Intimate partner violence and specific substance use disorders: Findings from the National Epidemiologic Survey on Alcohol and Related Conditions

Philip H. Smith[1], **Gregory G. Homish**[1,2], **Kenneth E. Leonard**[2,3], and **Jack R. Cornelius**[4]

[1]Department of Community Health and Health Behavior, School of Public Health and Health Professions, State University of New York at Buffalo

[2]Research Institute on Addictions, State University of New York at Buffalo

[3]Department of Psychiatry, State University of New York at Buffalo

[4]Department of Psychiatry, University of Pittsburgh

Abstract

The association between substance use and intimate partner violence (IPV) is robust. It is less clear how the use of specific substances relates to relationship violence. This study examined IPV perpetration and victimization related to the following specific substance use disorders: alcohol, cannabis, cocaine and opioid. The poly-substance use of alcohol and cocaine, as well as alcohol and marijuana were also examined. Data were analyzed from wave two of the National Epidemiologic Study on Alcohol and Related Conditions (2004–2005). Associations between substance use disorders and IPV were tested using logistic regression models while controlling for important covariates and accounting for the complex survey design. Alcohol use disorders and cocaine use disorders were most strongly associated with IPV perpetration, while cannabis use disorders and opioid use disorders were most strongly associated with IPV victimization. A diagnosis of both an alcohol use disorder and cannabis use disorder decreased the likelihood of IPV perpetration compared to each individual substance use disorder. A diagnosis of both an alcohol use disorder and cocaine use disorder increased likelihood of reporting IPV perpetration compared to alcohol use disorders alone, but decreased likelihood of perpetration compared to a cocaine use disorder diagnosis alone. Overall, substance use disorders were consistently related to intimate partner violence after controlling for important covariates. These results provide further evidence for the important link between substance use disorders and IPV, and add to our knowledge of which specific substances may be related to relationship violence.

Keywords

Intimate partner violence; substance use; mental health; alcohol use; illicit drug use

Introduction

The likelihood that an individual will experience intimate partner violence (IPV) during their lifetime is high (Breiding, Black, & Ryan, 2008b; Coker, et al., 2002). Based on the National Violence Against Women Survey, Coker and colleagues (2002) estimated that the

Please direct correspondence regarding this manuscript to Philip Smith, Department of Community Health and Health Behavior, School of Public Health and Health Professions, State University of New York at Buffalo, 329 Kimball Tower, 3435 Main Street, Buffalo, NY 14214 (phone: 716.829.5702; fax: 716.829.6040; psmith3@buffalo.edu).

lifetime prevalence of psychological, physical, or sexual IPV was 28.9% for women and 22.9% for men. Using data from the Behavioral Risk Factor Surveillance System, Breiding et al. (2008) found that 29.4% of women and 15.9% of men reported at least one lifetime occurrence of physical or sexual IPV. IPV victimization is associated with numerous adverse health outcomes, such as current poor health, depressive symptoms, chronic disease, chronic mental illness, injury, posttraumatic stress disorder and HIV risk (Breiding, Black, & Ryan, 2008a; Campbell, 2002; Coker, et al., 2002; Hill, Schroeder, Bradley, Kaplan, & Angel, 2009; Johnson & Leone, 2005). While there is strong evidence that substance use is both a risk factor and outcome associated with IPV (Caetano, McGrath, Ramisetty-Mikler, & Field, 2005; El-Bassel, Gilbert, Wu, Go, & Hill, 2005; Leonard, 1993; Stuart, Temple, & Moore, 2007), our understanding of the association between specific substances and IPV is limited. A greater understanding of these associations will potentially allow intervention and prevention efforts to focus more specifically on the substances most closely associated with relationship violence.

Specific substance use and intimate partner violence perpetration

Experimental research has tested a direct psychopharmacologic link between specific substance use and IPV, but the strength of the findings varies by drug class. For example, there is robust evidence that alcohol intoxication increases aggression (Chermack & Giancola, 1997), but findings for marijuana and cocaine are equivocal (Hoaken & Stewart, 2003). These experimental studies are limited in that they only test a direct pathway between acute substance use and aggressive behavior. Thus, insignificant findings for a specific drug type do not necessarily imply that use of this drug does not contribute to relationship violence. There are other pathways through which use of specific substances may lead to relationship violence perpetration (Leonard, 1993; T. M. Moore, et al., 2008), and observational research may be better equipped to tap into these mechanisms.

There is a large body of observational research examining the association between specific substances and IPV perpetration (Foran & O'Leary, 2008; Leonard, 1993; T. M. Moore, et al., 2008); however, the consistency of the findings varies with regards to specific substances. There is strong and consistent evidence that alcohol use is associated with intimate partner violence (Foran & O'Leary, 2008; Leonard, 1993), notwithstanding the few studies that do not find evidence of this effect (Feingold, Kerr, & Capaldi, 2008). Findings on the relation between specific illicit drugs and IPV perpetration are less consistent (Feingold, et al., 2008; Murphy, O'Farrell, Fals-Stewart, & Feehan, 2001; Stuart, et al., 2008). The majority of these studies use treatment or community based samples of convenience, each of which has important limitations. Treatment samples tend to be relatively homogenous, and, are not necessarily representative of the population of individuals with substance use disorders; thus, findings may lack generalizability. Findings from community samples tend to be more broadly applicable, but the prevalence of use disorders with respect to specific substances is often too uncommon in these samples to be studied in any meaningful way. As a solution, most community samples have collapsed drug use into a single variable, or measured general drug use rather than substance use disorders.

Population based samples may be particularly advantageous for addressing the relation between specific substances and intimate partner violence. These samples may be large enough to assess the problematic use of individual substances, while at the same time provide a high degree of external validity. A few previous studies have examined substance use and partner violence perpetration using population based samples (Anderson, 2002; Caetano, et al., 2005; Cunradi, Caetano, & Schafer, 2002; Kantor & Straus, 1987; Stalans & Ritchie, 2008); however, some only examined alcohol (Caetano, et al., 2005; Kantor & Straus, 1987), while others collapsed drug use into a single category (Anderson, 2002; Cunradi, et al., 2002). Stalans and Ritchie (2008) examined associations between specific

substance use types and relationship violence using data from the National Household Survey on Drug Abuse. Their findings indicated that in the overall sample marijuana abuse or dependence was not associated with IPV perpetration, while a significant association was found for past year stimulant use. These findings provide insight into the relation between specific substance use and IPV perpetration; however, the authors were unable to test associations between the abuse of specific stimulant drugs and IPV perpetration, and the IPV outcome measure only included hitting, leaving out other types of physically violent behavior. In an attempt to summarize previous findings across a diverse range of studies, Moore and colleagues (2008) conducted a comprehensive meta-analysis on the relation between specific substance use and IPV perpetration. With regards to physical IPV perpetration, significant effects were found for cocaine and opiates, while the effects for sedatives, marijuana, stimulants, and hallucinogens were not statistically significant.

Moore and colleagues (2008) also called attention to the need for research on how poly-substance use contributes to relationship violence. Substance users often use combinations of substances or substances in sequence (S. C. Moore, 2010), and comorbid substance use may differentially impact relationship violence compared to the use of individual substances. Due to the relatively common co-morbid use of these substances, it may be important to assess the impact on relationship aggression. Moore and Stuart (2004) examined the interaction between alcohol use and other drug use among men in a batterer intervention program, and found a significant effect. However, Murphy et al. (2001) conducted a similar analysis among men in alcohol treatment, and did not find evidence of an interaction. These studies did not assess the interaction between alcohol and individual substances, and are subject to the previously noted limitations of treatment samples, which could account for the conflicting results. Research is needed to assess poly-substance use in more heterogeneous populations.

Specific substance use and IPV victimization

The relation between specific substance use and IPV victimization is also complex, and multiple pathways have been hypothesized (El-Bassel, et al., 2005; Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997). For one, outcomes associated with substance use may generally increase risk for conflict in relationships, leading to violent behavior. Substance use issues can lead to increased stress in the relationship and disputes with regards to, for example, spending money or where and with whom a couple spends time, which may manifest as violent conflict in some couples (Goldstein, 1985). Women may be particularly vulnerable to IPV victimization while they are under the influence of substance use. Also, it has been suggested that women may use drugs like marijuana and tranquilizers to self-medicate the physical and emotional pains of victimization a factor that may operate in cross-sectional studies (Gilbert, El-Bassel, Rajah, et al., 2000; Gilbert, El-Bassel, Schilling, Wada, & Bennet, 2000; Kilpatrick, et al., 1997).

As with IPV perpetration, research generally supports an association between victimization and substance use. Empirical evidence for an association between alcohol use and IPV victimization is conflicting (Breiding, et al., 2008a; Coker, et al., 2002; El-Bassel, et al., 2005; Testa, Livingston, & Leonard, 2003; Walton, et al., 2009). Findings from the small number of studies on IPV victimization and individual illicit drug categories are mixed, making it difficult to draw conclusions about these relations (Coker, et al., 2002; El-Bassel, et al., 2005; Kilpatrick, et al., 1997; Testa, et al., 2003; Walton, et al., 2009). In a population based study of U.S. couples, Coker et al. (2002) found that female IPV victimization was associated with heavy alcohol use and painkiller use, but not with other illicit drug use (the majority of which was likely marijuana). Male IPV victimization was associated with painkiller use and other drug use, but not heavy alcohol use. Although this study was unique

in its assessment of specific substances, problematic use was not assessed, which may have resulted in weakened or null findings.

There is reason to speculate that multiple substance use may interact synergistically when associated with victimization. If the theory that individuals self-medicate with substance use to cope with the emotional and physical pains of IPV victimization is accurate, there is also reason to believe individuals may tap into the synergistic effects of concurrent substance use for this purpose. Thus, it is expected that multiple substance use may be associated with IPV victimization beyond the additive effects of individual substances. Research is needed to examine these effects.

The Present Study

The primary objective of this study was to examine the association between relationship violence and the problematic use of alcohol, cocaine, cannabis and opiates. Secondary objectives were to test for gender differences in these associations, as well as to explore the effect of poly-substance use on relationship violence. Data were examined from the second wave of the National Epidemiologic Survey on Alcohol and Related Conditions. This relatively large dataset, acquired from a nationally representative sample of the U.S. non-institutionalized adult population, contains information on substance use and use disorder diagnoses. The data also contains information on relationship violence perpetration and victimization, as well as several relevant social and mental health variables, making it suitable for addressing this research question. There is little theory to give guidance to which specific substances aside from alcohol may be related to relationship violence, and so hypotheses were driven by findings from previous research. It was hypothesized that alcohol use disorders would be associated with both IPV perpetration and victimization; based on the robust evidence that alcohol is related to relationship violence. It was also hypothesized that stimulant abuse would be associated with IPV perpetration given the existing evidence for this relation. The evidence for an association between marijuana and violence perpetration is highly conflictual. The comprehensive meta-analysis conducted by Moore and colleagues (2008) found that marijuana related to psychological, but not physical relationship aggression. This study examined physical relationship violence; thus, it was hypothesized that marijuana abuse would not be associated with IPV perpetration. A priori hypotheses were not generated for the association between opiate abuse and IPV victimization, for the association between specific substances and IPV victimization, for the assessment of gender differences or for the assessment of drug interactions due to the small number of previous studies examining these topics.

Method

Study Sample

A detailed account of the NESARC methodology can be found elsewhere (Grant & Kaplan, 2005; Grant, Kaplan, Shepard, & Moore, 2003). Briefly, the first wave of NESARC data was collected during 2001 and 2002, and the second during 2004 and 2005. The response rate for the first wave was 81%, and the sample of 43,093 represented the civilian, non-institutionalized adult population in the United States. The second wave included 34,653 of the original respondents. For both waves, surveys were administered face-to-face, using computer-assisted personal interviews. Blacks, Hispanics, and young adults were oversampled, and the data were weighted to adjust for non-response at the household and personal levels. Based on the 2000 Decennial Census, the data was adjusted on socio-demographic variables to ensure an accurate representation of the U.S. population. This study was based on the 25,778 wave two respondents who reported being married, dating, or being in a relationship during the past year.

Measures

Substance use disorders—The NESARC survey contained the National Institute on Alcohol Abuse and Alcoholism's Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV version (AUDADIS-IV) to measure substance use disorders (Grant & Dawson, 2000; Grant, Hasin, Chou, Stinson, & Dawson, 2004). This tool assesses both abuse and dependence diagnoses for alcohol and other specific substances. For a full description of these measures, see Grant et al. (2004). In total, nine different drugs/drug categories were assessed in the NESARC data set: cannabis, cocaine, heroin, opioids, tranquilizers, sedatives, hallucinogens, amphetamines, and inhalants. Questions about drug use were prefaced by requesting that respondents only reported on use not prescribed by a physician. Thus, respondents reported on the illicit use of prescription drugs, such as sedatives, and not their medical use. For this study, respondents were considered problematic substance users if they received either an abuse or dependence diagnosis. Of the drug categories assessed in NESARC, only alcohol, cocaine, cannabis and opioids were examined for this study; other substances were not examined due to low endorsement of their use. Binge drinking was also included in this study to test for its impact relative to the AUD measure. Binge drinking was defined as consuming five or more drinks for men and four or more drinks for women in a single day, and participants reported on how frequently they drank this much during the past 12 months. Responses ranged from 1 to 11 (1 = every day, 11 = never in the last year), and were reverse coded to aid interpretability (0 = never in the last year, 10 = every day).

Two specific poly-substance use combinations were chosen for analysis in this study: diagnosis of both alcohol and cocaine use disorders, and diagnosis of both alcohol and marijuana use disorders. These particular combinations were chosen because of the frequency of their use (S. C. Moore, 2010). Interaction terms were added to regression models in order to create groupings for these poly-substance use combinations.

Intimate partner violence—Five items were used to assess physical IPV perpetration. Respondents were asked how frequently they had engaged in the violent behaviors during the past year (from 0 to 4, never to more than once per month), and then were asked how frequently they had experienced the violent behaviors from their partner. For example, participants were asked, "In the last 12 months, how often did you push, grab or shove your spouse or partner?" and then, "How often did your spouse or partner do this to you?" For this study, responses to the five perpetration questions were combined into a single binary variable representing whether the respondent perpetrated IPV during the past year. The same was done for IPV victimization. There were several reasons for this decision. First, the response options for these questions could not be easily combined. The options included "never", "once", and "twice", but then jumped to "monthly" and "more than monthly", which precluded summing them for a frequency of violence measure. In addition, two items assessed physical aggressive acts, "pushing, grabbing, or shoving" and "slap, kick, bit or hit", and two items were directed at injuries due to violence, which may have occurred because of one the specific actions listed above, but may have occurred due to other aggressive acts that are not captured by limited number of items (e.g. pinched, twisted arm). As a result, it was necessary to include the injury items because they might capture additional aggressive acts, but they could not simply be added to the frequency of the aggressive acts because it would constitute double counting for some individual. For example, a hit that left a bruise might be counted as two items. As a consequence, the more valid approach was to simply indicate whether any IPV had occurred.

Covariates—There are a number of demographic, socio-economic and mental health variables that could potentially account for the association between specific drug types and

mental health disorders. Age, gender, race/ethnicity, education and household income were examined as socio-demographic covariates, and antisocial symptoms and depression symptoms as mental health covariates. The NESARC survey asked a number of questions regarding depression and antisocial symptoms, to which respondents answered yes or no for whether or not they occurred during the past year for depression and during their lifetime for antisocial behavior. Affirmative responses were summed for each of these variables, creating a count variable for antisocial (0–30) and depression (0–19) symptoms.

As pointed out by Anderson (2002) and others (Johnson & Leone, 2005), a large proportion of violence in community based samples tends to be mutual, and so victims are often perpetrators and perpetrators are often also victims. In light of evidence that both perpetration and victimization are related to substance use, it is important to consider the potential confounding effect of victimization when examining perpetration, and vice versa. Thus, victimization was examined as a covariate in perpetration models, and perpetration was examined as a covariate in the victimization models.

Statistical Analyses

All statistical analyses for this study were conducted using Stata/SE version 10.0 (StataCorp, 2007), taking into account NESARC's complex survey design (sampling, weighting scheme, etc.). Chi-square tests of independence and t-tests were employed to examine differences in frequencies and means of covariates and substance use variables between those reporting IPV and the remainder of the sample. Logistic regression analyses were conducted in order to examine associations while adjusting for potentially confounding covariates. Models were created in a stepwise fashion, and separate models were calculated for IPV perpetration and victimization. Given the correlations between perpetration and victimization, one would ideally want to assess the influence of substance use on perpetration after controlling for victimization and vice versa. However, many episodes of couple violence involve aggressive actions by both members (Anderson, 2002; Johnson, 2006). As a result, statistically controlling for victimization when examining perpetration can have the effect of removing predictable variance that is attributable to perpetration among mutually violent couples.[1] A similar problem arises in examining victimization. Consequently, we present analyses of perpetration with and without victimization in the model. Similarly, our analyses of victimization were conducted with and without perpetration in the model. Understanding whether a specific substance is related to perpetration or victimization depends upon the full set of analyses.

For our base models, initially a main effects model was created that controlled for socio-demographic characteristics, symptoms of depression and antisocial symptoms. Second, several interactions were tested for significance: gender by each substance use variable, alcohol use disorder by cocaine use disorder, and alcohol use disorder by cannabis use disorder. If a significant interaction was detected, simple slope analyses were conducted to generate separate odds ratios for individual groups. These same procedures were then repeated with the inclusion of victimization as a covariate in the analysis of perpetration and the inclusion of perpetration as a covariate in the analysis of victimization.

Due to listwise deletion of respondents with missing data, the full logistic model for IPV perpetration included 25,633 of the 25,778 respondents in a relationship (99.4%), and the full model for IPV victimization included 25,631 of the respondents in a relationship (99.4%). Those with missing data were older (mean = 50.70 compared to 46.43) and more

---

[1] We would like to thank an anonymous reviewer for suggesting the presentation of models with and without accounting for the correlation between IPV perpetration and victimization.

likely to be black, Hispanic/Latino, or other race/ethnicity. There was also a slightly lower prevalence of IPV among those with missing data (3.0% compared to 5.3% for victimization, and 3.7% compared to 5.4% for perpetration). However, it was not expected that these differences would impact the results in any meaningful way, given that less than 1% of the sample had any missing data.

Results

Intimate Partner Violence

Females were slightly more likely to report past year IPV perpetration than males (6.9% and 4.0%, respectively). The reverse was true for victimization, with 5.6% of men experiencing IPV victimization compared to 5.0% of women. Of those reporting IPV perpetration, 74.9% of men and 54.3% of women also reported IPV victimization. Table 1 displays a comparison between those reporting IPV perpetration, those reporting IPV victimization, and the remainder of the sample on sociodemographic and mental health variables. Perpetrators were more likely to be female, were younger, were more likely to be of non-white race/ethnicity, had lower levels of education and household income, and displayed greater numbers of depression and antisocial symptoms (all p-values < 0.001). IPV victims were more likely to be male, were younger, were more likely to be of non-white race/ethnicity, had lower levels of education and household income, and displayed greater numbers of depression and antisocial symptoms (all p-values < 0.001).

Table 2 displays the prevalence of substance use disorders by IPV perpetrator and victim status. All substance use disorders examined (alcohol, cocaine, cannabis, opioids) were more prevalent among both IPV perpetrators and IPV victims than the remainder of the sample (all p-values < 0.001). Alcohol use disorders were the most prevalent use disorders among IPV perpetrators (21.7%), followed by cannabis use disorders (5.8%). Cocaine use disorders and opioid use disorders were less prevalent (2.1% and 1.5%, respectively). Alcohol use disorders were the most prevalent use disorders among IPV victims (24.6%), followed by cannabis use disorders (7.4%). Cocaine use disorders and opioid use disorders were less prevalent (2.0% and 2.4%, respectively).

Intimate partner violence perpetration: Logistic regression results

Table 3 displays the odds ratios for substance use disorder associations with IPV perpetration, calculated using logistic regression and adjusted for demographics. There were notable differences between models unadjusted for and adjusted for victimization. For the main effects models alcohol use disorders and cocaine use disorders were significantly associated with IPV perpetration both before and after controlling for victimization. Binge drinking frequency and cannabis use disorders were significantly associated with perpetration only when estimates were unadjusted for victimization. Opioid use disorders became significantly inversely associated with perpetration when estimates accounted for victimization.

Significant gender by substance use interactions were found for alcohol use disorders, binge drinking frequency and cannabis use disorders both before and after including victimization in model estimates. No significant gender by substance use interactions were found for cocaine or opioid use disorders. Without controlling for victimization, the association with alcohol use disorders was significant for both males and females, although the association was stronger for females than males. When victimization was accounted for in estimates, the association was no longer significant for males. Binge drinking frequency was associated with IPV perpetration for females but not males regardless of whether victimization was included in the model. For males, the association with cannabis use disorders was non-

significant without controlling for victimization, and inversely significant when victimization was accounted for. For females, the association was no longer significant when estimates accounted for victimization.

Intimate partner violence victimization: Logistic regression results

Table 4 displays the odds ratios for substance use disorder associations with IPV victimization, calculated using logistic regression and adjusted for demographics. There were notable differences between models unadjusted for and adjusted for perpetration. For the main effects models, alcohol use disorders, frequency of binge drinking and cannabis use disorders were significantly associated with IPV victimization both before and after controlling for perpetration. Opioid use disorders became significantly associated with victimization after controlling for perpetration. Cocaine use disorders became significantly inversely associated with victimization after controlling for perpetration.

In models that did not account for perpetration, significant gender by use disorder interactions were found for all substances except cocaine. The associations with alcohol use disorders and cannabis use disorders were significant for both males and females, with odds ratios that were slightly lower for males than females. The associations with binge drinking and opioid use disorders were significant only for females. There were no significant gender by use disorder interactions when victimization was statistically controlled. However, the interaction odds ratio for opioid use disorders was close to significant ($p = 0.052$), with a significant, positive association for females and no association for males.

Poly-substance use interactions

Results from the logistic regression analysis of poly-substance use interactions are shown in Table 5. These odds ratios were adjusted for demographic covariates. With regards to IPV perpetration, a significant interaction was found for both alcohol use disorder by cocaine use disorder and alcohol use disorder by cannabis use disorder. Alcohol use disorder without cocaine use disorder and cocaine use disorder without alcohol use disorder were both significantly associated with IPV perpetration, regardless of whether models adjusted for victimization. Evidence was found that those with both a cocaine use disorder and alcohol use disorder had greater odds of reporting IPV perpetration than those with an alcohol use disorder only, although the association was statistically significant only in the model adjusting for victimization. Conversely, having both use disorders was associated with decreased odds of reporting IPV perpetration compared to those with a cocaine use disorder only. Again, this was only significant in the model adjusting for victimization.

With regards to cannabis, the general finding was that alcohol use disorders alone and cannabis use disorders alone were associated with increased odds of IPV perpetration; however, having co-morbid use disorders decreased the odds of IPV perpetration relative to each individual use disorder. With regards to IPV victimization, no evidence was found for an interaction between alcohol and cocaine. In the model controlling for perpetration, the interaction between cannabis use disorder and alcohol use disorder was statistically significant. Having combined alcohol and cannabis use disorders was associated with increased odds of IPV victimization relative to each individual substance.

Discussion

This study examined the associations between specific substance use disorders and intimate partner violence, using data from wave two of NESARC. The findings substantiated our understanding of the role illicit drug use plays in relationship violence. The NESARC dataset was large enough to examine these relations and produce nationally generalizable

results. Consistent patterns emerged for the individual substances examined in this study, some of which differed by gender.

One of the key aspects of the results is to understand the inter-dependent nature of perpetration and victimization in the context of partner violence. It is often the case that aggressing against one's partner and receiving aggression from one's partner are linked at the level of the incident. As a result, if a drug were to have an acute effect only on the perpetration of violence, it would necessarily have a relationship both with perpetration directly and influence the relationship with victimization indirectly through the impact of perpetration on the other person's defensive or retaliatory response. If nearly every perpetration were followed by an aggressive response by the other person, controlling for victimization in the analysis would remove a substantial portion of the variance in perpetration. Consequently, understanding the role of substance use in partner violence requires that we examine both perpetration and victimization, both independently as well as controlling for each other.

Cocaine Use Disorders

Perhaps the clearest picture emerges for the association between cocaine use disorders and partner violence. Our hypothesis that cocaine use disorders would be associated with relationship violence perpetration was confirmed, and the result was consistent for both males and females, with and without controlling for victimization. Moreover, this relationship is actually strengthened after controlling for victimization. This provides robust evidence that problematic cocaine use is associated with relationship violence perpetration. In a recent meta-analysis of the association between illicit drug use and IPV perpetration, Moore et al. (2008) found that cocaine use had the largest effect size compared to other drug use, and our results support this finding.

Conversely, cocaine use disorders were not related to victimization in the unadjusted model, but were related to a reduced likelihood of IPV victimization for both men and women in the model adjusted for perpetration. There is little previous research with which to compare this finding. El-Bassel et al. (2005) found some evidence that women using cocaine were more likely to be victims of relationship violence; however, their study used a treatment sample of women seeking methadone, and it is difficult to draw comparisons across these highly different study samples. One can speculate that the positive association with perpetration and inverse association with victimization are due to the psychopharmacologic effects of cocaine use, but alternative explanations cannot be ruled out due this study's design.

Opioid Use Disorders

The results relative to opiate use and partner violence also provide a fairly consistent pattern. Opioid use disorders were not associated with violence in the unadjusted models. However, they were associated with a decreased likelihood of violence perpetration for both men and women when victimization was added to the model. Conversely, opioid use disorders were positively associated with victimization. However, the interaction of opioid disorders and gender, which was significant in the unadjusted model and marginal (p=.052) when perpetration was controlled, indicated that opioid disorders were associated with an increased risk of victimization for women. This may indicate that opioid disorders increase the likelihood of victimization for women, or that victimization leads to opioid use for women. Female victims of relationship violence tend to experience more injury and psychological distress than men (Stets & Straus, 1990), which might account for the significant association of opioid use disorders and victimization among women but not among men.

Marijuana

In their meta-analysis, Moore et al. (2008) found that marijuana use was associated with psychological but not physical IPV perpetration. Physical violence was the outcome of interest in this study; thus, we hypothesized a null association between marijuana and IPV perpetration. Our findings were mixed, based on gender differences and whether models accounted for variance associated with IPV victimization. The interaction between cannabis use disorders and gender was significant in both the unadjusted and the models adjusting for victimization. For women, marijuana was associated with increased perpetration, although the association when controlling for victimization did not reach statistical significance (p = 0.08). This may suggest that marijuana use is more strongly implicated in mutual relationship violence than independently perpetrated violence for women. The association was inverse and significant for men when victimization was entered into the model, suggesting that heavy, problematic marijuana use may decrease the likelihood of non-reciprocated violence. Marijuana use disorders were robustly associated with IPV victimization, for both men and women. Previous researchers have speculated that IPV victims may self-medicate with substance use to cope with the effects of violence (El-Bassel, et al., 2005; Testa, et al., 2003); therefore, it is possible these associations with marijuana are due to the analgesic effects of acute use.

Alcohol Use Disorders

There is a large body of literature implicating problematic alcohol use as a risk factor for relationship violence (Foran & O'Leary, 2008; Leonard, 1993). Thus, we hypothesized that alcohol use disorders would be associated with both violence perpetration and victimization. The results were generally consistent with this expectation. Alcohol use disorders were robustly associated with IPV perpetration and victimization. However, there was also an interaction between AUD and gender, both for perpetration and victimization, suggesting that the effect of AUD, although significant for women and men, was stronger for women than for men. This interaction was not significant for victimization when perpetration was statistically controlled, suggesting that it might be applicable primarily for mutual violence. The interaction remained significant for perpetration while controlling for victimization, and indicated that the association between AUD and perpetration was significant for women, but not for men. Again, inasmuch as there is a very strong relationship between perpetration and victimization, these findings suggest that AUD is related to mutual IPV among men (the relationship held when victimization was controlled), but may be less relevant for male only violence.

The findings with respect to the relationship between frequency of binge drinking and IPV were somewhat different. These analyses suggested that binge drinking was associated with women's perpetration, and that this relationship was not affected by controlling for victimization. For men, binge drinking was not related to perpetration. For both men and women, binge drinking was related to victimization, irrespective of perpetration. The pattern of findings suggests that binge drinking was specifically related to women's perpetration, and associated with men's and women's victimization.

Drug interactions

The exploratory analyses for specific drug interactions uncovered some interesting patterns. For the alcohol by cocaine interaction, findings suggest that having both an alcohol and cocaine use disorder increased risk for violence perpetration relative to having only an alcohol use disorder, but decreased risk for violence perpetration relative to having only a cocaine use disorder. It seems plausible that this reflects a patterning of use in which alcohol is used, either simultaneously or subsequent to cocaine use to modulate the effect of the cocaine. This pattern has been reported to be fairly common (S.C. Moore, 2010). Similarly,

the combination of cannabis and alcohol use disorders decreased risk relative to both individual use disorders, possibly suggesting that the synergistic effects of simultaneous cannabis and alcohol consumption decrease risk for aggressive behavior. However, it is important to note that explanations based on simultaneous use are purely speculative, as NESARC did not assess whether these substances were used simultaneously. Clearly, more research is needed to understand the joint impact of these substance use disorders with regards to violent behavior.

Limitations

This study was subject to some limitations. As previously noted, the study design for the current report was cross-sectional, which does not allow analyses to establish temporal relationships between variables. Although NESARC is a two-wave longitudinal study, intimate partner violence was assessed differently at waves one and two, making a comparison between waves methodologically unsound. The wave two data were chosen for this study because the assessment of IPV was more comprehensive than the first wave. Past research has focused on substance use as a risk factor for IPV perpetration and both predictors and outcomes related to victimization, but this directionality cannot be supported or refuted by this study. Taken in context with previous research, the findings from this study provide valuable information on the relationship between specific substance use and IPV. Also, intimate partner violence was only measured at the individual, and not the couple, level. Thus there was no way to verify the respondents' reports of either IPV victimization or perpetration. This may be important given that relationship violence tends to be under-reported in survey research (Dutton & Hemphill, 1992). It would have been difficult for the NESARC study to evaluate couple-level variables and still obtain such a large sample size, and it is the large sample size that allowed this study to examine specific substance use disorders for both men and women, and for both IPV perpetration and victimization. Future longitudinal research that assesses these variables at the couple level can build on this study's findings. Lastly, those with a predisposition to act aggressively may be less likely to be in a relationship at any one time point than others. Thus, a limitation of this sample is that aggressive individuals may be underrepresented in the study sample.

Conclusions

All substance use disorders examined in this study were related to intimate partner violence after controlling for important covariates. There were several differences between results when models were adjusted or unadjusted for the interdependence between IPV perpetration and victimization, and the comparison of these findings provides insight into possible differences between mutually violent couples and couples where only one partner is physically violent. The findings from this study, especially when adjusting for the correlation between victimization and perpetration, were largely consistent with what might be expected when considering the psychopharmacological effects of the drugs. Alcohol and cocaine were most strongly associated with intimate partner violence, while cannabis and opioid analgesics were most strongly associated with victimization. Conversely, associations with victimization were weak or inverse for cocaine, while associations with perpetration were weak or inverse for marijuana and opioids. It is impossible to conclusively determine the mechanisms underlying the findings of this study, but this consistency is certainly worth noting, and may indicate that the psychopharmacologic effects of drugs are more strongly implicated when only one partner is violent, while other mechanisms such as conflict surrounding drug use may be more strongly related to mutual IPV. When significant gender effects were detected, associations tended to be stronger for women than for men, especially with regards to victimization. Poly-substance use effects for specific combined use disorders were also detected, highlighting the importance of the further exploration of these findings. Overall, this study supported the continued exploration of possible mechanisms underlying

the association between substance use and relationship violence, as well as the simultaneous treatment of these problematic behaviors (Stuart, et al., 2007).

Acknowledgments

Reference List

Anderson KL. Perpetrator or victim? Relationships between intimate partner violence and well-being. Journal of Marriage and Family. 2002; 64(4):851–863.

Breiding MJ, Black MC, Ryan GW. Chronic disease and health risk behaviors associated with intimate partner violence--18 U.S. states/territories, 2005. Annals of Epidemiology. 2008a; 18(7):538–544. [PubMed: 18495490]

Breiding MJ, Black MC, Ryan GW. Prevalence and risk factors of intimate partner violence in eighteen U.S. states/territories, 2005. American Journal of Preventive Medicine. 2008b; 34(2):112–118. [PubMed: 18201640]

Caetano R, McGrath C, Ramisetty-Mikler S, Field CA. Drinking, alcohol problems and the five-year recurrence and incidence of male to female and female to male partner violence. Alcoholism: Clinical and Experimental Research. 2005; 29(1):98–106.

Campbell JC. Health consequences of intimate partner violence. The Lancet. 2002; 359(9314):1331–1336.

Chermack ST, Giancola PR. The relation between alcohol and aggression: An integrated biopsychosocial conceptualization. Clinical Psychology Review. 1997; 17(6):621–649. [PubMed: 9336688]

Coker AL, Davis KE, Arias I, Desai S, Sanderson M, Brandt HM, et al. Physical and mental health effects of intimate partner violence for men and women. American Journal of Preventive Medicine. 2002; 23(4):260–268. [PubMed: 12406480]

Cunradi CB, Caetano R, Schafer J. Alcohol-related problems, drug use, and male intimate partner violence severity among US couples. Alcoholism: Clinical and Experimental Research. 2002; 26(4):493–500.

Dutton D, Hemphill K. Patterns of socially desirable responding among perpetrators and victims of wife assault. Violence And Victims. 1992; 7(1):29–39. [PubMed: 1504031]

El-Bassel N, Gilbert L, Wu E, Go H, Hill J. Relationship between drug abuse and intimate partner violence: a longitudinal study among women receiving methadone. American Journal Of Public Health. 2005; 95(3):465–470. [PubMed: 15727978]

Feingold A, Kerr DCR, Capaldi DM. Associations of substance use problems with intimate partner violence for at-risk men in long-term relationships. Journal of Family Psychology. 2008; 22(3):429–438. [PubMed: 18540771]

Foran HM, O'Leary KD. Alcohol and intimate partner violence: A meta-analytic review. Clinical Psychology Review. 2008; 28(7):1222–1234. [PubMed: 18550239]

Gilbert L, El-Bassel N, Rajah V, Foleno A, Fontdevila J, Frye V, et al. The converging epidemics of mood-altering-drug use, HIV, HCV, and partner violence: a conundrum for methadone maintenance treatment. The Mount Sinai Journal of Medicine, New York. 2000; 67(5–6):452.

Gilbert L, El-Bassel N, Schilling R, Wada T, Bennet B. Partner violence and sexual HIV risk behaviors among women in methadone treatment. AIDS and Behavior. 2000; 4(3):261–269.

Goldstein PJ. The drugs/violence nexus: A tripartite conceptual framework. Journal of Drug Issues. 1985; 15(4):493–506.

Grant, BF.; Dawson, DA. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV). Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 2000.

Grant BF, Hasin DS, Chou SP, Stinson FS, Dawson DA. Nicotine Dependence and Psychiatric Disorders in the United States: Results From the National Epidemiologic Survey on Alcohol and

Related Conditions. Archives of General Psychiatry. 2004; 61(11):1107–1115. [PubMed: 15520358]

Grant, BF.; Kaplan, K. Source and accuracy statement for wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 2005.

Grant, BF.; Kaplan, K.; Shepard, J.; Moore, T. Source and accuracy statement for wave 1 of the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions. Bathesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2003.

Hill T, Schroeder R, Bradley C, Kaplan L, Angel R. The long-term health consequences of relationship violence in adulthood: An examination of low-income women from Boston, Chicago, and San Antonio. American Journal Of Public Health. 2009; 99(9):1645. [PubMed: 19608949]

Hoaken PNS, Stewart SH. Drugs of abuse and the elicitation of human aggressive behavior. Addictive Behaviors. 2003; 28(9):1533–1554. [PubMed: 14656544]

Johnson MP. Conflict and Control: Gender Symmetry and Asymmetry in Domestic Violence. Violence Against Women. 2006; 12(11):1003–1018. [PubMed: 17043363]

Johnson MP, Leone JM. The differential effects of intimate terrorism and situational couple violence: findings from the national violence against women survey. Journal of Family Issues. 2005; 26(3): 322–349.

Kantor G, Straus M. The "drunken bum" theory of wife beating. Social Problems. 1987:213–230.

Kilpatrick DG, Acierno R, Resnick HS, Saunders BE, Best CL. A 2-year longitudinal analysis of the relationships between violent assault and substance use in women. Journal of Consulting and Clinical Psychology. 1997; 65(5):834–847. [PubMed: 9337502]

Leonard KE. Drinking patterns and intoxication in marital violence: Review, critique, and future directions for research. Alcohol and interpersonal violence: Fostering multidisciplinary perspectives. 1993:253–280.

Moore SC. Substitution and complementarity in the face of alcohol-specific policy interventions. Alcohol and Alcoholism. 2010; 45(5):403–408. [PubMed: 20729529]

Moore TM, Stuart GL. Illicit substance use and intimate partner violence among men in batterers' intervention. Psychology of Addictive Behaviors. 2004; 18(4):385–389. [PubMed: 15631612]

Moore TM, Stuart GL, Meehan JC, Rhatigan DL, Hellmuth JC, Keen SM. Drug abuse and aggression between intimate partners: A meta-analytic review. Clinical Psychology Review. 2008; 28(2):247–274. [PubMed: 17604891]

Murphy CM, O'Farrell TJ, Fals-Stewart W, Feehan M. Correlates of intimate partner violence among male alcoholic patients. Journal of Consulting and Clinical Psychology. 2001; 69(3):528–540. [PubMed: 11495182]

Stalans LJ, Ritchie J. Relationship of substance use/abuse with psychological and physical intimate partner violence: Variations across living situations. Journal of Family Violence. 2008; 23(1):9–24.

StataCorp. Stata Statistical Software (Version 10 MP). College Station; StataCorp LP: 2007.

Stets JE, Straus MA. Gender differences in reporting marital violence and its medical and psychological consequences. Physical violence in American families. 1990; 8(145):151–166.

Stuart GL, Temple JR, Follansbee KW, Bucossi MM, Hellmuth JC, Moore TM. The role of drug use in a conceptual model of intimate partner violence in men and women arrested for domestic violence. Psychology of Addictive Behaviors. 2008; 22(1):12–24. [PubMed: 18298227]

Stuart GL, Temple JR, Moore TM. Improving batterer intervention programs through theory-based research. JAMA. 2007; 298(5):560–562. [PubMed: 17666677]

Testa M, Livingston JA, Leonard KE. Women's substance use and experiences of intimate partner violence: A longitudinal investigation among a community sample. Addictive Behaviors. 2003; 28(9):1649–1664. [PubMed: 14656551]

Walton MA, Murray RL, Cunningham RM, Chermack ST, Barry KL, Booth BM, et al. Correlates of intimate partner violence among men and women in an inner city emergency department. Journal of Addictive Diseases. 2009; 28(4):366–381. [PubMed: 20155606]

Table 1

Description of sample by perpetrator and victim status: Socio-demographic characteristics and mental health illness symptoms

	Perpetrator	Non-perpetrator	Victim	Non-victim
Sex				
Male	37.2%	51.6%	53.5%	50.7%
Female	62.8%	48.4%	46.5%	49.3%
Age				
Mean (SE)	38.73 (0.22)	46.88 (0.07)	38.81 (0.22)	46.87 (0.07)
Race/ethnicity				
White, non-Hispanic	57.5%	72.8%	59.0%	72.7%
Black, non-Hispanic	18.3%	9.2%	17.2%	9.3%
Hispanic/Latino	16.5%	11.5%	17.0%	11.5%
Other	7.6%	6%	6.9%	6.5%
Education level				
< High school	16.8%	11.9%	16.2%	12.0%
High school or equivalent	31.6%	26.6%	2.9%	26.8%
> High school	51.7%	61.5%	54.6%	61.3%
Household income				
< $25,000	29.3%	18.4%	27.9%	18.5%
$25,000–$49,999	31.6%	27.7%	31.6%	27.7%
$50,000–79,999	22.3%	26%	22.0%	26%
>79,999	16.9%	27.8%	18.6%	27.7%
Antisocial symptoms (0–30)				
0 symptoms	58.3%	82.5%	55.1%	82.7%
1–2 symptoms	27.0%	14.4%	28.0%	14.4%
3 or more symptoms	14.7%	3.1%	17.0%	3.0%
Depression symptoms (0–19)				
0–1 symptoms	68.6%	84.8%	66.7%	84.9%
2 or more symptoms	31.4%	15.2%	33.3%	15.1%

Note. Based on those in a relationship at wave 2 of the NESARC survey (N=25,778). Frequencies take into account the sampling and weighting procedures of the study design. All differences were statistically significant (p<0.001), based on chi-square tests of independence for categorical variables and t-tests for continuous variables.

Table 2

Frequencies of specific substance use disorders by perpetrator and victim status

	Perpetrator	Non-perpetrator	Victim	Non-victim
Alcohol use disorder	21.7%	9.7%	24.6%	9.5%
Cocaine use disorder	2.1%	<0.1%	2%	<0.1%
Cannabis use disorder	5.8%	1.4%	7.4%	1.3%
Opioid use disorder	1.5%	0.1%	2.4%	0.1%

Note. Based on those in a relationship at wave 2 of the NESARC survey (N=25,778). Frequencies take into account the sampling and weighting procedures of the study design. All differences were statistically significant (p<0.001).

Table 3

Intimate partner violence perpetration results from logistic regression (n=25,633)

	Main effects	Main effects, adjusted for victimization	Gender interactions	Gender interactions, adjusted for victimization
Alcohol UD	**1.58 (1.44, 1.75)**[***]	**1.35 (1.19, 1.54)**[***]	---	---
Alcohol UD x Gender			**0.79 (0.67, 0.92)**[**]	**0.65 (0.52, 0.80)**[***]
Males			**1.41 (1.24, 1.61)**[***]	1.10 (0.93, 1.31)
Females			**1.79 (1.59, 2.01)**[***]	**1.71 (1.45, 2.01)**[***]
Binge drinking (0–10)	**1.03 (1.02, 1.05)**[***]	1.02 (1.00, 1.04)	---	---
Binge drinking x Gender			**0.95 (0.93, 0.97)**[***]	**1.08 (1.05, 1.11)**[***]
Males			1.01 (0.99, 1.03)	0.98 (0.96, 1.01)
Females			**1.06 (1.04, 1.08)**[***]	**1.06 (1.03, 1.09)**[***]
Cocaine UD	**1.91 (1.39, 2.64)**[***]	**2.76 (2.05, 3.73)**[***]	---	---
Cocaine UD x Gender			0.71 (0.35, 1.44)	0.61 (0.20, 1.85)
Males				
Females				
Opioid UD	0.75 (0.54, 1.05)	**0.44 (0.29, 0.67)**[***]	---	---
Opioid UD x Gender			0.75 (0.44, 1.27)	0.81 (0.41, 1.61)
Males				
Females				
Cannabis UD	**1.30 (1.06, 1.69)**[*]	0.86 (0.64, 1.34)	---	---
Cannabis UD x Gender			**0.58 (0.41, 0.82)**[**]	**0.40 (0.22, 0.73)**[**]
Males			1.02 (0.77, 1.36)	**0.60 (0.41, 0.87)**[**]
Females			**1.77 (1.38, 2.27)**[***]	1.49 (0.95, 2.33)

Note. UD = use disorder. All models adjusted for age, gender, household income, education, race/ethnicity, depression symptoms, and antisocial symptoms. Models also adjusted for victimization where specified in heading. Estimates took into account the sampling and weighting procedures of the survey design.

[*] p<0.05,

[**] p<0.01,

[***] p<0.001

Table 4

Intimate partner violence victimization results from logistic regression (n=25,631)

	Main effects	Main effects, adjusted for perpetration	Gender interactions	Gender interactions, adjusted for perpetration
Alcohol UD	**1.52 (1.39, 1.66)*****	**1.27 (1.14, 1.42)*****	---	---
Alcohol UD x Gender			**0.83 (0.72, 0.97)***	1.14 (0.94, 1.38)
Males			**1.42 (1.29, 1.58)*****	
Females			**1.71 (1.49, 1.95)*****	
Binge drinking (0–10)	**1.04 (1.02, 1.05)*****	**1.03 (1.01, 1.05)****	---	---
Binge drinking x Gender			**0.96 (0.93, 0.98)*****	1.00 (0.97, 1.03)
Males			1.02 (1.00, 1.04)	
Females			**1.07 (1.05, 1.08)*****	
Cocaine UD	1.05 (0.76, 1.44)	**0.64 (0.50, 0.82)****	---	---
Cocaine UD x Gender			0.71 (0.36, 1.38)	0.76 (0.28, 2.09)
Opioid UD	1.33 (0.99, 1.79)	**2.20 (1.50, 3.22)*****	---	---
Opioid UD x Gender			**0.63 (1.01, 2.50)***	0.52 (0.27, 1.01)[a]
Males			1.10 (0.71, 1.70)	1.71 (0.89, 3.30)
Females			**1.75 (1.30, 2.34)*****	**3.27 (2.61, 4.09)*****
Cannabis UD	**1.66 (1.42, 1.94)*****	**1.81 (1.47, 2.23)*****	---	---
Cannabis UD x Gender			**0.77 (0.59, 0.99)***	1.36 (0.81, 2.26)
Males			**1.52 (1.25, 1.84)*****	
Females			**1.97 (1.60, 2.43)*****	

Note. UD = use disorder. All models adjusted for age, gender, household income, education, race/ethnicity, depression symptoms, and antisocial symptoms. Models also adjusted for victimization where specified in heading. Estimates took into account the sampling and weighting procedures of the survey design.

[a]The p-value for the opioid UD x gender odds ratio was 0.052.

*
p<0.05,

**
p<0.01,

***
p<0.001

Table 5

Poly-substance use and relationship violence: Testing interactions between multiple substance use disorders.

	Perpetration (N=25,633)		Victimization (N=25,631)	
	Without adjustment for victimization	**Adjusted for victimization**	**Without adjustment for perpetration**	**Adjusted for perpetration**
Model 1:				
Alcohol UD x Cocaine UD	**0.31 (0.15, 0.65)**[**]	**0.22 (0.08, 0.58)**[**]	0.51 (0.70, 4.46)	1.01 (0.32, 3.17)
Cocaine UD alone	**4.65 (2.51, 8.61)**[***]	**8.91 (5.23, 14.3)**[***]	---	---
Alcohol UD alone	**1.61 (1.46, 1.77)**[***]	**1.38 (1.22, 1.57)**[***]	---	---
Combined, compared to cocaine UD alone	0.50 (0.24, 1.04)	**0.29 (0.11, 0.81)**[*]	---	---
Combined, compared to alcohol UD alone	1.45 (0.98, 2.13)	**1.92 (1.06, 3.45)**[*]	---	---
Model 2:				
Alohol UD x Cannabis UD	**0.39 (1.76, 3.02)**[***]	**0.21 (0.13, 0.36)**[***]	0.78 (0.57, 1.07)	**1.78 (1.09, 2.90)**[*]
Cannabis UD alone	**2.30 (1.76, 3.02)**[***]	**2.17 (1.42, 3.32)**[**]	---	1.27 (0.83, 1.96)
Alcohol UD alone	**1.70 (1.54, 1.89)**[***]	**1.51 (1.33, 1.72)**[***]	---	1.21 (1.09, 1.34)
Combined, compared to cannabis UD alone	**0.67 (0.50, 0.88)**[**]	**0.32 (0.19, 0.53)**[***]	---	**2.15 (1.30, 3.56)**[***]
Combined, compared to alcohol UD alone	**0.90 (0.72, 1.12)**	**0.46 (0.34, 0.63)**[***]	---	**2.26 (1.83, 2.81)**[***]

Note. UD = use disorder. Results based on logistic regression. All models controlled for age, sex, education, household income, depression symptoms and antisocial symptoms. Models also adjusted for perpetration or victimization where noted in column heading.

[*] p<0.05,

[**] p<0.01,

[***] p<0.001