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Physical Injury, PTSD Symptoms, and Medication Use: Examination in Two Trauma Types

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Physical injury is prevalent across many types of trauma experiences and can be associated with posttraumatic stress disorder (PTSD) symptoms and physical health effects, including increased medication use. Recent studies suggest that PTSD symptoms may mediate the effects of traumatic injury on health outcomes, but it is unknown whether this finding holds for survivors of different types of traumas. The current study examined cross-sectional relationships between injury, PTSD, and pain and psychiatric medication use in 2 trauma-exposed samples, female survivors of motor vehicle accidents (MVAs; $n = 315$) and intimate partner violence (IPV; $n = 167$). Data were obtained from participants at 2 trauma research clinics who underwent a comprehensive assessment of psychopathology following the stressor. Regression with bootstrapping suggested that PTSD symptoms mediate the relationship between injury severity and use of pain medications, $R^2 = .11$, $F(2, 452) = 28.37$, $p < .001$, and psychiatric medications, $R^2 = .06$, $F(2, 452) = 13.18$, $p < .001$, as hypothesized. Mediation, however, was not moderated by trauma type ($ps > .05$). Results confirm an association between posttraumatic psychopathology and medication usage and suggest that MVA and IPV survivors alike may benefit from assessment and treatment of emotional distress after physical injury.

In a recent year, 45.4 million injury-related visits were reported at U.S. hospital emergency departments (Centers for Disease Control and Prevention, 2012). Approximately one third of individuals hospitalized due to injury report a diagnosable psychological disorder when assessed after 12 months, such as posttraumatic stress disorder (PTSD), depression, or generalized anxiety (Bryant et al., 2010). Physical sequelae may be severe, including chronic pain, disfigurement, and functional disability (Ramchand, Marshall, Schell, & Jaycox, 2008). Although studies have found traumatic injury and PTSD to be associated with higher health care costs (Rivara et al., 2007), the relationships between injury, PTSD, and medication use have not been examined across samples exposed to different types of traumas. This is an important gap in the research, as discrete, accidental traumas may have different effects from chronic, interpersonal traumas in the role that posttraumatic psychological health plays in recovery from injury (van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005). The current study tests whether PTSD symptoms are a possible mechanism of the relationship between traumatic injury and medication use, and whether the effect of PTSD symptoms on this relationship differs between two samples exposed to different types of trauma: motor vehicle accidents (MVAs) and intimate partner violence (IPV).

Previous investigations of physical injury and subsequent mental health have found that self-reported injury severity predicts posttraumatic psychopathology (Blanchard, Hickling, Taylor, & Loos, 1996; Jeavons, 2000). In tourists who survived the 2004 Southeast Asia tsunami, more severe injuries were associated with increased PTSD symptomatology and poorer general mental health 3 years later (Dyster-Aas et al., 2012). The study of psychological effects of physical injuries, however, has been limited by methodological inconsistencies across studies (O'Donnell, Creamer, Bryant, Schnyder, & Shalev, 2003). For example, the relationship between physical injury and mental health after a traumatic event may depend on the type of trauma. For survivors of serious MVAs, in which at least one person required medical attention, estimates of PTSD range from 15% to 45% (Blanchard & Hickling, 2004). A study of 158 MVA survivors conducted by Blanchard and colleagues (1996) found that injury severity predicted the development of PTSD (along with prior depression, fear of dying at the time of the accident, and involvement in accident-related litigation). Jeavons (2000) also found this relationship in MVA survivors and speculated

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that long-term disability due to injury serves as a reminder that can trigger PTSD symptoms.

IPV is another trauma that carries high risks of physical injury and mental health consequences (Foa & Riggs, 1995). Survivors of IPV, however, face additional emotional complexity due to its interpersonal nature and pervasive sociocultural effects (Dutton, 2009). According to Dutton, IPV is a pattern of coercive control in an intimate relationship, exerted through physical, sexual, and psychological abuse. The estimated prevalence of any physical injury resulting from an incident of IPV is approximately 40% among female survivors (Tjaden & Thoennes, 2000). Studies of the emotional sequelae of injury in this population suggest that increased severity of physical abuse is associated with greater risk of PTSD (Wilson et al., 2011). Less is known about how physical injury affects subsequent mental health in IPV, in part because IPV survivors often do not seek treatment due to shame or fear of retribution (Fanslow & Robinson, 2011). Although we are unaware of research that has investigated the impact of trauma type on the relationship between injury and psychopathology, we hypothesize that the link would be stronger and more direct for single-incident, non-interpersonal traumas such as MVAs, relative to IPV, which has more possible intermediating variables (e.g., shame, betrayal, reduced social support; Dutton, 2009).

Both physical injury and PTSD diagnosis are associated with increased health care utilization following accidental trauma (Jacobs, Lier, & Schopflocher, 2004). Similarly, IPV is associated with a 1.6- to 2.3-times relative increase in health care utilization and costs (Ulrich et al., 2003; see also Plichta, 2004; Rivara et al., 2007). Use of prescription medications is one indication of health care utilization that has been found to differentiate between trauma types. A history of interpersonal trauma such as physical, emotional, or sexual abuse increases health care utilization as indicated by the total number of medications prescribed for an individual (Farley & Patsalides, 2001). Use of pain medications in particular is influenced by trauma history and presence of PTSD symptoms (Sansone, Mueller, Mercer, & Wiederman, 2010). Schwartz and colleagues (2006) found that a PTSD diagnosis was related to greater use of prescription pain medication, even when restricting the analysis to those patients whose index trauma did not involve personal physical injury. Not surprisingly, use of psychiatric medications was also elevated after traumatic experiences (Boscarino, Galea, Ahern, Resnick, & Vlahov, 2003). Receiving an injury and developing PTSD were both associated with greater utilization of psychiatric medications, including antidepressants and anxiolytics (Harpaz-Rotem, Rosenheck, Mohamed, & Desai, 2008).

The current study examined physical injury, PTSD, and medication use among trauma survivors to explore a possible relationship of mediation. Mediation and moderation both describe third variable effects on the relationship between an independent and dependent variable (Fairchild & MacKinnon, 2009). In mediation, the independent variable influences the dependent variable through the indirect effects of another variable (the mediator). Moderation refers to the process by which the relationship between the independent and dependent variables differs in strength or direction across levels of another variable (the moderator). A growing body of work has investigated mechanisms underlying the relationship between trauma, psychological distress, and physical health. Tansill, Edwards, Kearns, Gidycz, and Calhoun (2012), for example, found that trauma-related mental health symptoms, including symptoms of PTSD, mediated the relationship between sexual victimization and poorer physical health. Eadie, Runtz, and Spencer-Rogers (2008) similarly found posttraumatic stress symptoms to partially mediate the relationship between sexual assault history and physical health outcomes. One recent investigation (Irish et al., 2013) assessed the relationship between physical injury and physical health in MVA survivors and found it to be mediated by posttraumatic stress symptoms. Together, these studies provide evidence that PTSD symptoms influence the link between traumatic injury and physical health. They also suggest that PTSD symptoms may predict measures of health care utilization such as medication use. In the current study, PTSD symptoms were examined as a possible indirect variable influencing the association between physical injury and medication use among trauma survivors. Cross-sectional data were used to explore whether the relationships between variables were consistent with statistical mediation (although note that longitudinal studies are necessary to support a causal interpretation of these results).

To examine the influence of trauma type as a moderator of these associations, two subgroups were used, female survivors of MVAs or IPV. Moderated mediation describes the situation in which a mediation effect varies over different values of a moderator (Preacher, Rucker, & Hayes, 2007). The current study began by examining whether the hypothesized relationship between physical injury and medication use was influenced by the indirect effect of PTSD symptoms. Next, provided an indirect effect were found for PTSD (indicating possible mediation), trauma type would be examined to explore whether it moderated the effect (whether it differs between the MVA and IPV samples). We hypothesized that more severe physical injury from either type of trauma and increased PTSD symptomatology would be independent contributors to use of pain and psychiatric medications, consistent with previous research. We proposed that injury severity would be associated with medication use via the indirect effect of PTSD symptoms in both samples, consistent with past work. Moderated mediation analyses would test the exploratory hypothesis that IPV survivors would show a weaker relationship between PTSD symptoms and medication use, relative to MVA survivors, due to the presence of other explanatory factors characteristic of prolonged interpersonal trauma that could influence help-seeking (e.g., shame, fear of retribution; Dutton, 2009; Fanslow & Robinson, 2011). These results would demonstrate the need for longitudinal studies to test for temporal and possible causal relationships between variables.

Method

Participants

The sample consisted of individuals who sought assessment from two trauma research clinics. The first included 315 female MVA survivors (men were excluded from these analyses to allow direct comparison across samples) who were seen at the State University of New York in Buffalo from 2000–2008. The second consisted of 167 female IPV survivors who were seen at the University of Memphis in Tennesee from 2008–2012. Both clinics focused on assessment of psychopathology following a specific traumatic stressor (MVA and IPV, respectively). Individuals participated in exchange for a thorough psychosocial evaluation, feedback, and referrals for treatment as indicated. See previously published studies for more details on recruitment (MVA: Beck, Grant, Clapp, & Palyo, 2009; Clapp, Masci, Bennett, & Beck, 2010; IPV: Beck et al., 2011).

The IPV sample was significantly younger than the MVA sample, $t(477) = 5.50$, $p < .001$, $d = 0.46$, and more racially diverse, $\chi^2(2, N = 482) = 62.76$, $p < .001$ (comparing numbers of participants who self-identified as African American, Caucasian, or any other race). The samples did not differ in mean household income (approximately $30,000 per year) or median education level (some college). MVA survivors, however, reported more severe physical injury, $t(331.38) = 6.71$, $p < .001$, $d = 0.74$; higher CAPS scores, $t(393.38) = 7.66$, $p < .001$, $d = 0.77$; more pain medications, $t(435.95) = 12.61$, $p < .001$, $d = 1.21$; and more psychiatric medications, $t(345.32) = 2.12$, $p = .035$, $d = 0.23$. Degrees of freedom vary because equal variances could not be assumed for these comparisons. (See Table 1).

Women assessed in the Buffalo MVA clinic ($n = 336$) were included in the current study if they had experienced an MVA that met Criterion A for PTSD. Of the 327 participants who did, two were excluded from analyses because of possible unreliable reporting. Given that an outcome of interest was use of pain medications, one participant was also excluded due to current substance dependence. Finally, to differentiate the samples, participants from the MVA clinic who had experienced IPV were excluded from these analyses ($n = 9$ who endorsed items on the Traumatic Life Events Questionnaire; TLEQ; Kubany & Haynes, 2004; and/or reported PTSD symptoms related to domestic violence during the diagnostic interview). The final MVA sample included 315 individuals.

Data from women who had experienced romantic partner abuse seen at the University of Memphis IPV clinic ($n = 238$) were included in analyses if their reported abuse met PTSD Criterion A. Of the 185 women meeting this criterion, one participant was excluded for unreliable reporting and three were excluded due to current substance dependence. To differentiate the samples, data from participants in the IPV clinic were excluded if they reported directly experiencing an MVA on the Life Events Checklist (LEC; Blake et al., 1997) that caused any current symptoms of PTSD ($n = 6$) or driving phobia ($n = 8$) as assessed in a diagnostic interview. The final IPV sample consisted of 167 individuals.

Table 1
Sample Characteristics Grouped by Trauma Type

	MVA ($n = 315$)		IPV ($n = 167$)	
Variable	*M* or *n*	% or *SD*	*M* or *n*	% or *SD*
Age (years)*	42.42	11.88	36.18	11.69
Race*				
African American	41	13.0	62	37.1
Caucasian	261	82.9	81	48.5
Hispanic	7	2.2	4	2.4
Asian	2	0.6	3	1.8
Native American	3	1.0	1	0.6
Other	1	0.3	12	7.2
Injury severity score*	2.15	0.93	1.55	0.91
Total CAPS score*	46.48	25.15	29.93	21.06
# Pain medications*	1.24	1.22	0.25	0.64
# Psychiatric medications*	0.60	0.87	0.48	0.88
Total medications*	3.18	2.53	1.73	2.52

Note. Means and standard deviations for selected demographic and outcome variables; number and percentage of respondents identifying as each racial category. MVA = motor vehicle accident; IPV = intimate partner violence; CAPS = Clinician-Administered PTSD Scale for DSM-IV.
*$p < .05$.

Measures

The extent of physical injury in both samples was assessed using semistructured interviews conducted by trained clinicians who inquired about the nature of the trauma and the respondent's emotional reactions. MVA survivors completed a modified version of the MVA Interview (Blanchard & Hickling, 2004), which included a question about physical injuries suffered in the accident. For IPV survivors, this interview was adapted to create the Domestic Violence Interview (Beck et al., 2011), which gathered information about physical, emotional, and sexual abuse inflicted by both the most recent and the worst abusive intimate partner. In the present study, the most severe injury resulting from physical or sexual abuse from either relationship was used for analyses. Interviewers for the MVA and IPV clinics coded injury severity as follows: 0 = *no injury*, 1 = *minor injury*, 2 = *moderate injury—needed medical attention*, 3 = *major injury—hospitalization*, or 4 = *severe injury—major surgery*.

PTSD symptoms were assessed by the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1997), a semistructured interview that was used to assess frequency and intensity of PTSD symptoms on a scale of 0 = *does not occur/is not distressing* to 4 = *occurs nearly every day/is extremely distressing*. The total severity score is calculated by summing frequency and intensity ratings for all symptoms,

resulting in a range of 0 to 136. Interviews were videotaped, and approximately 30% of the MVA interviews and 20% of the IPV interviews were randomly selected to be rated by independent assessors for reliability checks. Intraclass correlation coefficients for the total CAPS severity score were .99 for the MVA sample and .93 for the IPV sample.

Participants in both clinics were asked to complete a self-report questionnaire asking the name, reason for use, dosage, start date, and prescriber for all current medications. Medications were coded according to chemical properties and most common therapeutic use and were categorized as pain medications (opioid and nonopioid analgesics, nonsteroidal anti-inflammatory drugs, and anesthetics), psychiatric medications (sedatives/hypnotics/anxiolytics, antidepressants, antipsychotics, and stimulants) or other medications.

Procedure

Following informed consent, participants in both clinics were interviewed by a trained assessor using either the MVA Interview or the Domestic Violence Interview to assess characteristics of the trauma including extent of physical injury. Participants completed the TLEQ (MVA sample) or the LEC (IPV sample) to assess history of other traumatic events and were then interviewed with the CAPS in reference to their index trauma (MVA or IPV). Additionally, participants completed the medication questionnaire. Following the assessment, a feedback session was held in which results were discussed and participants were given referrals. All procedures were conducted in compliance with the regulations of the SUNY Buffalo (MVA sample) or University of Memphis (IPV sample) Institutional Review Boards.

Data Analysis

We hypothesized that the extent of physical injury sustained during trauma would predict the number of prescription pain and psychiatric medications in the total sample. Furthermore, it was expected that the severity of PTSD symptoms reported on the CAPS would mediate the relationship between injury and number of medications. Regression with bootstrapping, a nonparametric resampling approach, was used to examine the indirect effect of injury on number of medications through PTSD symptoms. The SPSS PROCESS macro (Preacher & Hayes, 2008) was used to run simultaneous regressions predicting medication use from the injury and PTSD variables and to generate 1,000 bootstrap samples to derive 95% confidence intervals for the indirect effects through PTSD symptoms. Additionally, we hypothesized that this association would be moderated by trauma type (MVA vs. IPV), demonstrated by a significant PTSD symptom by trauma-type interaction.

Results

Data were examined for skewness, kurtosis, and outliers to determine whether the primary variables met the assumptions of univariate and multivariate normality. Both injury severity and total PTSD symptoms were normally distributed. Due to severe positive skew in the dependent variables, number of medications, an inverse transformation was applied.

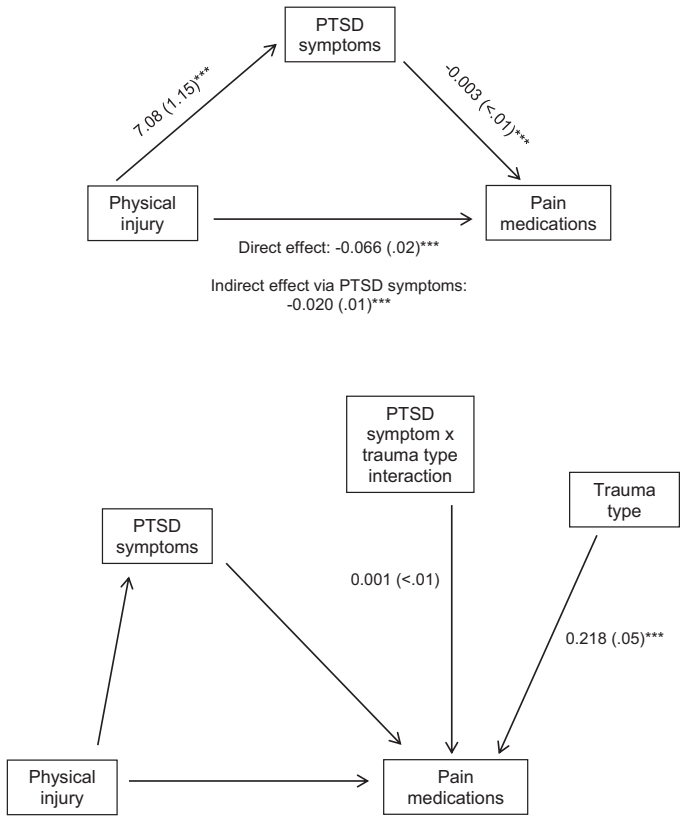

Figure 1. Mediation (top) and moderated mediation (bottom) path diagrams for pain medications. Unstandardized regression weights shown, with standard errors in parentheses. The outcome variable is the inverse number of medications reported. ***$p < .001$.

The model predicting the inverse number of pain medications from injury severity, PTSD symptoms, and the indirect effect of injury through PTSD symptoms was significant, $R^2 = .11$, $F(2, 452) = 28.37$, $p < .001$. Physical injury had a significant direct effect on pain medications, $B = -0.066$, $SE = .02$, $p < .001$, and on PTSD symptoms, $B = 7.08$, $SE = 1.15$, $p < .001$. As hypothesized, more severe injury was associated with greater use of pain medications and more severe PTSD symptoms. The total indirect effect of physical injury on the inverse number of pain medications via PTSD symptoms was estimated to be -0.020 ($SE = 0.01$), with a 95% confidence interval of $[-0.03, -0.01]$ (see Figure 1, top). Because zero is not included in the confidence interval, it is concluded that PTSD symptoms are a significant mediator ($p < .05$). Kappa-squared, a measure of effect size that represents the proportion of the maximum possible indirect effect that the obtained effect represents (Preacher & Kelley, 2011), was .06 for this model, $p < .001$. Kappa-squared values can be interpreted similar to Cohen's r^2 values, in which .01, .09, and .25 are small, medium, and large effects, respectively (Preacher & Kelley, 2011).

Moderation was tested by examining the Trauma Type × PTSD Symptom interaction in the prediction of pain medication use. When trauma type and the Trauma Type × PTSD Symptom interaction were included (along with injury severity, PTSD symptoms, and the mediation effect), the model predicting the inverse number of pain medications remained significant, $R^2 = .25$, $F(4, 450) = 36.85$, $p < .001$. Although MVA survivors reported more pain medications than IPV survivors, the Trauma Type × PTSD Symptom interaction was nonsignificant, $B = 0.001$, $SE < 0.01$, $p = .300$, indicating no moderated mediation (see Figure 1, bottom).

The model predicting the inverse number of psychiatric medications from injury severity, PTSD symptoms, and the indirect effect of injury severity through PTSD symptoms was also significant, $R^2 = .06$, $F(2, 452) = 13.18$, $p < .001$. As with pain medications, physical injury had a significant direct effect on psychiatric medications in the total sample, $B = -0.036$, $SE = 0.01$, $p = .010$. More severe injury was associated with greater use of psychiatric medication. The total indirect effect of physical injury on psychiatric medication use was estimated to be -0.014 ($SE < .01$), with a 95% confidence interval of $[-0.02, -0.01]$. Consistent with hypotheses, PTSD symptoms thus were also a significant mediator of the effects of physical injury on the use of psychiatric medications, $p < .05$. Kappa-squared was .05, a small to medium effect, $p = .002$ (see Figure 2 top).

When trauma type and the Trauma Type × PTSD Symptom interaction were added to the model predicting the inverse number of psychiatric medications, the new model was also significant, $R^2 = .06$, $F(4, 450) = 7.39$, $p < .001$. There was a nonsignificant trend toward a Trauma Type × PTSD Symptom interaction in the prediction of psychiatric medication use, consistent with hypotheses (stronger mediation in MVA than IPV), $B = 0.002$, $SE < .01$, $p = .082$ (see Figure 2, bottom).

Because trauma groups differed on demographic variables (age and race), moderated mediation analyses were rerun controlling for these variables. Results for pain medications did not change in significance. The Trauma Type × PTSD Symptom interaction trend for psychiatric medications, however, changed to $p = .127$. In addition, trauma groups differed such that the MVA group had more severe physical injury severity and used more pain and psychiatric medications than the IPV group. Mediation was tested separately in each group to account for these variables, and results revealed that mediation did not reach significance in the IPV sample for either pain or psychiatric medications. Although mediation did not occur, the individual regression paths in the IPV group were in the hypothesized directions, suggesting that the injury, PTSD, and medication use variables were related to each other in a similar manner in both trauma groups.

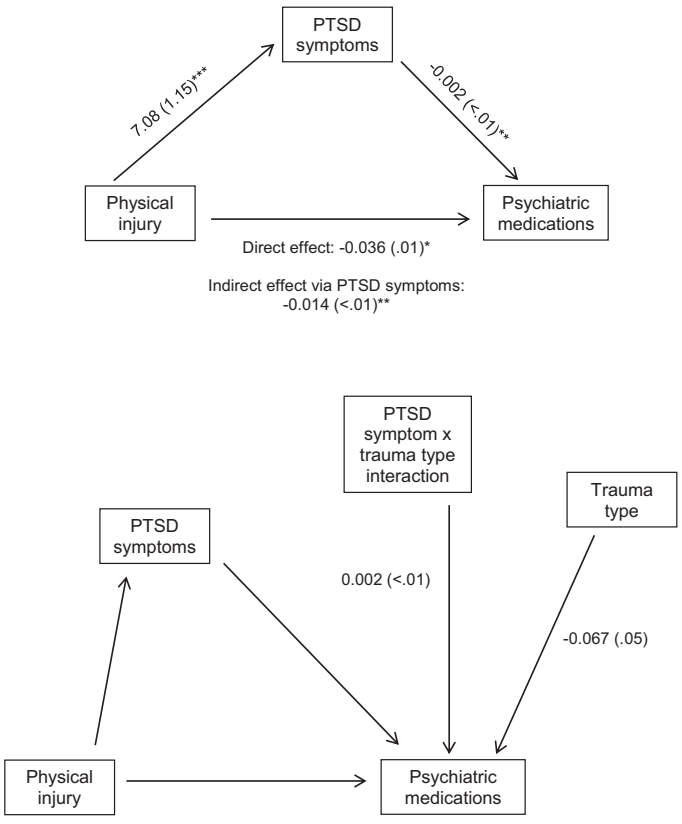

Figure 2. Mediation (top) and moderated mediation (bottom) path diagrams for psychiatric medications. Unstandardized regression weights shown, with standard errors in parentheses. The outcome is the inverse number of medications. $^*p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Discussion

This study examined potential mechanisms underlying the relationship between physical injury and medication use in trauma survivors. It was hypothesized that more severe symptoms of PTSD could indirectly affect use of pain and psychiatric medications in individuals who had sustained physical injury due to MVAs or IPV. A more speculative question was whether the effects of PTSD on this relationship would differ across trauma types. In accordance with recent studies (Eadie et al., 2008; Irish et al., 2013; Tansill et al., 2012), results indicated that PTSD symptoms were a possible mediator of the relationship between traumatic injury and number of pain and psychiatric medications. This effect, however, was not moderated by trauma type. Overall, these findings suggest that symptoms of PTSD may partially explain the relationship between injury and medication use in trauma survivors; however, differences between types of trauma appear to be minimal.

The current study supports the link between traumatic injury and subsequent psychopathology, especially PTSD. Similarly, results support the contention that physical health outcomes can be associated with posttraumatic psychopathology. Utilization of both pain and psychiatric medications was predicted by PTSD symptoms, which showed an indirect effect on the relationship between severity of traumatic injury and medication use, consistent with statistical mediation. This finding is consistent with previous work that has shown PTSD symptoms to

predict use of not only psychiatric medications (Harpaz-Rotem et al., 2008), but also pain medications (Sansone et al., 2010). Schwartz and colleagues (2006) hypothesized that PTSD might be associated with dysregulation of the endogenous opioid system, including neurobiological alterations in pain perception and tolerance. Functional magnetic resonance imaging studies have also demonstrated that PTSD is associated with irregular activation in the anterior insular cortex (implicated in both physical pain perception and emotional regulation), as well as altered subjective experience of pain (Strigo et al., 2010). Another possible mechanism for the relationship between PTSD symptoms and increased pain medication use is hypervigilance for threat cues, both external (e.g., the sound of skidding tires for an MVA survivor) and internal (e.g., pain). Individuals who respond to trauma with prolonged, generalized hypervigilance may be less able to modulate their experience of physical pain (Klossika et al., 2006). Furthermore, trauma survivors who develop avoidance symptoms of PTSD may be more likely to take analgesic medications to avoid physical symptoms of pain that might trigger reminders of the trauma. Note that these hypotheses are speculative because the regression analyses in the current study were cross sectional and can only show correlation, not causal relationships.

Similarly, the use of psychiatric medications may be in part a response to specific PTSD symptoms, or a response to more generalized negative affect or physical pain. Some psychiatric medications (e.g., benzodiazepines) may also be used as an avoidant coping strategy, allowing individuals to obtain relief from both emotional distress and physical pain (Zandstra et al., 2004). Future research should examine trauma survivors' motivations in using pain and psychiatric medications, especially shorter-acting medications intended for immediate symptom relief, to further elucidate whether avoidant coping, increased sensitivity to physical discomfort, or both are responsible for the relationship between PTSD symptoms and medication use.

The hypothesis that trauma type would moderate the mediational association between PTSD symptoms and medication use was not supported. As expected, IPV survivors reported less severe physical injury than MVA survivors and less severe PTSD symptomatology. Physical injury and PTSD symptoms, however, each predicted increased use of pain and psychiatric medications in both traumas. Similar to previous samples of MVA and IPV survivors who showed high utilization of healthcare in general (e.g., Jacobs et al., 2004; Ulrich et al., 2003), this study found high rates of medication use, with 75.6% of the MVA sample and 38.3% of the IPV sample reporting regular pain medications, psychiatric medications, or both. Future examinations of injury and medication use among IPV survivors could profit from including factors that may reduce medical help-seeking, like shame, helplessness, or fear of consequences (Fanslow & Robinson, 2011). Given variations in psychological consequences of single-incident traumas versus repetitive, interpersonal traumas (van der Kolk et al., 2005), associations between injury severity and medication use may be mediated by different factors in different trauma-exposed populations. For example, social support has been identified as a strong predictor of PTSD (Ozer, Best, Lipsey, & Weiss, 2003); social support may vary by trauma type and could influence the relationship between PTSD symptoms and medication use. Continued study of the associations between injury, PTSD symptoms, other possible mediators/moderators, and medication usage is clearly warranted.

One of the strengths of this study was its examination of types of trauma that tend to have different psychosocial consequences, such as stigmatization of IPV survivors versus increased community support for MVA survivors. Both of these traumas have high risks of physical injury. An interesting direction for future research may be examining mediational relationships in traumas in which personal injury is less normative (e.g., emotional abuse without physical or sexual abuse; witnessing harm to others) to extend the findings to individuals whose medication use is less likely to be related to the index trauma itself. Another strength of the current study is its use of a computationally intensive simulation technique, bootstrapping, which allows powerful investigation of mediation even in smaller, nonnormally distributed samples.

The primary limitation of this study was that due to the cross-sectional nature of this data we were unable to examine true mediation as defined by the temporal relationships between injury, PTSD symptoms, and medication use. Unmeasured variables reduce our ability to make causal inferences from the current study, but the correlational relationships support the need for further investigation with longitudinal studies. Other limitations include the measurement of physical injury, a single self-report rating, that was not verified by medical or police records (see O'Donnell et al., 2003). Additionally, reliability checks were not done on the part of the trauma interview that assessed extent of physical injury. Ideally, self-report measures should be confirmed by medical record documentation to minimize interference from the individual's subjective interpretation of their injuries. Similarly, the self-report nature of the medication questionnaire presented a limitation. For example, we did not distinguish between medications that were prescribed before or after the trauma, for several reasons: The self-report data were impossible to verify, participants were often vague about dates or did not remember, and the IPV often occurred over an extended period of time that overlapped with medication prescriptions. Regional differences in health care, such as prescribing practices, between Buffalo and Memphis may have also influenced the results of this study.

This study is the first to examine the relationship between physical injury and medication use in survivors of two different trauma types, and its findings have important clinical implications. Specifically, interventions designed to treat PTSD in IPV survivors (Kubany & Ralston, 2008) do not directly address potential physical consequences of the abuse, such as chronic pain, in contrast to interventions designed for MVA survivors (Blanchard & Hickling, 2004). Treatments for post-IPV distress could include explicit assessment and treatment of the physical and psychological effects of traumatic injury. The current study

demonstrates that injuries are indeed associated with greater distress in survivors of both MVAs and IPV. These results also suggest that identifying and treating PTSD symptoms following traumatic injury may affect medication usage and improve clinical outcomes in all trauma survivors.

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