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Patterns of Violence Against Women: A Latent Class Analysis

Courtenay E. Cavanaugh
Rutgers University

Jill T. Messing
Arizona State University

Hanno Petras
JBS International, Inc., Bethesda, Maryland

Barbara Fowler, Lareina La Flair, Joan Kub, Jacqueline Agnew, Sheila Fitzgerald, Richelle Bolyard, and Jacquelyn C. Campbell
Johns Hopkins University

This study examined patterns of nine types of violence against women (VAW) and associated mental health problems. The following self-reported, lifetime violence victimization was examined among 1424 employed women: (1) childhood physical abuse, (2) childhood sexual abuse, (3) physical abuse between parents/guardians during childhood, (4) psychological intimate partner violence (IPV), (5) physical IPV, (6) sexual IPV, (7) adult physical or sexual assault by a nonintimate partner, (8) physical workplace violence, and (9) psychological workplace violence. Latent class analysis was used to identify homogenous patterns, called "classes," of women's "yes/no" responses to experiencing these types of violence. The best model consisted of 4-classes characterized by the following probabilities: low violence (Class 1: 63.1%), high psychological and physical IPV (Class 2: 15.6%), high physical and psychological workplace violence (Class 3: 12.4%), and moderate to high childhood abuse (Class 4: 9.0%). When compared to Class 1 (low violence), membership in Classes 2 (IPV) and 4 (childhood abuse) was associated with screening positive for depression in the past week at baseline after controlling for the influence of demographic characteristics on class membership. Also, when compared to Class 1 (low all), membership in Class 2 (IPV) was associated with greater odds of screening positive for posttraumatic stress disorder in the past month at the six month follow-up assessment. Findings document distinct patterns of VAW and associated proximal and distal mental health outcomes. Implications for interventions aimed to improve employed women's health are discussed.

Keywords: childhood abuse, depression, intimate partner violence, posttraumatic stress, workplace violence

Violence against women is recognized as a serious public health problem (World Health Organization, 2011). Women are at greater risk for experiencing childhood sexual abuse (Molnar, Buka, & Kessler, 2001; Sachs-Ericsson, Blazer, Plant, & Arnow, 2005) and/or intimate partner violence (IPV) than men (Black & Breiding, 2008; Tjaden & Thoennes, 2000). Approximately one in three women experience child sexual abuse involving contact (Russell, 1983; Wyatt, Loeb, Solis, Carmona, & Romero, 1999), and nearly one in four women are raped and/or physically assaulted by an intimate partner during their lifetime (Tjaden & Thoennes, 2000). Many women also witness IPV between parents/caregivers during childhood (Zinzow et al., 2009), and/or experience childhood physical abuse (Sachs-Ericsson et al., 2005), psychological IPV (Coker, Smith, McKeown, & King, 2000), and workplace violence (WPV; Duhart, 2001; Tjaden & Thoennes, 2001).

Violence tends to co-occur. That is, victims of violence often experience more than one type of violence during their lifetime; this has been described as poly victimization (Finkelhor, Ormrod, Turner, & Hamby, 2005; Finkelhor, Ormrod, & Turner, 2007; Turner, Finkelhor, & Ormrod, 2010). Multiple violent acts may occur within the same context (e.g., childhood or a relationship with an intimate partner) or across different contexts (i.e., childhood and a relationship with an intimate partner). For example, many children who experience sexual abuse also experience childhood physical abuse (Briere & Elliott, 2003; Scher, Forde, McQuaid, & Stein, 2004). Additionally, many women who experience IPV experience multiple types of abuse including psychological, physical, and or sexual (Smith, Thornton, DeVellis, Earp, & Coker, 2002; Sullivan, Cavanaugh, Buckner, & Edmondson, 2009). Poly victimization may also occur across different contexts as many forms of childhood abuse, including sexual (Arata, 2002; Messman & Long, 1996), physical (Bensley, Van Eenwyk, &

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Courtenay Cavanaugh, Department of Psychology, Rutgers University; Jill T. Messing, School of Social Work, Arizona State University; Hanno Petras, JBS International, Inc., Bethesda, Maryland; Barbara Fowler, The Johns Hopkins University Administration; Lareina La Flair, Johns Hopkins University; Joan Kub, Richelle Bolyard, and Jacquelyn Campbell, The Johns Hopkins University School of Nursing; Jacqueline Agnew and Sheila Fitzgerald, The Johns Hopkins University School of Public Health.

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Correspondence concerning this article should be addressed to Courtenay Cavanaugh, PhD, Rutgers University, Department of Psychology, Armitage Hall, 311 North Fifth Street, Camden, NJ 08102. E-mail: cocavana@camden.rutgers.edu

Wynkoop Simmons, 2003) and physical abuse between parents/caregivers (Bensley et al., 2003; Ehrensaft et al., 2003), have been associated with women's subsequent victimization in adulthood. Additionally, abuse in a relationship, whether current or previous, has been indicated to elevate risk for WPV (Child & Mentes, 2010).

Despite the abundant literature suggesting that violence co-occurs, little is known about the heterogeneity—or patterns—of violence against women, and the mental health problems associated with distinct patterns of violence. Prior research has tended to examine multiple victimizations by summing the number of types of violence experienced and comparing the number of types of violence victimizations with adverse outcomes (Follette, Polusny, Bechtle, & Naugle, 1996; Turner et al., 2010). While this literature informs our understanding of the cumulative nature of violence, it does not elucidate the specific types of violence or combinations of types of violence associated with adverse outcomes. Studies employing cluster analysis or latent class analysis extend research on cumulative counts of violence victimization by identifying: (1) clusters or patterns of specific types of violence victimization that co-occur, and (2) the risks and adverse problems associated with distinct patterns of violence. Such information may be used to inform violence related prevention and intervention efforts.

Only a few studies have used cluster or latent class analysis to examine patterns of violence against women and associated mental health problems. These studies have documented three patterns of IPV among help-seeking women (Dutton, Kaltman, Goodman, Weinfurt, & Vankos, 2005); four patterns of IPV among women nationally (Carbone-Lopez, Kruttschnitt, & Macmillan, 2006) and four patterns of violence among female veterans (Campbell, Greeson, Bybee, & Raja, 2008). For example, Campbell and colleagues (2008) found four patterns of childhood sexual abuse, adult sexual assault, physical IPV, and sexual harassment in the workplace; the patterns were characterized by: (1) low levels of all four types of violence, (2) high levels of all four types of violence, (3) high levels of all four types except physical IPV, and (4) high levels of physical IPV and workplace sexual harassment. Patterns 2 through 4 reveal patterns of violence occurring across different contexts including childhood, adult intimate relationships, and the workplace (Campbell et al., 2008). The two other studies in this area revealed patterns of violence occurring within the context of intimate relationships (Carbone-Lopez et al., 2006; Dutton et al., 2005). The three studies also showed that when compared to patterns of no or low violence victimization, patterns characterized by violence victimization were associated with mental health problems, including depression and posttraumatic stress (Campbell et al., 2008; Carbone-Lopez et al., 2006; Dutton et al., 2005).

While one prior study examined sexual harassment in the workplace as one of the forms of violence (Campbell et al., 2008), other forms of WPV (including psychological and physical WPV) as well as childhood physical abuse and physical abuse between caregivers/guardians during childhood have not been examined (Campbell et al., 2008; Carbone-Lopez et al., 2006; Dutton et al., 2005). Thus, in order to understand the true co-occurring nature of violence in women's lives, more studies are needed that examine patterns of violence against women utilizing a broader range of violent events affecting women, including childhood physical abuse, witnessing IPV during childhood as well as psychological and physical WPV. The present study examined patterns of violence against women, including childhood physical abuse, psychological and physical WPV, and witnessing IPV between caregivers/guardians during childhood, and associated mental health problems. We hypothesized that the best fitting and most clinically meaningful model would consist of multiple latent classes of violence including patterns characterized by low violence, high violence within specific contexts (e.g., childhood, a relationship with an intimate partner, or the workplace), and high violence across contexts (e.g., childhood and IPV and/or WPV and childhood/IPV). We also hypothesized that there would be distinct relationships between class membership and participants' psychological distress, with the greatest psychological distress associated with women in a class characterized by high probabilities of childhood abuse and IPV.

Method

Participants and Procedures

The present study purpose was to examine patterns of violence victimization and associated mental health problems among women. However, while many forms of violence against women, including childhood abuse or IPV, affect women in general, WPV only affects working women. Therefore, our study used archival data pertaining to numerous types of violence against women and mental health problems for a large sample of women employed in the nursing profession. Thus, this investigation utilizes data from a prospective study examining consequences of WPV among nurses and nursing personnel. That study was approved by the Institutional Review Board of Johns Hopkins University (no. 00001034). Participants were recruited from three hospitals and one hospital-based geriatric care center in a Mid-Atlantic U.S. metropolitan area. Eligibility criteria included being: (1) English speaking, (2) employed at one of the four hospitals for at least four weeks prior to the baseline survey, (3) 18 years of age or older, (4) in a position that requires reporting to a nurse manager and having some patient care responsibility or contact, and (5) providing informed consent. Participants completed an online baseline assessment consisting of questions regarding experiences of childhood abuse, IPV, WPV, and symptoms of depression during the past week. They were given $10 in gift cards to the hospital cafeteria as an incentive for completing the baseline interview.

A matched case-control sample of participants was selected for follow-up six months later (Checkoway, Pearce, & Kriebel, 2004); this assessment included a measure assessing symptoms of posttraumatic stress disorder (PTSD) during the past month. The case-control sample selected for follow-up included all of the women reporting WPV (physical or psychological) in the past 12 months at their current place of employment and a random sample of respondents who did not report having experienced WPV at their current place of employment during the previous 12 months at the baseline assessment. Cases and controls were also matched by their unit of employment (e.g., emergency department, administration, etc.). Utilization of a matched case-control sampling procedure allowed—for the purposes of the original study—robust comparisons to be made on the main dependent variable of interest, WPV by department. This is because case control sampling creates a sample where approximately the same number of participants did/did not experience the outcome of interest (Checkoway et al., 2004). For the purposes of the current analysis, where WPV

is only one of the variables of interest, the oversampling of cases at 6 month follow-up results in an overrepresentation of women who experienced WPV. Therefore, in analysis that utilizes follow-up data on PTSD, weighting was used to readjust the proportion of WPV victims back to the proportion in the baseline sample. Participants were given $15 check if they completed a follow-up assessment.

Baseline assessments were completed by 1503 female nurses. Seventy nine of the 1,503 female nurses (5.3%) comprising the baseline sample were missing data on one of the four demographic covariates (i.e., age, child status, marital status, racial identity) used in the present data analysis. The majority (n = 68) were missing information about their age. Analyses were run to compare participants with and without missing demographic data with respect to the nine violence indicators, depression at baseline, and PTSD at the six month follow-up assessment. No differences between participants with and without missing data were found with respect to the violence victimization variables or baseline depression. However, there were significant differences between participants with and without missing data with respect to PTSD. Participants with missing data were more likely to have PTSD at the follow up compared to participants without missing data. In order to control for demographic covariates influence on the latent class of violence victimization, this study sample was comprised of the 1,424 participants without missing data on the four demographic variables of interest.

Of these 1,424 participants, 1,095 of these were selected for follow up, 465 (42.5%) of whom reported experiencing WPV (psychological or physical) during the 12 months prior to baseline. Of the participants selected for follow up, 908 (82.9%) completed the six month follow-up assessment; 384 had experienced WPV in the 12 month prior to baseline and 524 did not. All variables included in this study were gathered at baseline with the exception of PTSD, for which information was only obtained at the six month follow-up assessment.

Variables

The variables of interest, definitions, and coding are presented in Table 1. The following nine types of violence were assessed and comprised the latent classes: (1) childhood physical abuse, (2) childhood sexual abuse, (3) physical abuse between parents/guardians during childhood, (4) psychological IPV, (5) physical IPV, (6) sexual IPV, (7) adult physical or sexual assault by a nonintimate partner, (8) physical WPV, and (9) psychological WPV. These were treated as dichotomous variables.

The Center for Epidemiologic Studies Depression Scale (Andresen, Malmgren, Carter, & Patrick, 1994) was used to assess depression. This instrument consists of 10 questions concerning depressive symptoms individuals may have felt during the previous week. Responses are rated on a 4-point Likert scale with the following response options: rarely or none of the time (less than 1

Table 1
Variable Definitions

Latent class indicators	Question and coding
1. Childhood physical abuse	As a child, were you ever physically abused (spanked a lot, whipped, hit with objects, etc.) by a parent or another adult or caretaker? Positive endorsement = 1, negative endorsement = 0.
2. Childhood sexual abuse	As a child, did anyone ever touch you in a way you did not wish to be touched, or force you into any kind of sexual activity? Positive endorsement = 1, negative endorsement = 0.
3. Physical abuse between parents/caregivers during childhood	While you were growing up, was your parent or guardian physically abused by his or her partner? Positive endorsement = 1, negative endorsement = 0.
4. Psychological intimate partner violence	As an adult, have you ever been emotionally abused or sexually harassed by a former or current intimate partner? Positive endorsement = 1, negative endorsement = 0.
5. Physical intimate partner violence	Have you been hit, slapped, kicked, pushed, or otherwise physically hurt by a former or current intimate partner? Positive endorsement = 1, negative endorsement = 0. Question from the abuse assessment screen (Rabin, Jennings, Campbell, & Bair-Merritt, 2009).
6. Sexual intimate partner violence	As an adult, have you been forced into sexual activities by a former or current intimate partner? Positive endorsement = 1, negative endorsement = 0. Question also taken from the abuse assessment screen.
7. Assault by a nonintimate partner	As an adult, have you ever been physically assaulted, sexually assaulted, threatened with physical or sexual assault, or stalked by someone who was not your intimate partner? Positive endorsement = 1, negative endorsement = 0.
8. Physical workplace violence	Have you experienced threats or violence (i.e., pushing/shoving, pinching, scratching, hitting/kicking, slapping, biting, beating, rape/forced sex, shooting/stabbing, or threats of any of these, among others) at your hospital workplace? Positive endorsement = 1, negative endorsement = 0.
9. Psychological workplace violence	Have you ever experienced psychological violence (e.g. verbal abuse, bullying, stalking, sexual harassment) at your hospital workplace? Positive endorsement = 1, negative endorsement = 0.

Mental health & demographic	Definition
Depression	Total score of symptoms of depression during past week greater than 10 on the Center for Epidemiologic Studies Depression Scale-10. Depressed = 1, not depressed = 0.
PTSD	Total number of PTSD symptoms in past month was three or more on the PC-PTSD. PTSD = 1, no PTSD = 0.
Age	Calculated age given participants date of birth. Dichotomous variable split at M = 40.
Race/ethnicity	Identified racial or ethnic background as White = 0, Non-White (Black, Asian, or Other) =1.
Marital status	Married or a member of an unmarried couple = 1, divorced, widowed, separated, never married = 0
Children	Has children at home = 1, otherwise = 0.

day), some or a little of the time (1–2 days), occasionally (3–4 days), and all of the time (5–7 days). Two items are reverse scored. The 10 items are summed ($\alpha = .77$, current sample) and scores of 10 or higher indicate depression.

The Primary Care PTSD Screen (PC-PTSD; Prins et al., 2003) consists of four items for assessing symptoms of PTSD in the past month, including re-experiencing the event, numbing, avoidance, and hyperarousal, with yes/no response options. Items are summed ($\alpha = .72$, current sample); among women, a cutoff score of 3 has been found to have good sensitivity (0.70), specificity (0.84), and efficiency (0.81). PTSD has been found to be correctly identified in 78% of cases by the PC-PTSD. This instrument is a recommended screen for PTSD (Davis, Whitworth, & Rickett, 2009).

Four demographic variables (age, race, marital status, and child status) were used to describe the study sample and these demographic variables were controlled for in analyses examining mental health problems associated with patterns of violence. Age was initially treated as a continuous variable, but led to model instability due to its limited range and was consequently split at the mean ($M = 40$) and treated as a dichotomous variable. Race (coded White = 0, Non-White = 1), marital status (coded married or a member of an unmarried couple = 1, otherwise = 0), and child status (coded children living at home = 1, otherwise = 0) were also treated as dichotomous variables.

Data Analysis

Latent class analysis (LCA; Hagenaars & McCutcheon, 2002) was used to examine distinct patterns of lifetime violence victimization among the 1,424 women. LCA uses observed categorical or binary data (or indicators) to identify homogeneous patterns, called "classes" of a latent construct. In this case, the observed binary data, "yes/no" responses to individuals' lifetime experiences of the nine types of violence assessed, were used to identify latent classes of violence. Individuals with similar response patterns regarding their experience of these nine types of violence are placed into the same class. Class assignment is based on posterior membership probabilities (Magidson & Vermunt, 2004). LCA was conducted using Mplus version 6 (Muthen & Muthen, 2010), and descriptive statistics were derived using SPSS 18 (SPSS, 2009). Mplus accounts for missing data on latent class indicator variables (the nine violence variables), using the full information maximum likelihood estimation (Muthen & Muthen, 2010). Thirteen hundred and sixty-four participants had no missing data on any of the nine violence indicators while 60 individuals (4.2%) had missing data on one of the nine violence indicators. Of the 60 individuals with missing data on one of the nine violence indicators, 58 had missing data on only one violence indicator, one individual had missing data on two violence indicators, and one individual had missing data on three violence indicators. Mplus does not account for missing data on covariates, which is why participants missing data on demographic covariates were removed from the sample.

Three steps were taken to identify the most parsimonious latent class solution. First, latent classes were sequentially run to obtain model fit statistics for 1–7 classes. The candidate models were determined based on fit statistics as well as by inspecting the substantive fit of the model solution. Next, the candidate models were run again controlling for demographic covariates (i.e., age, race, marital status, and child status) via latent class regression (Bandeen-Roche, Miglioretti, Zeger, & Rathouz, 1997) and the candidate models with and without controlling demographic covariates were examined for stability. This comparison was done to investigate the possibility of model instability and misspecification of the influence of covariates (Nylund, Asparouhov, & Muthén, 2007). Finally, the candidate models were run with class membership regressed on demographic covariates and distal outcomes were modeled as true consequences of the latent class profiles utilizing the auxiliary command (Petras & Masyn, 2010). The goal of this modeling step was to examine significant differences between latent classes and participants' screen for depression at the baseline assessment and PTSD at the six month follow-up assessment. Weights were used to control for the unequal case-control sample selection at the six month follow-up assessment as this may have affected reports of PTSD. The most optimal model was then chosen based on model fit and clinical meaning.

The Bayesian Information Criterion (BIC; Schwarz, 1978) and Lo-Mendell-Rubin likelihood ratio test of model fit (Lo, Mendell, & Rubin, 2001) were used to evaluate the overall statistical model fit along with other fit statistics provided in Table 2. Good model fit is indicated by the lowest values of the BIC, and adjusted BIC (Magidson & Vermunt, 2004). For the Lo-Mendell-Rubin test, a low p value ($p < .05$) indicates that the current model tested has a superior fit than the model with one less class.

Results

Participants were between 21 and 71 years of age ($M = 39.83$, $SD = 11.09$). The majority were White (73.5% White, 11.8% Asian, 10.0% Black, and 4.6% Other), married or a member of an unmarried couple (63.3%), and did not have children living at home (51.6%). The prevalence of childhood abuse was as follows: 255 (18.0%) childhood physical abuse, 247 (17.4%) childhood

Table 2
Fit Statistics (N = 1424)

Model tested	Loglikelihood	*Df*	BIC	Adjusted BIC	Entropy	*p* -value for Lo-Mendell-Rubin	Absolute frequency for smallest class	Relative frequency for smallest class
1-Class	–5876.790	9	11818.930	11790.340	—	—	—	—
2-Classes	–5425.703	19	10989.370	10929.014	0.748	0.0000	430.05239	30.2%
3-Classes	–5350.601	29	10911.778	10819.655	0.768	0.0130	201.60004	14.2%
4-Classes	–5286.639	39	10856.467	10732.577	0.775	0.0846	123.46483	8.7%
5-Classes	–5257.064	49	10869.928	10714.272	0.740	0.2678	93.81963	6.6%
6-Classes	–5239.798	59	10908.008	10720.585	0.752	0.2566	44.91192	3.2%
7-Classes	–5225.952	69	10952.928	10733.739	0.800	0.0743	16.37622	1.2%

sexual abuse, and 133 (9.4%) physical abuse between caregivers/guardians during childhood. The prevalence of IPV was as follows: 312 (22.0%) psychological, 254 (17.9%) physical, and 110 (7.8%) sexual. Adult assault by a nonintimate partner was reported by 186 (13.4%) women. Finally, 459 (32.2%) women reported having experienced physical WPV, and 425 (29.9%) reported having experienced psychological WPV. Of the nine forms of violence examined, 451 (33.1%) women reported experiencing none, 313 (22.9%) had experienced one, and 600 (44.0%) reported experiencing two or more forms of violence. One fifth of the participants had a positive screen for depression at baseline (20.5%), and 50 (5.5%) had a positive screen for PTSD at the six month follow-up assessment.

Latent Class Analyses Model Fit Statistics

Fit statistics for latent classes 1–7 are presented in Table 2. As shown, the lowest BIC was for the 4-class solution, suggesting support for this model. However, the Lo-Mendell-Rubin test was significant ($p < .01$) for the 3-class solution, suggesting that the 3-class solution fit better than the 2-class solution. Thus, the 3- and 4-class solutions were deemed to be the candidate models. Subsequent analyses of these models controlling for covariates suggested that these models remained stable when controlling for demographic covariates. Finally, these models were run controlling for demographic covariates and the auxiliary command was used to test whether there were significant differences between the latent class models and screens for depression at baseline and PTSD at the follow-up assessment. The 4-class model was determined to be the most parsimonious model, given a lower BIC than the 3-class model after controlling for demographic covariates and including analyses of mental health outcomes. This model was also deemed to have a more clinical meaning than the 3-class solution. The entropy, which summarizes the degree to which the latent classes are distinguishable and the precision with which individuals can be placed into classes, was 0.8 for the 4-class solution, indicating a superior level precision (Ramaswamy, Desarbo, Reibstein, & Robinson, 1993).

Figure 1 shows the 4-class solution based on model estimated probabilities of having experienced any of the nine types of violence victimization examined. Class 1 (low all) was characterized by low probabilities of experiencing any of the violence items and comprised 63.1% of the sample. Class 2 (IPV) was characterized by high probabilities of psychological and physical IPV and comprised 15.6% of the sample. Class 3 (WPV) was characterized by high probabilities of psychological and physical WPV and comprised 12.4% of the sample. Class 4 (childhood abuse) was characterized by medium to high probabilities of experiencing childhood abuse (physical, sexual, or witnessing IPV), and comprised 9.0% of the sample.

Associations Between Latent Classes of Violence Victimization and Participants' Demographics

Table 3 summarizes the associations between the four demographic covariates and class membership. Class 1 (low all) was treated as the reference group for these analyses. As shown, there were significant differences between classes 2 (IPV) and 1 (low violence) with respect to child status, age, and marital status. Members in class 2 (IPV) had significantly greater odds of having children living at home (Odds Ratio (OR) = 3.82, $p < .05$) and being older (OR = 5.15, $p < .01$), but were significantly less likely to be married or a member of an unmarried couple (OR = 0.06, $p < .001$) than members in class 1 (low all). There also were

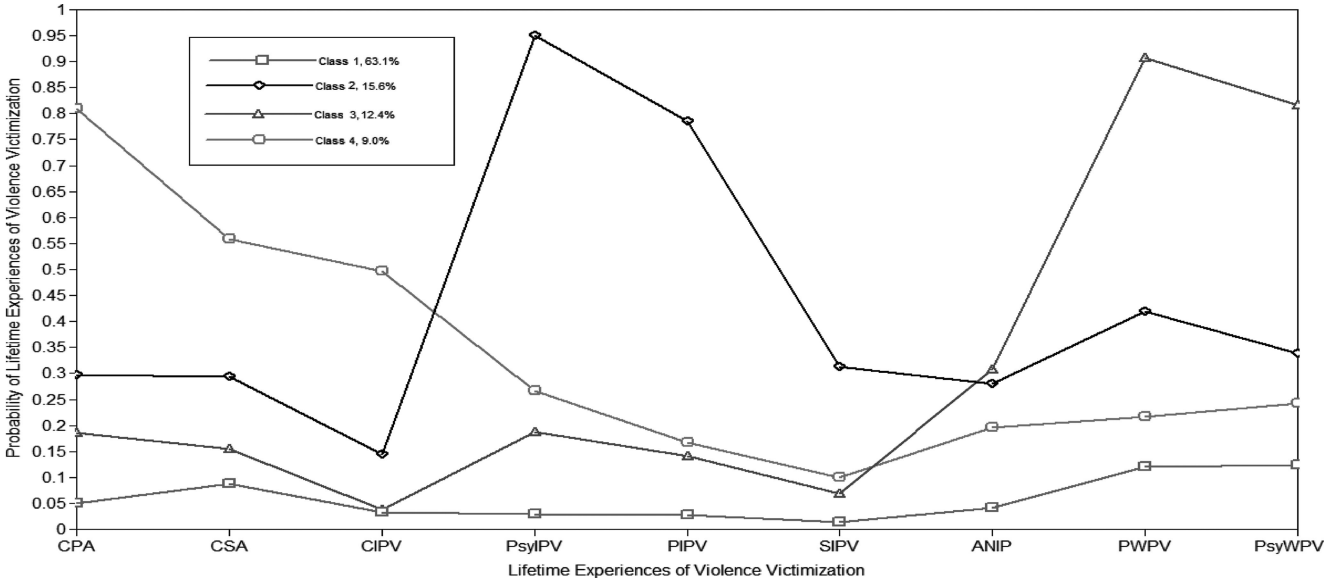

Figure 1. Patterns of violence; including childhood abuse, IPV, assault by a nonintimate partner and WPV; among female nurses (N = 1424) CPA = childhood physical abuse; CSA = childhood sexual abuse; CIPV = physical abuse between parents/caregivers during childhood; PsyIPV = psychological IPV; PIPV = physical IPV; SIPV = sexual IPV; ANIP = assault by a nonintimate partner; PWPV = physical WPV; PsyWPV = psychological WPV.

Table 3
Comparisons Between Latent Classes on Demographic Covariates

Class comparisons	Estimate	Standard error	*p* -value	Odds ratio
2 versus 1				
Child status	0.582	0.237	<.05	3.82
Age	0.712	0.237	<.01	5.15
Marital status	–1.257	0.231	<.001	0.06
Race	–0.649	0.254	<.05	0.22
3 versus 1				
Child status	–0.180	0.230	NS	0.66
Age	0.661	0.432	NS	4.58
Marital status	–0.095	0.271	NS	0.80
Race	–1.167	0.402	<.01	0.07
4 versus 1				
Child status	0.312	0.332	NS	2.05
Age	–0.047	0.337	NS	0.90
Marital status	0.194	0.339	NS	1.56
Race	0.539	0.310	NS	1.71

Note. References = no children at home, younger than 40, not married or member of unmarried couple, and White race; NS = not significant at $p < .05$; Class 1 = low all, Class 2 = IPV; Class 3 = WPV; Class 4 = childhood abuse.

significant associations between classes 2 (IPV) and 3 (WPV) compared to class 1 (low all) with respect to participants' race. Non-White nurses were 4.5 times (1/0.22) less likely to be in class 2 (IPV; OR = 0.22, $p < .05$) and 14 times (1/0.07) less likely to be in class 3 (WPV; OR = 0.07, $p < .01$) compared to class 1 (low all).

Associations Between Latent Classes of Violence Victimization and Participants' Mental Health Status

Results revealed significant differences between latent classes and participants' mental health status after controlling for the influence of demographic covariates on class membership. When compared to class 1 (low all), membership in class 2 (IPV; OR = 1.87, $p < .01$) and class 4 (childhood abuse; OR = 1.99, $p < .05$) were associated with significantly greater odds of screening positive for depression in the past week at baseline after controlling for the influence of age, race, marital status, and child status on class membership. When compared to class 1 (low all) and controlling for the influence of demographic covariates on class membership, membership in class 2 (IPV; OR = 4.30 $p < .01$) was associated with significantly greater odds of screening positive for PTSD in the past month during the six month follow-up assessment.

Discussion

Many women experience multiple forms of violence during their lifetime (Hedtke et al., 2008), yet few studies have examined patterns of women's lifetime violence victimization and associated mental health problems (Campbell et al., 2008; Carbone-Lopez et al., 2006; Dutton et al., 2005). This study extended prior work by examining a broader range of violent events affecting women including childhood physical abuse, witnessing IPV during childhood, and WPV. In addition, the use of LCA allowed for a data driven approach to grouping individuals, which is considered to be more informative than inspecting sum scores. As hypothesized, we found distinct patterns of violence against women. These patterns were characterized by low violence (class 1) and violence occurring within specific contexts such as a relationship with an intimate partner (class 2), the workplace (class 3), or during childhood (class 4). We had also hypothesized to find distinct patterns of violence occurring across contexts (e.g., childhood abuse and IPV and/or WPV and childhood abuse or IPV); however, our results did not support this hypothesis. Thus, our hypothesis was that there would be direct relationships between class membership and participants' psychological distress was partially supported. Significant differences between class membership and participants' psychological distress were found after controlling for the influence of demographic covariates on class membership; however, our hypothesis that the class characterized by high probabilities of childhood abuse and IPV would have the highest psychological distress was not supported because the existence of this class was not supported by this data.

Instead, study findings revealed that members in class 2 (IPV) and class 4 (childhood abuse), but not class 3 (WPV), were significantly more likely to experience mental health issues when compared to class 1 (low all). Specifically, women in class 2 (IPV) were more likely to have positive screens for depression at baseline and PTSD at the six month follow up, and women in class 4 (childhood abuse) were significantly more likely to have positive screens for depression at baseline. These findings suggest that proximal experiences of violence (IPV) may be more likely to lead to PTSD symptoms than distal experiences of violence (childhood abuse), while depressive symptoms may not have this same time sensitivity. Class 3 (WPV) was not significantly associated with greater mental health problems than class 1 (low all), suggesting that WPV may not increase psychological distress among women in the same manner that violence occurring within more personal relationships (childhood abuse and IPV) does.

The absence of a class characterized by violence occurring across contexts is interesting given the literature suggesting the co-occurrence of childhood abuse and adult victimization (Bensley et al., 2003; Engstrom, El-Bassel, Go, & Gilbert, 2008) as well as WPV and abusive relationships or childhood abuse (Child & Mentes, 2010; Little, 1999). One possible explanation for the current finding is that women who experience violence across contexts may have chosen not to participate in this study. Alternatively, violence victimization across different contexts may be a relatively rare phenomenon among employed women. The effects of violence, particularly mental health problems associated with experiencing both childhood abuse and adult revictimization, may make it difficult for survivors to become employed or to maintain employment over a period of time (Lloyd, 1997; Staggs, Long, Mason, Krishnan, & Riger, 2007).

Findings should be interpreted in the context of this study's limitations. This study used single item questions to assess violence and, therefore, it is likely that the rates of violence reported here underestimate the true prevalence of violence in this population. For example, studies have shown that multiple, detailed questions about violence are needed to yield disclosure of some violent experiences such as child sexual abuse (Williams et al., 2000). Additionally, our operationalization of greater violence exposure was based on higher probabilities of more types of violence, but did not capture severity of the violence or duration,

which may also be related to greater exposure and more serious mental health outcomes. Future research is needed to better understand characteristics of violence victimization (cumulative exposure, severity, and/or duration) contributing to associated adverse health outcomes. Lastly, this study sample was comprised of women employed as nurses and who were predominantly White. Therefore, findings may not be generalized to women who are not employed/employed as nurses and of other racial/ethnic backgrounds. Similar studies are needed which assess (1) patterns of a broad range of violence victimization on other populations of women and (2) associations between distinct patterns of violence against women with other associated problems including sexual risk behavior (Cavanaugh, Hansen, & Sullivan, 2010) and suicidality (Cavanaugh, Messing, Del-Colle, O'Sullivan, & Campbell, in press). This information may inform our understanding of potential vulnerabilities for violence and related prevention and intervention efforts.

Despite the study limitations, this study is novel in examining patterns of nine types of violence affecting women across their life span. Findings reveal four distinct patterns of violence against women and associated mental health problems. Our results suggest that patterns of IPV are associated with depression and PTSD, while patterns of childhood abuse are associated with depression. Thus, in order to improve the mental health of women affected by violence, interventions targeting symptoms of depression and posttraumatic stress may be warranted among employed women affected by IPV, while interventions targeting symptoms of depression may be warranted among employed women affected by childhood abuse. Because evidence-based treatments for PTSD and depression may differ, for example treatment for PTSD may involve exposure therapy while treatment for depression does not, the findings presented in this manuscript suggest the need to tailor mental health interventions for distinct populations of women affected by violence.

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