional and physical neglect. All five variables were measured by subscales from the Childhood Trauma Questionnaire with higher scores indicating greater levels of abuse/neglect (possible range: 5–25 for each subscale; α = .86, .85, .96, .88, and .74 for the emotional, physical, sexual abuse subscales and the emotional and physical neglect subscales, respectively; Bernstein & Fink, 1998). Cut-off scores for low to moderate, moderate to severe, and severe to extreme vary by subscale, respectively (emotional abuse: 9–12; 13–15; 16–25; physical abuse: 8–9; 10–12; 13–25; sexual abuse: 6–7; 8–12; 13–25; emotional neglect: 10–14; 15–17; 18–25; physical neglect: 8–9; 10–12; 13–25).

Sociodemographic characteristics, indicators of psychological distress, and substance use

Sociodemographic characteristics: Sociodemographic characteristics were evaluated including living arrangements, age, race/ethnicity, education, employment status, and number of children. Living arrangements is a dichotomous variable reflecting whether or not a woman was married and/or cohabitating with her intimate partner (*yes, married and/or cohabitating* = 1; *no, not, married and/or cohabitating* = 0). Respondents' age is provided in years (observed range: 18–58). Three categories describe the race/ethnicity of the participants: Black, white, and other. Education level is provided in years (observed range: 0–18) and employment status was a dichotomous variable (*yes, employed* = 1; *no, not employed* = 0). Women reported their total number of children (observed range: 0–11)., Total monthly household income was provided in dollars (observed range: $0 – $4,200).

IPV-related posttraumatic stress symptoms: The 49-item Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995; Foa, Cashman, Jaycox, & Perry, 1997) was used to operationalize the four indicators that assessed symptoms associated with IPV-related PTSD. The first

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[2]Examination of the measures reflecting the frequency of physical assault and frequency of injury indicated that these variables were non-normally distributed. In order to correct for this, these variable were log-transformed following recommendations by Tabachnik and Fidell (2006).

indicator assessed whether or not any events of IPV were considered traumatic according to DSM diagnostic criterion A (yes = 1; no = 0; American Psychiatric Association, 2000). The second indicator measured the severity of re-experiencing, avoidance and numbing, and arousal symptoms (i.e., sum score of the severity of 17 symptoms; possible range: $0 - 51$; $\alpha = .92$). The third indicator reflected the number of domains in which functioning was impacted by symptoms (i.e., count of life domains impacted by symptoms; possible range; 0 – 7; Sullivan, Cavanaugh, Buckner, & Edmondson, 2009). A final indicator assessed whether or not the woman met the formal diagnostic criteria for PTSD in the past six months (*yes* = 1; *no* = 0). Although, there is conceptual and statistical overlap between this final indicator and the first three variables operationalizing this domain, this final indicator was included in order to provide an understanding of the proportion of respondents who would meet the clinical criteria for PTSD and thus further increase the interpretability of the results.

Other indicators of psychological distress: Three areas of mental health were examined: depression, engagement in self-harming behaviors, and coping. The 20-item Center for Epidemiologic Studies-Depression Scale (CES-D) was used to measure self-reported symptoms of depression over the past six months (Radloff, 1977). All CES-D items were summed with higher scores indicating greater levels of distress (possible range 0–60; $\alpha = .91$). While the CES-D is a screening tool, a cutoff score of 16 may be interpreted to indicate "significant" or "mild" depressive symptomatology (Radloff, 1977; Thomas, Jones, Scarinci, Mehan, & Brantley, 2001). Self-harming behavior was measured by seven-items from the Deliberate Self-Harm Inventory (Gratz, 2001); a variable was created reflecting the number of different self-harming behaviors a woman ever engaging in (observed range: 0–7). Examples of self-harming behavior include cutting, burning, and sticking one's self with a sharp object. Coping was measured by the Coping Strategy Indicator (CSI; Amirkhan, 1990). The CSI contains three subscales (11-items each; possible range: 0–33) that assess social support seeking coping, problem solving coping, and avoidance coping; α were .93, .83, and .74, respectively.

Substance use: Seven variables were used to capture a range of substance using behaviors. Alcohol use was measured by a single variable reflecting the frequency of alcohol use to intoxication in the past six months. This variable was calculated by taking the product of two separate items asking women (1) how many months of the past six months they used alcohol to intoxication, and (2) the number of days per month they typically used alcohol to intoxication (possible range: 0–180). Four dichotomous variables (*yes*=1; *no*=0) were created measuring a woman's use of marijuana, cocaine, opiates (includes heroin and other opiates), and/or sedatives over the past six months.[3] A single variable reflecting the number of different illicit substances a respondent ever used was also computed. Specific drugs included: marijuana, cocaine, heroin, methadone, other opiates and analgesics, barbiturates, sedatives/hypnotics/tranquilizers, cocaine, amphetamine, hallucinogens, and inhalants (possible range = 0 – 11). Finally, the 10-item Drug Abuse Screening Test - DAST 10 (possible range: 0–10; reliability = .85) was used to create a dichotomous indicator of the degree of consequences related to drug use (Skinner, 1982); scores of 0 to 2 on the DAST were coded "0" to reflect the presence of no or few problems related to drug use while scores of 3 or higher were coded "1" to indicate problems associated with substance use that

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[3]Although the use of a full range of illicit substances were assessed in this study (e.g. marijuana, cocaine, heroin and other opiates, sedatives/hypnotics/tranquilizers, amphetamines, hallucinogens, barbiturates, and inhalants) only cocaine, marijuana, opiates, and sedatives are examined in the research presented here as these were the substances most frequently utilized by the sample. Data on the pattern of use for all the aforementioned substances (ever, 30-days, and past six months) is presented in Sullivan et al.(Sullivan, et al., 2009).

were intermediate to severe (and likely meet DSM diagnostic criteria; "Assessment of Substance Abuse: Drug Abuse Screening Test (DAST)," 2001; Skinner, 1982).

Analysis

The LCA was performed with Mplus 5.1 software; model parameters were estimated via maximum likelihood procedures (Muthen & Muthen, 1998–2007). LCA provided estimates of the probability of membership in identified classes and of the probability of particular responses to items for members of identified classes (Auerbach & Collins, 2006; Lanza, Flaherty, & Collins, 2003). A series of models were estimated beginning with a one class model and incorporating additional classes as indicated until an optimal solution was obtained.

Fit indices and the substantive meaningfulness of the models were examined to determine the optimal solution (Muthén, 2003). Based upon existing research recommendations, model fit was compared using multiple indices including the Bayesian information criteria (BIC), the sample-size adjusted BIC (ABIC), the log likelihood value (LL), posterior probabilities, and entropy (Everitt, Landau, & Leese, 2001; Nylund, et al., 2007). The bootstrap likelihood ratio test (BLRT) was used to confirm the final number of classes (Nylund, et al., 2007).

As with any clustering technique, the validation of classes is crucial to confirm the differences between classes as well as further elucidate the substantive meaning of the subgroups. Differences among the classes on external variables not included in the latent class measurement model (treated as "auxiliary" variables in Mplus; (Muthen & Muthen, 1998–2007) were determined through Chi-square analyses.

RESULTS

LCA

Table 1 provides model fit indices for each of the models. Although the smallest BIC value was observed for the four-class model, the BLRT for the four-class model, while significant (p .001), failed to replicate two-thirds of the time suggesting this model was not stable. In contrast, the BLRT was both significant and stable in the three-class model. Further support for the three-class model was provided by its' classification quality, the three-class model correctly classified individuals into their respective groups approximately 91% of the time (entropy = .909).

Based on the convergence of statistical evidence and the substantive interpretation of the models, the three-class solution was supported (Muthén, 2003). Table 2 shows the means and standard deviations of the latent class indicators for each class.

Classes were distinguished by their experiences of current IPV and childhood trauma. Labels for the classes reflect their levels of current IPV and childhood abuse and neglect (CAN), respectively. The largest class (Class 1), identified as the Low IPV-Low CAN Victimization group, accounted for approximately 63% of the sample (n = 133). Women in this group experienced relatively low levels of current IPV victimization and low levels of childhood victimization compared to women in the other two classes. Class 2, identified as the Low IPV-High CAN Victimization group, accounted for approximately 26% of the sample (n=56). Women in this class were similar to those in the Low IPV-Low CAN Victimization group regarding low levels of current IPV however, they reported a history of significantly higher rates of childhood abuse and neglect. Class 3, identified as the High IPV-High CAN Victimization group, accounted for 11% of the sample (n = 23). These women reported very high rates of current IPV, higher than women in either of the other two

groups, and reported a history of child abuse and neglect victimization comparable to the rate reported by women in the Low IPV-High CAN group.

Differences in socio-demographic characteristics, IPV-related posttraumatic stress, other indicators of psychological distress, and substance use were assessed among women in the three classes (see Table 3). Few differences in sociodemographic characteristics were observed, restricted primarily to the percentage of women employed and average monthly household income (nonsignificant differences for socio-demographics were excluded from the table).

Divergent patterns of posttraumatic stress were observed across the three classes with respect to symptom severity, number of life domains impacted by PTSD symptoms, and positive diagnostic screen for PTSD. Results revealed that all three classes significantly differed from one another, and that the patterns of escalation in severity and prevalence of PTSD symptoms were in the expected direction. For example, 24%, 43% and 75% of the women in the Low IPV-Low CAN, Low IPV-High Can, and High IPV-High CAN Victimization groups, respectively, met the diagnostic criteria for PTSD in the past six months.

A similar pattern of statistically significant distinctions was observed among other indicators of psychological distress across the latent classes. Increasing levels of distress were observed for depression and avoidance coping strategies from the Low IPV-Low CAN to High IPV-High CAN Victimization groups. Differences were also observed regarding self-injurious behaviors; women in the Low IPV-High CAN and High IPV-High CAN Victimization groups demonstrated higher levels of these behaviors than women in the Low IPV-Low CAN Victimization group but did not differ from each other.

With regard to substance use, the indicator reflecting the number of different illicit substances ever used evidenced a statistically significant difference among the three classes. The High IPV-High CAN Victimization group reported using, on average, approximately four illicit substances in their lifetime. This behavior reflected greater diversity of substance use than either of the other classes. Further, although differences among the classes on drug use problems failed to reach a standard level of statistical significance, it is notable that substantially more women in the High IPV-High CAN Victimization group scored in the problematic range on the DAST than did women in either of the other two groups.

DISCUSSION

This is the first known study to examine the heterogeneity of victimization experiences among women who are being victimized by their intimate partners on dimensions of current IPV and a history of childhood abuse and neglect. Empirical classification of women into subgroups demonstrated consistency with and further support for the assertion that divergent patterns of IPV and childhood victimization are associated with differences in psychological distress and psychosocial functioning (Bogat, et al., 2005; Carlson, McNutt, Choi, & Rose, 2002; Golder & Logan, 2010; Goodman, Dutton, Weinfurt, & Vankos, 2005). In the following sections, an overview of each of the classes is provided followed by a more in depth analysis of the functioning of each group across the various domains; implications for intervention and future investigation are also addressed.

Analyses identified three classes of women (Low IPV-Low CAN, Low IPV-High CAN and High IPV-High CAN) characterized by distinct patterns of current and past victimization. Each of the classes accounted for an increasingly smaller proportion of the sample such that women who experienced the least amount of victimization represented the majority of the sample while those experiencing the highest levels of violence were a minority. This finding

supports the conceptualization of women experiencing current IPV as a heterogeneous group and suggests that the intensity and nature of intervention programming be tailored to the level of violence being experienced by women with consideration to concurrent issues of psychological distress and substance use. The ability to match the level of intervention intensity to violence and associated symptoms severity may provide community based organizations with guidance about how to allocate valuable and limited resources.

Notwithstanding the varying levels of victimization across latent classes, it should be recognized that concerningly high levels of physical, sexual, and psychological IPV were identified among this sample of current IPV victims recruited from the community. The rates of partner violence experienced among the subgroups can be contextualized in comparison to other populations of women at high risk for IPV. For example, the frequency of physical IPV across the different classes of women in the present study were 2- to 11-times higher than those found among Najavits' (2009) high-risk sample of treatment-seeking women with PTSD and a substance use disorder. Similarly, levels of psychological IPV appear elevated, in comparison to other groups of women who experience IPV, particularly among the High IPV-High CAN Victimization group (Tolman, 1999); among women in this group, the level of psychological IPV was approximately 173 compared to 102 in Tolman's sample. Likewise, in relation to sexual IPV, 90% of the women in the High IPV-High CAN Victimization group reported experiencing a sexual victimization by their intimate partners in the past six months; this is 11 times higher than among women in the general population (Tjaden & Thoennes, 2000). Among women in the Low IPV-Low CAN and Low IPV-High CAN Victimization groups, rates of sexual victimization were 6 to 7 times higher than those found among women in the general population.

As with IPV, a distinct pattern across the three classes was evident for childhood abuse and neglect. Comparison of findings from this study to findings from other community samples, provided in parentheses below, suggest that women in the Low IPV-Low CAN Victimization group experienced 'average', but not particularly high levels of abuse and neglect as children (emotional abuse: 6.99–8.9; physical abuse: 6.53–7.1; sexual abuse: 5.71–6.9; emotional neglect: 6.78–10.0; and physical neglect 6.02–6.7; Bernstein, Stein, Newcomb, Walker, Pogge, Ahluvalia et al., 2003; Scher, Stein, Asmundson, McCreary, & Forde, 2001). In contrast, both the Low IPV-High CAN and the High IPV-High CAN Victimization groups experienced rates of childhood abuse and neglect that were well above that of other community samples (Bernstein, et al., 2003; Scher, et al., 2001).

Despite the similarity between the Low IPV-High CAN and the High IPV-High CAN Victimization groups in regard to childhood abuse and neglect, there were subtle and important differences. The Low IPV-High CAN group evidenced slightly higher rates of all kinds of childhood abuse and neglect as compared to the High IPV-High CAN, with the exception of childhood sexual abuse; women in the High IPV – High CAN group reported the highest levels of childhood sexual abuse. This finding is consistent with research that strongly suggests that childhood sexual abuse increases a woman's vulnerability to revictimization in adulthood (Messman-Moore & Long, 2000). The experience of sexual victimization during childhood may have subsequent affective, cognitive, and behavioral repercussions that predispose women to subsequent victimization as adults (Gidycz, Coble, Latham, & Layman, 1993; Messman-Moore & Long, 2000). Findings from the present research, specifically differences between the Low IPV-High CAN and High IPV-High CAN Victimization groups across measures of IPV-related PTSD symptoms and psychological distress as well as substance use, serve to further elucidate the mechanisms by which early sexual victimization may be connected to adult IPV. For example, the High IPV-High CAN Victimization group reported the highest levels of distress (i.e., IPV-related PTSD symptoms, depression, avoidant coping) and substance use (i.e., greatest number of

illicit drugs used; highest percentage of respondents reporting problems associated with substance use). This strongly suggests that intervention strategies that target the reduction of PTSD symptoms and depression, assist women in developing more adaptive coping strategies, and reducing substance use may be particularly effective means to assist women similar to those in the High IPV-High CAN group and may ultimately lead to decreases in their experience of IPV.

Similarly, while the Low IPV-Low CAN and Low IPV-High CAN Victimization groups had somewhat similar profiles in terms of current IPV, there were clear distinctions between these classes in regard to patterns of childhood abuse and neglect. As the label indicates, women in the Low IPV-High CAN Victimization group evidenced high levels of childhood abuse and neglect - well above the sample mean - while women in the Low IPV-Low CAN Victimization group fell below the mean. As suggested by the research examining the psychosocial sequlae to childhood victimization, there were predictable differences between these two groups evident across all the indicators of IPV-related PTSD symptoms and select indicators of psychological distress (i.e., depression, self-harm, avoidant coping). As evidence, almost double the number of women in the Low IPV-High CAN Victimization group met the diagnostic criteria for PTSD in the past six months compared to the women in the Low IPV-Low CAN Victimization group where only slightly less than a quarter met criteria.

The pattern of findings in the present study are consistent with prior research that finds that both childhood and adult victimization experiences are associated with general psychological distress and PTSD symptomology (Golder & Logan, 2010; Messman-Moore & Long, 2000, 2003; Messman & Long, 1996; Seedat, Stein, & Forde, 2005). While further research is needed to clarify the relationship between childhood victimization and the experience of adult IPV, the pattern of relationships among these indicators strongly suggests that the psychosocial sequelae associated with each type of victimization, respectively (i.e., childhood victimization, generally, childhood sexual abuse, specifically, IPV) must be addressed in order to fully meet the mental health needs of women currently experiencing IPV. Intervention strategies that assist women to have lives free of IPV and attend to the psychosocial repercussions of childhood victimization may be particularly useful in improving the overall psychosocial functioning of this population (Cloitre, et al., 2002; Cloitre, et al., 2005; Cloitre, et al., 2004). For example, programming that assists women to develop safety plans, provides the information and assists in developing the skills necessary to identify the "warning signs" of potentially abusive relationships, as well as the signs of healthy relationships, in addition to more clinically focused intervention components that address difficulties in regards to affect regulation, problematic attitudes and beliefs about self and others, as well as interpersonal skill deficits.

Compared to the general population of women, rates of substance use are elevated among this sample; almost 25% of the women in the current sample reported some form of illicit drug use in the past six months compared to women in the general population where about 12% report any illicit substance use in the past year (SAMHSA, 2007 and 2008 and 2008). Additionally, results of the Drug Abuse Screening Test indicated that slightly more than one-fifth of the sample was experiencing drug problems. Notwithstanding these findings, examination of differences across the latent classes provides a potentially more nuanced and informative understanding of substance use among this population. Generally, there was an increasing pattern of substance use across the three classes. Significant between group differences were observed for the number of illicit substances a women reported ever having used and for those women experiencing drug problems. These findings are consistent with literature that indicates that victimization – be it IPV and/or childhood abuse - contributes to high risk behaviors such as substance use (El-Bassel et al., 2004; El-Bassel, Gilbert, Wada,

Witte, & Schilling, 2000; El-Bassel, Simoni, Cooper, & Gilbert, 2001; Golder, 2005; Golder, Gillmore, Spieker, & Morrison, 2005; Logan, et al., 2006).

However, while there were higher than average levels of substance use across the sample, the majority of women were not evidencing problematic levels of drug use, per se; the preponderance of women above the 'cut point' for drug problems were in the High IPV-High CAN Victimization group. Relatedly, it is important to note that all substance use is not equally problematic (see Marlatt & Gordon, 1985). For women similar to those in the Low IPV-Low CAN and Low IPV-High CAN Victimization groups, substance use may not rise to a level where formal drug treatment is necessary or even helpful. Research suggests that affect regulation, particularly in terms of negative affect, is an important motivation underlying substance use (Cooper, Frone, Russell, & Mudar, 1995) such that substance use serves to assist individuals in improving and/or distracting themselves from their adverse emotional state (McCollam, Burish, Maisto, & Sobell, 1980). Thus, for a large portion of women experiencing current IPV, intervention strategies that assist them in identifying triggers for stress, recognizing negative affective states, and developing healthy coping responses to replace substance use (and other unhealthy behaviors) may be sufficient to reduce or eliminate illicit drug use. Conversely, trauma-informed substance abuse treatment may be necessary and more appropriate to effectively intervene with populations of women similar to those in the High IPV-High CAN Victimization group (McHugo et al., 2005; Morrissey et al., 2005). Notwithstanding these suggestions, further research investigating the continuum of substance using behavior and the attendant consequences among this population is necessary before any definitive conclusions can be drawn.

This research has additional implications for programs and practitioners serving victims of IPV. Overall, study findings strongly suggest that more targeted and individualized intervention plans should be developed through an increased understanding of the variability of current and former victimization, psychological distress and substance use among women experiencing current IPV. In particular, protocols that sensitively and effectively evaluate women's cumulative experiences of childhood and IPV victimization are necessary; such protocols should not only assess whether something has 'ever' happened but also the type (i.e. sexual, physical, psychological), frequency, and duration of victimization as well. In regard to psychological distress, it may be that moderately elevated levels of distress (i.e. IPV-related PTSD symptoms; depression), as observed among women in the Low IPV-Low CAN Victimization group, constitute a normative reaction to a highly stressful situation. As such, it is possible, that levels of psychological distress would be reduced once the causes of this stress, namely violence within the intimate relationship, are addressed. In fact, research finds that interventions designed to reduce/eliminate violence prior to escalation and/or earlier in the relationship will lead to a decreased risk of moderate to severe posttraumatic stress symptoms among women experiencing IPV (Coker, et al., 2005). Development of "early" interventions that work to reduce/eliminate violence, though not necessarily to end the relationship, may be particularly important strategies for engaging women similar to those in the Low IPV-Low CAN Victimization group - especially if a woman does not wish to end her relationship and/or believes she cannot leave due to socioeconomic constraints (Bogat, et al., 2005).

Likewise, increasing levels of psychological distress can serve as indicators that formalized intervention strategies designed to address the mental health consequences/correlates of victimization are necessary to effectively treat women similar to those in the Low IPV-High CAN and High IPV-High CAN Victimization groups. As evidenced, while the average score for depression was above the clinical cut-off for the sample as a whole, significant differences between the groups existed. Women in the Low IPV-High CAN and High IPV-High CAN Victimization groups had depression scores ranging from slightly above the

sample mean to a full standard deviation above the mean, respectively; the collection and aggregation of good assessment data would allow programs and practitioners to examine the distribution of depression within their own populations and potentially make more informed decisions about treatment planning. Assessment data that provided an understanding of an individual's current and past victimization could be helpful to better predict that individual's experiences of, for example, depression (or vice versa).

Similarly, the pattern of increasing prevalence and severity of IPV-related posttraumatic stress symptoms identified among the groups in the present study appears consistent with a convergence of evidence that reactions to traumatic or stressful events are best conceptualized as occurring along a continuum (Breslau, Reboussin, Anthony, & Storr, 2005; Norman, Tate, Anderson, & Brown, 2007; Ruscio, Ruscio, & Keane, 2002). This and other studies (Breslau, et al., 2005) have documented that many trauma-exposed individuals will have moderate to high levels of posttraumatic stress-related symptomology but fail to meet the full DSM diagnostic criteria; Breslau, Reboussin et al. (2005) termed individuals with this clinical presentation as "sub-threshold clinical entities". The present study adds to a growing body of research that suggests that alternative diagnostic operationalizations of PTSD are important in providing clinicians and researchers with a more accurate and nuanced understanding of women's responses to trauma generally and IPV specifically – regardless of whether they meet full diagnostic criteria as currently articulated in the DSM-IV-TR (Brewin, Lanius, Novac, Schnyder, & Galea, 2009; Kilpatrick, Resnick, & Acierno, 2009; Sullivan, et al., 2009; Sullivan & Holt, 2008). It is an unfortunate reality that the inability to meet diagnostic criteria for PTSD can act as a barrier to receiving effective mental health treatment (Al-Saffar, Borga, Lawoko, Edman, & Hallstrom, 2004). Research underscores the importance of changes in service delivery systems to ensure that women who experience IPV and subsequent psychological distress have access to appropriate mental health care regardless of their ability to meet restrictive diagnostic guidelines.

Future research should extend and build on the current study by identifying other areas of psychosocial function across which there may be differences or similarities among the classes. Research suggests that IPV and PTSD may influence an individual's perception and use of formal and informal social support, for instance service utilization vs. support from friends and family. For example, higher levels of IPV may be associated with increased formal service utilization, particularly from health care providers such as ER services (Paranjape, Heron, & Kaslow, 2006) and help seeking from informal sources of social support. Another potentially important area for future exploration is women's perceptions of their intimate relationship and their motivation to maintain or end the relationship. Women experiencing IPV go through a process whereby they attach meaning to and develop strategies for dealing with the violence (Mills, 1985). Research suggests this process may be affected by presence and severity of PTSD symptoms. Individuals with PTSD have been found to over-attend to threatening cues and information and to interpret ambiguous cues as threatening (Litz & Keane, 1989). In fact, IPV victims with more symptoms of PTSD tend to perceive themselves as being at greater risk of re-abuse (Cattaneo, Bell, Goodman, & Dutton, 2007). Finally, structural issues, such as income, employment, and housing may affect women's response to IPV. In fact, in the current study, the only sociodemographic factors that varied across the latent classes were employment and monthly household income; women in the High IPV-High CAN Victimization group had rates of employment and monthly income significantly below women in the other two groups. It has been argued that an accurate understanding of women's behavior can only be obtained through capturing the environmental and social context in which women live their lives (Germain & Bloom, 1999; Henderson, 1998; Pottieger, Tressell, Surratt, Inciardi, & Chitwood, 1995). Thus research that more fully examines the transaction between currently abused women and their environments at multiple systemic levels (e.g., genetic, biological, psychological, familial,

cultural, community, and physical environment; Germain & Bloom, 1999) is essential. Further, the field of IPV research and practice would also benefit from elucidating the heterogeneity among women who experience childhood abuse and IPV regarding issues such as service utilization, criminal justice involvement, and social support.

Limitations of the present study should be noted. The study design used cross-sectional, retrospective, self-report methods with women who were not randomly selected. Given that data are cross-sectional, they statically examine patterns that likely change over time. A longitudinal study of a similar nature would provide an opportunity to examine the trajectories of these patterns. The use of self-report measures may also represent a limitation. However, research on IPV as well as substance use indicates that both the validity and reliability of self-report data is good to excellent (Caetano, Schafer, Field, & Nelson, 2002; Darke, 1998; Fincham, 1992; Hser, Maglione, & Boyle, 1999; Magdol, Moffitt, & Silva, 1998; Rouse, Kozel, & Richards, 1985). Like any retrospective study, recall may bias study findings. Recent research has shown that experience sampling methods, where data captured in near-real time in women's natural environment to reduce recall bias, is safe and could prove to be a promising method for increasing understanding of women's experiences as they are lived daily (Sullivan, Khondkaryan, Santos, & Peters, 2011). Findings likely are generalizable to community women who experience a range of physical IPV, but may not be generalizable to women at the extreme end of the IPV spectrum, especially those whose autonomy is so severely restricted that they could not participate in an in-person interview. While research utilizing LCA and related methodologies to investigate victimization in other populations (i.e., adolescence and the perpetration of violence) provide both methodological and substantive support for the three class solution identified in the present study (Higgins, Jennings, Tewksbury, & Gibson, 2009; Klostermann, Mignone, & Chen, 2009; Reid & Sullivan, 2009), future research with similar populations of recently victimized women are necessary to determine the replicability of these findings. Finally, while the sample size in the present study may be considered modest, it is nevertheless sufficient for LCA; sample sizes considerably smaller than the present study have been reported in the literature (Klonsky & Olino, 2008).

The purpose of the current study was to use LCA methods to elucidate the heterogeneity and gain insight into the way IPV and childhood abuse and neglect victimization patterns differentially influence women's lives with regard to psychological distress and substance use. Results suggest that important differences exist among women in this high-risk population in regard to recent IPV and childhood abuse and neglect – that they are not a homogeneous group. These differences are reflected in distinct patterns of IPV-related posttraumatic stress symptoms, other indicators of psychological distress, and substance use. These findings can inform the development of intervention strategies targeting the particular needs of different subgroups of women so that their mental health and substance use problems can be reduced or prevented altogether.

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Biographies

Seana Golder received her B.A. from the University of Maryland, her M.S.W. at Louisiana State University, and her Ph.D. in Social Welfare from the University of Washington in Seattle, WA. She is currently an Associate Professor at the Kent School of Social Work at the University of Louisville. Dr. Golder's research focuses on women's engagement in high risk behaviors (substance use; lawbreaking; risky sexual behavior) with a particular emphasis on understanding the intersection of victimization, substance use, and psychological distress among higher risk women, especially women in the criminal justice system.

Christian M. Connell, Ph.D., is an Associate Professor of Psychiatry and Director of Child Development and Epidemiological Research at The Consultation Center, Yale School of Medicine. His research addresses the prevention of risk behaviors and promotion of positive outcomes for at-risk youth within community settings or served by formal care systems. This research examines potentially malleable influences on the development of risky behavior (i.e., substance use, sexual risk behavior, antisocial behavior) among at-risk youth, as well as the development and evaluation of programs to prevent or reduce involvement in such behaviors. He is also interested in the application of advanced multivariate data analytic methods to examine risk and protective processes associated with developmental processes in behavioral outcomes.

Tami P. Sullivan, Ph.D., is an Assistant Professor in the Division of Prevention and Community Research and Director, Family Violence Research and Programs, Department of Psychiatry, Yale University. Her program of research focuses individual and system level factors associated with the wellbeing of women victims of intimate partner violence (IPV). She studies (a) precursors, correlates, and outcomes of women's IPV victimization and their use of aggression, (b) the co-occurrence of IPV, posttraumatic stress, substance use, and sexual risk with specific attention to daily processes, and (c) researcher-practitioner collaborations on IPV in the criminal justice system. She is particularly interested in risk and protective factor research that informs the development of interventions to be implemented in community settings.

Table 1

Statistics for Latent Class Models: BIC; ABIC; LL; and Entropy

Model	Description	BIC	Adjusted BIC	LL	Entropy	BLRT
1	One-class	6138.822	6084.954	−3032.880	1.000	NA
2	Two-class	5784.828	5699.274	−2820.100	.895	P .000
3	Three-class	5702.040	5584.800	−2751.923	.909	P .000
4	Four-class	5638.684	5489.751	−2693.469	.917	P .000 [*]

[*] Best loglikelihood value was not replicated in 4 out of 5 bootstrap draws.

Table 2

Means, standard errors, and Range for the sample and identified classes on the latent class indicators.

	Sample[1] (N= 212)	Class 1: Low IPV- Low CAN Victimization (n=133)	Class 2: Low IPV- High CAN Victimization (n=56)	Class 3: High IPV-High CAN Victimization (n=23)
	Mean/% (SE)	Mean/% (SE)	Mean/% (SE)	Mean/% (SE)
Intimate Partner Violence Indicators				
Frequency of Physical Assault	35.20 (3.26)	23.24 (.10)	21.02 (.12)	141.09 (.43)
Sexual IPV	56.13% (.03)	51.2% (.04)	54.2% (.08)	90.1% (.06)
Psychological IPV	127.92 (2.39)	120.69 (.13)	124.60 (.21)	172.89 (.27)
Frequency of Injury	6.33 (.85)	0.34 (.03)	0.49 (.06)	1.32 (.10)
Childhood Abuse and Neglect Indicators				
Childhood - Emotional Abuse	11.05 (.37)	7.93 (.11)	16.50 (.19)	15.49 (.41)
Childhood - Physical Abuse	9.07 (.31)	7.06 (.05)	12.50 (.29)	12.38 (.42)
Childhood - Sexual Abuse	9.75 (.47)	7.50 (.08)	12.86 (.23)	15.18 (.30)
Childhood- Emotional Neglect	11.27 (.36)	8.39 (.13)	16.32 (.16)	15.51 (.39)
Childhood- Physical Neglect	7.31 (.22)	5.80 (.18)	10.03 (.69)	9.32 (1.00)

[1] Sample data are from SPSS; all other data are from Mplus. Means and standard errors reported for frequency of injury for the sample reflect raw scores; analyses for this item was conducted with transformed variable as previously discussed. Sample mean (standard error) for the transformed variable is 0.49 (.03).

Table 3

Between Group Differences: Sociodemographics, IPV-Related PTSD, Other Indicators of Psychological Distress, and Substance Use

	Sample[1] (N= 212)	Class 1: Low IPV-Low CAN Victimization (n=133)	Class 2: Low IPV- High CAN Victimization (n=56)	Class 3: High IPV- High CAN Victimization (n=23)	Chi-Square Difference Test
	Mean/% (SE)	Mean/% (SE)	Mean/% (SE)	Mean/% (SE)	
Sociodemographic Indicators					
Employed	34.9 (.03)	40.2% [a] (.04)	31.2% [a,b] (.07)	13.5%[b] (.06)	9.38**
Household Income, Past Month	1104.21 (59.49)	1125.42 [a] (76.77)	1211.84 [a] (131.13)	704.03[b] (106.66)	14.79**
IPV-Related PTSD Indicators					
PTSD: Criteria A	44.81% (.03)	37.6%[a] (0.04)	48.0% [a] (.07)	78.9%[b] (0.08)	17.11**
PTSD: Symptom severity	19.22 (.79)	16.11[a] (0.96)	21.85[b] (1.35)	30.60[c] (2.44)	31.86 **
PTSD: Count of life domains	3.05 (.14)	2.61 [a] (0.18)	3.45[b] (0.29)	4.62[c] (0.39)	19.65 **
Met Diagnostic Criteria for PTSD	34.45% (.00)	23.6% [a] (0.03)	43.1%[b] (.07)	74.5%[c] (0.09)	23.32**
Other Indicators of Psychological Distress					
Depression	24.89 (.82)	22.15 [a] (1.01)	25.98[b] (1.28)	38.17[c] (2.29)	39.90 **
Self-harm	.63 (.08)	0.35[a] (0.07)	1.09[b] (0.20)	1.13[b] (0303)	13.41 **
Coping: Social Support	21.971 (.44)	22.00 [a] (0.56)	21.81 [a] (0.87)	22.19 [a] (1.39)	0.05
Coping: Problem Solving	26.68 (.30)	26.63 [a] (0.39)	26.86 [a] (0.61)	26.56 [a] (0.95)	0.09
Coping: Avoidant	24.00 (.29)	23.06 [a] (0.38)	24.91[b] (0.56)	27.16[c] (0.62)	31.15**
Substance Use Indicators					
Number of illicit drugs ever used	2.28 (.14)	1.91 (0.15)	2.68[b] (0.31)	3.45[c] (0.62)	7.23*
DAST	21.11% (.02)	17.6% (0.03)	19.6% (0.06)	44.2% (0.11)	5.08[2]
Alcohol Intoxication	15.64 (2.32)	13.52 (2.73)	15.05[a] (4.52)	29.49 [a] (9.43)	2.66
Cocaine	21.7% (.02)	19.2% [a] (0.03)	24.0% [a] (0.06)	30.1% [a] (0.09)	1.10
Marijuana	24.0% (.02)	25.3% [a] (0.03)	24.4% [a] (0.06)	16.0%[a] (0.07)	1.16
Opiates	19.8% (.02)	16.8% [a] (0.03)	21.4% [a] (0.05)	33.2% [a] (0.10)	2.28
Sedatives	9.43% (.01)	5.3% [a] (0.02)	15.9% [a] (0.05)	17.4% [a] (0.08)	4.78

Chi-square is provided by Mplus as an equality tests of means across classes using posterior probabilities that are based on multiple imputations with 2 degrees of freedom for the overall test and one degree of freedom for the pairwise tests. The same superscripts denote that means between the two groups for each variable are statistically equivalent (i.e., not significantly different).

[1] Sample data are from SPSS; all other data are from Mplus.

[2] Overall, significance level is $p = .08$; there is a significant difference between the first class and third class ($p < .01$) and between the second and third class groups ($p < .05$).