Published in final edited form as:

Drug Alcohol Depend. 2008 November 1; 98(0): 35–44. doi:10.1016/j.drugalcdep.2008.04.010.

Partner Aggression among Men and Women in Substance Use Disorder Treatment: Correlates of Psychological and Physical Aggression and Injury

Stephen T. Chermack^{1,2}, Regan L Murray^{1,2}, Maureen A Walton¹, Brenda A Booth³, John Wryobeck⁴, and Frederic C. Blow^{1,2}

¹University of Michigan Addiction Research Center, Department of Psychiatry, University of Michigan, Ann Arbor, MI

²Serious Mental Illness Treatment Research Evaluation Center (SMITREC), VA Ann Arbor Healthcare System, Ann Arbor, MI

³Division of Health Services Research, Department of Psychiatry, University of Arkansas for Medical Sciences, Little Rock, AR

⁴Department of Psychiatry, University of Toledo, Toledo, OH

Abstract

This study examined intimate partner aggression in a sample of 489 participants enrolled in substance use disorder treatment, and expands on prior research by including measures of various forms of aggression, a mixed gender sample (76% men, 24% women), and measurement of several potential risk domains. Aggression measures included both *participant-to-partner* and *partner-to-participant* psychological aggression, physical aggression and injury. Analyses focused on the role of distal and proximal risk factors, including demographics, history of childhood physical and sexual abuse, and family history of problems with alcohol, drugs and depression, as well as recent substance use and symptoms of depression. Overall rates of *participant-to-partner* psychological aggression (77%), physical aggression (54%) and injuring partners (33%) were high, as were rates of *partner-to-participant* psychological aggression (73%), physical aggression (51%), and injury (33%). Several distal (family history variables, physical abuse) and proximal factors (binge drinking, several different drugs, depressive symptoms) were bivariate related to most of the aggression measures. However, according to multivariate analyses predicting aggression and injury measures, binge drinking and cocaine use were the drugs significantly associated with most measures, depression symptoms also were related to most aggression and injury measures, and a history of reported childhood physical abuse was related to all frequency of aggression and injury measures among those reporting such behaviors. Overall, the high rates of aggression among both men and women observed in this study further illustrate the need for interventions targeting substance use and aggression, and for further research regarding the inter-relationships among substance, aggression and depressive symptoms.

Keywords

alcohol; drugs; violence; cocaine; depressive symptoms

Correspondence and requests for reprints should be addressed to: Stephen T. Chermack, Ph.D., Psychiatry (116C), VA Ann Arbor, 2215 Fuller Road, Ann Arbor, MI 48105. Phone (734) 845-3908, fax (734) 845-3235, Chermack@umich.edu.

The views expressed in this article are those of the authors and do not necessarily represent the views of the University of Michigan, University of Arkansas for Medical Sciences, University of Toledo or the Department of Veterans Affairs.

1. Introduction

There is clear evidence suggesting a relationship between substance abuse and partner aggression. Studies with patients in substance use disorder (SUD) treatment programs typically have found rates of past year intimate partner violence (IPV) exceeding 50% (e.g., Chermack et al., 2000; O'Farrell and Murphy, 1995) which is significantly higher than rates found in community samples (~16–20%) (Field and Caetano, 2005a; Straus and Gelles, 1990). The relationship between aggression and substance abuse is complex, as several risk domains (demographics, distal background factors and more proximal factors) have been identified as impacting the likelihood of aggression. For example, studies have shown that relationships between demographics and partner aggression. For example, there is evidence that younger age is related to partner aggression (Chermack et al., 2001, Moore et al., 2008), that there tend to be higher rates of partner violence among African-American and Hispanic couples (e.g., Field and Caetano, 2005b), and that being married/co-habiting is related to partner violence (e.g., Moore et al., 2008). In terms of gender, studies have tended to find either no gender differences in aggression (when defined as physical aggression) directed towards partners (Chermack et al., 2001; Walton et al., 2002) or somewhat higher rates of female-to-male partner physical aggression (for a review see Archer, 2000), whereas other studies have documented that women have higher rates of victimization by partners (Walton et al., 2002) or being injured by partners (Felson and Cares, 2005; Morse, 1995; Tjaden and Thoennes, 2000). Finally, both distal factors (e.g., family history of substance use and/or violence, history of child sexual and/or physical abuse) and proximal factors (e.g., recent substance use patterns, psychiatric comorbidity/symptoms) have been shown to contribute independently and through interaction effects to aggression (Chermack et al., 2006; Goldstein, 1985; Quigley and Leonard, 2000).

Despite the numerous studies that have documented an association between substance use and aggression, there have been some common methodological issues that limit a comprehensive understanding of partner aggression in SUD treatment samples. For example, a number of studies have focused on only male-to-female physical aggression (e.g., Brown et al., 1998; Jaffe et al., 1988; Moore and Stuart, 2004), or on only females as the recipients or victims of aggression (e.g., El-Bassel et al., 2004; Fals-Stewart et al., 2002), without examination of female aggression towards partners or males as the recipient of aggression from their partners. Further, as noted by Fals-Stewart and Kennedy (2005) there has been a tendency to treat aggression as a unitary construct, rather than as a spectrum of behaviors that vary from psychological aggression, to physical aggression, to aggression resulting in injury. Recent studies have found that factors such as age, psychiatric distress, patterns of substance use, parental alcohol abuse, and childhood history of abuse correlate with the severity of physical aggression (e.g., Chermack and Blow, 2002; Chermack et al., 2001; Chermack et al., 2006; Testa et al., 2003). Of note, however, is that the aggression measures used in these studies addressed physical aggression, and did not include measures of psychological aggression, or whether aggression resulted in injuries. A notable exception examined psychological aggression in a SUD sample and found some similar risk factors and clinical correlates (history of physical abuse and parental violence; high levels of psychiatric distress) (Taft et al., 2006). Thus, because studies have tended to focus on only one form of aggression, it remains unclear whether the pattern of potential risk factors or markers would be different for different forms of aggression. For example, it has been suggested that it is essential to measure psychological aggression and injury, in addition to physical aggression, to obtain a better understanding of the relationship between gender and violence (Hamby, 2005).

Finally, a number of studies have focused solely on alcohol treatment samples (at times excluding users of other drugs) or on samples based on “primary” substances of abuse such

as cocaine and marijuana (e.g., O'Leary and Schumacher, 2003; Thompson and Kingree, 2006), or have only examined the impact of the most commonly used substances in their sample due to sample size and base rate issues (Chermack and Blow, 2002). These methodological issues limit the ability to examine the relationships between a wide array of commonly used drugs (alcohol and other drugs) and aggression in SUD samples, and the relative strength of the relationships between specific drug use and violence.

This study focused on comprehensively examining partner aggression among men and women in SUD treatment. The present study addresses a number of limitations of prior studies by including broader measurement of aggression, a sample including both men and women, as well as a more comprehensive range of drugs potentially related to violence. Specifically, partner aggression measures included rates of psychological aggression, physical aggression and injury, both aggression directed towards partners as well as from partners to participants. This study is the first to our knowledge to present rates and frequencies of such different forms of aggression and injury in a SUD treatment sample within a single study, and it was expected that inclusion of such different forms of aggression would reveal differences in terms of the role of gender (e.g., higher rates of woman sustaining injuries). Further, this study examined the relationships between several risk domains and partner aggression measures. Potential partner aggression risk domains were selected based on prior findings and contemporary theories of aggression (Babor et al., 1992; Chermack and Giancola, 1997; Chermack et al., 2006; Quigley and Leonard, 2000), and included demographics (age, minority status, gender), distal (childhood physical and sexual abuse, parental substance abuse and mental health history) and proximal (living with a spouse/partner, pre-treatment substance abuse, depressive symptoms) factors. The analysis approach provides novel information on factors associated with various forms of aggression, and also is designed to identify the relative impact of such factors in order to inform future interventions for substance use disorder treatment settings.

2. Methods

2.1. Procedures

Participants were recruited from SUD treatment programs including community residential centers, intensive outpatient, and regular outpatient treatment programs. Participants were screened to take part in a Randomized Control Trial (RCT) pilot study of a six session violence prevention intervention. For the RCT, inclusion criteria included having a positive history for past year physical aggression according to a modified Conflict Tactics Scale-II (CTS-II; see Measures section for additional information). Data for the present study are derived from information gathered from the initial screening for inclusion in the RCT and thus include those with and without past year violence. The purpose of the study (i.e., intervention for anger problems among individuals in substance abuse treatment) was disclosed to participants, they were informed about the length of the intervention (6 weeks plus 3- and 6-month follow-ups), and they received remuneration in the amount of ten dollars for completing the screening interview. Of those who were approached, ~95% consented to take part in this study. The survey used to screen participants consisted of brief measures of demographics, distal background factors (abuse history, family history variables), depression symptoms, alcohol and drug use, and a modified version of the CTS2.

2.2. Participants

Participants for this study (n=489) were individuals (76% men, 24% women) recruited from substance abuse treatment programs (64.4% from residential treatment and 35.3% from outpatient centers). The age of participants ranged from 18 to 63 years, with a mean of 35.9 years. With regard to ethnicity, most of the study participants were Caucasian (54.4%), with

the remaining participants of African American (35.4%), Native-American (3.9%), Hispanic (2.5%) and other ethnicities (3.9%). Approximately 9.5% were married, 4.8 % separated, 17.9% divorced, 1.3% widowed, 9.5% with a significant other and 46.3% never married. Overall, 26% reported that they were presently living with their spouse/partner. Regarding education, 6.7% had less than an eighth grade education, 38.7% attended (but did not graduate) high school, 26.2% graduated from high school, 23.9% attended college, and 4.3% graduated from college.

2.3. Measures

2.3.1. Past year partner aggression—Aggression within the year before treatment was assessed with a modification of the Revised Conflict Tactics Scale (CTS2; Straus et al., 1996). The original CTS was developed to assess family violence by asking about ways in which conflict is resolved by family members. The revision of the CTS allowed for additional questions regarding aggressive behavior, nonverbal psychological aggression, and the inclusion of a subscale related to injury (Straus et al., 1996). The CTS2 has been shown to have good internal consistency and has been well validated (for a review see Simpson and Christensen, 2005). The modification of the CTS2 allowed participants to rate the frequency with which various aggressive behaviors occurred in conflicts with both partners and non-partners (e.g., friends, strangers, acquaintances, etc) during the year preceding enrollment in treatment. The present paper focuses exclusively on partner violence, and includes CTS2 frequency scales for participant-to-partner aggression (psychological aggression, physical aggression, and injury) and partner-to-participant aggression (psychological aggression, physical aggression, and injury).

2.3.2. Proximal Risk Factors

Alcohol and Drug Consumption: Participants were asked about their drug and alcohol use in the 28 days before entering treatment using questions from the University of Arkansas Substance Abuse Outcomes Module (SAOM; Smith et al., 2006). Four questions were asked relating to alcohol: the number of days of alcohol use; average number of drinks consumed each drinking day; maximum number of drinks consumed; and the number of days involving binges (more than five drinks consumed). Participants were also asked to record the number of days that they used each of the following: marijuana; cocaine or crack, stimulants (prescribed and non-prescribed); opiates (prescribed and non-prescribed); sedatives (prescribed and non-prescribed); heroin; PCP; other hallucinogens; inhalants; anabolic steroids; and tobacco. The SAOM has undergone extensive reliability and validity examinations (Smith et al., 2006) and has demonstrated strong psychometric properties including high internal consistency (Chermack et al., 2000), test-retest reliability (Smith et al., 2006) and concurrent validity with widely used substance abuse measures such as the Addiction Severity Index (McLellan et al., 1992). The following substance use frequency variables were included in the analyses: heavy drinking days, marijuana use, cocaine use, heroin use, illicit opiate and sedative use, and illicit stimulant use. We combined illicit opiate and sedative medication use since these variables were highly intercorrelated ($r = .62$, $p < .001$), and other substance use variables were rarely if ever used in the sample and were thus not included in the main analyses.

Evidence of Depression: Participants completed the 9-item Patient Health Questionnaire (PHQ-9), which is a screening tool frequently used by primary care physicians to quickly measure patient depression severity over the past two weeks (Spitzer et al., 1999). The PHQ-9, which is derived from the Primary Care Evaluation of Mental Disorders instrument (Spitzer et al., 1999), has been shown to have adequate reliability and validity (Kroenke et al., 2001; Lowe, et al., 2004). The nine items of the PHQ-9 correspond to the nine DSM-IV criteria for a Major Depressive Disorder (MDD). Respondents are asked to indicate how

often symptoms such as sleeping too little or too much occur, with scores ranging from not at all (0) to nearly every day (3). Consistent with Kroenke and colleagues (2001) suggested cut-off point, participants in this current study were considered to be showing “evidence of depression” if they received a PHQ-9 score of at least ten. A score of 10 on the PHQ-9 has high specificity and sensitivity for MDD (88% and 88%), and is considered to fall within the “moderate” range of depression (Kroenke et al., 2001).

2.3.4. Distal Family Background Factors—To assess for family history of substance abuse and mental health problems, participants were asked to indicate if any biological family members had problems with the following: alcoholism, illegal drug abuse, abuse of prescription medications, depression, and violence and/or frequent rages. In order to assess childhood history of abuse, participants were asked the following two questions: “Were you ever physically abused as a child” and “Were you ever sexually abused as a child?”

2.4. Data Analysis

Descriptive information regarding the study sample as well as rates of past-year psychological aggression, physical aggression and injury (both directed towards partners, and directed towards participants from partners) were computed. The computation of aggression rates was based on the default scoring for the CTS2 (Straus, 2004) in which each frequency scale is dichotomized to indicated the presence or absence of each type of past year aggression. Next, we conducted correlational (Spearman’s rho) analyses of the predictor variables and aggression outcomes, as well as among potential predictor variables, and we also conducted analyses to investigate potential problems with multicollinearity among our predictors (Menard, 2001). These analyses indicated that there was no evidence of multicollinearity among the predictors. The primary analysis strategy consisted of six separate zero-inflated Poisson (ZIP) regression models to examine predictors of participant-to-partner aggression (psychological-, physical-, injury-) and partner-to-participant aggression (psychological-, physical-, injury-). ZIP regression is appropriate to use with event count data (i.e., data composed of the total number of counts of a specified behavior within a given time period), particularly event data in which the possibility exists for a large number of 0 scores (Zorn, 1996; Hernandez-Avila, 2006). Given that our outcome measures involved event count data for aggression, ZIP regression is the most appropriate approach to account for the large number of zeros. ZIP regression allows for prediction of “any” of a variable of interest (e.g., any injury) [predictor variables interpreted with odds ratios for predicting a certain “zero” for the outcome (e.g., no injury reported)], as well as the frequency of that variable among those reporting 1 or more events (interpreted with a relative risk ratio). All analyses included the following predictors: age, gender, race, childhood physical and sexual abuse, family history of alcoholism, substance use, depression, and violence; past 30-day heavy drinking, use of marijuana, cocaine, heroin, illicit opiates and sedatives, illicit stimulants, treatment location [residential or outpatient] and evidence of depression).

3. Results

3.1. Descriptive information and bivariate results

Table 1 summarizes descriptive information regarding the study sample. In terms of participant-to-partner aggression, the table reveals high overall rates of psychological aggression (77%), physical aggression (54%) and injuring partners (33%). Similarly, there were high rates of partner-to-participant aggression, with rates of psychological aggression, physical aggression, and being injured by partners were 73%, 51%, and 33%, respectively.

Table 2 depicts the correlations between potential predictor variables and the aggression frequency outcomes. Overall, the table illustrates that among patient characteristics and distal background variables, age, family history variables (alcohol, drugs and depression) and physical abuse history were significantly related to most of the aggression outcomes, gender was related to participant-to-partner psychological and physical aggression (female gender associated with higher frequency) and a higher frequency of being injured by a partner, and race was related only to psychological aggression measures (higher frequency associated with Caucasian race). In terms of more proximal factors, symptoms of depression, binge drinking, and use of cannabis, cocaine and illicit opiates/sedatives were related to all aggression and injury measures. Presently living with a spouse/partner was associated with higher frequency of psychological aggression measures, but lower frequency of being injured by a partner. Finally, table 3 displays the intercorrelations among the predictor variables. The table illustrates a number of statistically significant relationships among the predictor variables, although the magnitude of the correlations generally was modest.

3.2 ZIP regression analyses for Participant-to-Partner Aggression

For the ZIP regression analyses, each model was significant (see Table 4). The “Zero-inflation” columns indicate variables related to reporting no aggression, whereas the “Incident Count” columns indicate variables related to the number of incidents. Current evidence of depression, childhood physical abuse, presently living with a partner/spouse and cocaine use were significant in all three models. Evidence of depression and cocaine use were only related to whether or not aggression occurred at all (see “Zero-inflation” columns in Table 4), whereas a history of childhood physical abuse was related to the number of aggressive events (see “Incident count” columns in Table 4). However, the relationship between living with a spouse/partner and aggression outcomes was complex. Specifically, those living with a spouse/partner had a greater likelihood of reporting that any psychological and physical aggression occurred (see “Zero-inflation” columns in Table 4), but also had reduced frequency of physical aggression and injury among those reporting physical aggression and injury. Age, race, treatment program type and binge drinking were significant predictors in two of the models. Younger age was related to whether psychological and physical aggression occurred; being Caucasian was related to a higher frequency of psychological aggression, but reduced likelihood of ever injuring a partner; binge drinking was related to the number of incidents of psychological aggression and whether physical aggression occurred; and residential treatment was related to more incidents of physical aggression and whether injury occurred. Finally, gender was only related to the number of incidents of psychological aggression, and illicit stimulant use was related only to the number of incidents of injury.

3.2 ZIP regression analyses for Partner-to-Participant aggression

For the ZIP regression analyses, each model was significant (see Table 5). Only age and a history of childhood physical abuse were significant in all three models, with younger age being related to whether participants experienced aggression from partners (see “Zero-inflation” columns in Table 5), and those with a history of childhood abuse experiencing more incidents of aggression (see “Incident count” columns in Table 4). Evidence of depression, binge drinking and cocaine use were significant predictors in 2 of the models, and were related to whether or not aggression occurred. Further, illicit stimulant use also was significant in 2 models, but was related to the number of aggressive incidents. Finally, race was related to both the occurrence of injury by a partner, as well as frequency, but this relationship was complex. Specifically, Caucasians were less likely to be injured at all, but among those reporting an injury, Caucasians experienced more incidents of injury.

4. Discussion

The present study expanded on prior research on partner violence among individuals in substance abuse treatment by including a diverse sample in terms of gender, age, and ethnicity, assessing for past year prevalence rates and frequency of psychological aggression, physical aggression, and injury, and by examining numerous potential distal and proximal factors. Over three-quarters of the sample engaged in psychological aggression towards their partner. Consistent with previous studies, rates of physical aggression for both men and women in substance abuse treatment exceeded 50% and were higher than rates found in community-based samples (Fals-Stewart et al., 2002; Gondolf and Foster, 1991; Murphy and O'Farrell, 1994). Of particular importance is that the present study also illustrates high rates of injury (injuring partners and being injured) among men and women in SUD treatment. More specifically, our finding that >32% of this sample's participants reported injuring their partner (and 33% reported being injured by their partner) is markedly higher than rates observed in other samples. For example, the rates of injury in our sample were two to three times higher than the 13 percent reported in the normative college sample used in the CTS-II (Straus et al., 1996) and in randomly selected samples from the community (< 10%, Ehrensaft et al., 2003; < 15%, O'Leary and Williams, 2006).

4.1 Overview of psychological aggression, physical aggression and injury: The role of age, gender, and race

Similar to other studies, younger age generally was associated with increased likelihood of aggression (Chermack et al., 2000; Fonseca et al., 2006; Wilt and Olson, 1996). In terms of gender, relatively few gender differences were observed. Specifically, bivariate correlations indicated significant but modest relationships between female gender and psychological and physical aggression towards partners, as well as frequency of being injured by partners. However, in multivariate analyses, gender was related only to the frequency of psychological aggression. The overall findings with regard to physical aggression are similar to previous reports that have found no gender differences (Chermack et al., 2001; Heru et al., 2006; Hines and Saudino, 2003; Straus and Sweet, 1992), or slightly higher rates of female-to-male partner aggression (Archer, 2000). Further, the significant correlation between gender and partner-to-participant injury was consistent with prior studies that have shown women to be more likely to sustain injuries from partners and/or require medical attention as a result of partner violence (e.g., Archer, 2000; Felson and Cares, 2005; Stets and Strauss, 1989; Tjaden and Thoennes, 2000). Thus, the finding in this sample that women reported a higher frequency of being injured by their partner illustrates the importance of more comprehensively measuring aggressive behaviors in order to identify potential gender differences. However, the present is limited by not assessing a number of factors that could reveal potential gender differences. For example, it has been suggested that gender differences may exist in the severity and types of tactics used, as well as the emotional impact and motivation underlying aggressive acts. Hamby and Sugarman (1999) proposed that males might be more apt to use "malicious" tactics (e.g., belittling partner) while females might be more likely to endorse "minor tactics (e.g., swearing at partner). Studies have suggested that female-to-male aggression tends to be less severe (less likely to produce injury) (Archer, 2000; Cantos et al., 1994; Cascardi et al., 1992), that women experience greater fear in conflict situations (Jacobson et al., 1994), and that female-to-male aggression is more defensive in nature (Jacobson et al., 1994). Thus, future studies should examine more specifically types of aggressive behaviors and their consequences, including measurement of emotional and motivational factors associated with various forms of aggression.

Finally, the present study also illustrated some interesting findings with regard to race. It should be noted that our analysis strategy allowed for examining predictors of both "any"

injury, as well as injury frequency among those reporting injury, whereas most studies examining race differences employ dichotomous outcomes (e.g., Caetano et al., 2005). With regard to predicting “any” injury, the present findings are consistent with a number of studies suggesting higher rates of partner aggression and injury among those of minority status (Field and Caetano, 2005b; Halpern et al., 2006). However, among those reporting sustaining an injury, Caucasians tended to experience more incidents of being injured by their partner. This overall pattern of findings was somewhat unexpected, and it is unclear whether such findings are unique to the present sample. The findings raise the possibility of some potential underlying differences in the dynamics of partner aggression resulting in injury according to race, at least in the present sample. Such a pattern of findings needs replication through researchers examining both dichotomous and frequency outcomes.

4.2. Distal and Proximal Risk factors for partner aggression

Results from the current study suggest that several distal and proximal factors were associated with aggression in intimate partner relationships. Specifically, family history variables (alcoholism, drugs, depression) and history of physical abuse were correlated with all the aggression and injury outcomes. This is consistent with previous findings that both men and women who experience parental violence (Markowitz, 2001; O’Hearn and Margolin, 2000), parental substance misuse, and/or physical abuse are more likely to experience physical aggression in adulthood. However, in the multivariate analyses, only reported history of childhood physical abuse was related to all aggression and injury outcomes (both participant-to-partner and partner-to-participant), suggesting the relative importance of childhood physical abuse as a background factor related to aggression and injury in partner relationships. This finding appears consistent with a study by Chermack et al. (2000) suggesting parental aggressiveness appears more strongly related to adult problems with violence among SUD samples than family history of alcoholism. Finally, it is important to note that the multivariate analyses suggested that a history of physical abuse may be less related to whether or not aggression occurs, but rather to the frequency or number of incidents among those who report at least some aggression.

In terms of more proximal factors, current symptoms of depression was associated with having engaged in psychological and physical aggression towards partners, injuring partners, as well as being the recipient of psychological and physical aggression. This finding replicates previous work in which male perpetrators of violence were found to have higher scores on depression measures than did non-violent men (Hamberger and Hastings, 1991; Hastings and Hamberger, 1994; Maiuro et al., 1988), as well as studies including both men and women showing high levels of emotional distress associated with violence perpetration or victimization (Chermack et al., 2001; Walton et al., 2002). To our knowledge, the present study is the first to illustrate the relative importance of recent depressive symptoms as consistently related to various forms of aggression (directed to and from partners) in SUD treatment settings. With the present study design (cross-sectional design, measures assessing different time frames), it is not possible to ascertain the causal direction of the depression-aggression relationship, nor whether our measure reflected a comorbid depression disorder or mood symptoms that were substance-induced. Further longitudinal research is needed to better understand the inter-relationships among depressive symptoms, aggression and substance use. Regardless, the present findings suggest there is a need for routine assessment and intervention approaches for depression symptoms and aggression in SUD treatment settings, and that the presence of depressive mood symptoms appear to be an indicator of involvement with partner violence.

The analyses also suggested that the relationship between living with a spouse/partner and aggression outcomes was complex. Specifically, those living with a spouse/partner had a greater likelihood of reporting that any psychological and physical aggression towards their

partner occurred, but also had reduced frequency of physical aggression towards partners and injuring their partners (among those reporting physical aggression and injury). There are several potential explanations for these seemingly inconsistent findings. For example, it is possible that those engaging in frequent physical aggression and injurious behavior were more likely to experience separation or dissolution of their relationship as either a consequence or cause of their behavior. This is in keeping with previous studies' findings that physical aggression is often related to separation, divorce or relationship dissolution (Lawrence and Bradbury, 2001; Kurz, 1996, Shortt et al., 2006). It also is possible that those in less stable relationships (suggested by not living with a partner), and/or who have multiple partners, may be more likely to engage in physical aggression and injurious behavior. The present cross sectional methodology does not allow us to look at the inter-relationships among such factors over time.

According to bivariate analyses, use of several different types of substances (alcohol binge drinking, marijuana, cocaine, illicit opiate/sedative use) were associated with all of the aggression and injury outcomes, although in the multivariate analyses, binge drinking and cocaine use were most commonly related to aggression outcomes. This pattern of findings is consistent with prior experimental studies (Licata et al., 1993) as well as prior studies of SUD samples (Chermack and Blow, 2002; Fals-Stewart et al., 2003) that have shown a link between acute alcohol and cocaine use and aggressive behaviors. However, it should be noted that the present study design does not allow for making causal inferences regarding alcohol and drug use and violence. Biopsychosocial theories on the relationship between substance use and aggression highlight several potential mechanisms to explain this relationship, including the role of acute intoxication effects, individual difference factors and social-contextual factors (Chermack and Giancola, 1997; Goldstein, 1985). Nevertheless, the findings suggest that in SUD treatment samples, aggression appears more strongly linked to binge drinking and users of cocaine. Additional research could help clarify factors potentially underlying observed associations between various drugs and aggression (e.g., acute aggression enhancing intoxication effects; use of substances to self-medicate or dampen aggressive impulses; use of drugs following violence; fights over sharing drugs, paraphernalia; fights about consequences of drug use; irritability/aggression due to withdrawal).

Although the present findings are consistent with theory and prior research, this study has a number of limitations. The study relied on a cross-sectional design using measures that assessed different time frames (e.g., past-year partner violence, recent substance use and depression, distal family background and childhood variables). This limits our ability to make conclusions regarding causal relationships and raises some concerns about recall or response bias. Similarly, there were no efforts to corroborate participant self-report on the measures used in this study, although we used several strategies to support self-report validity (e.g., ensuring confidentiality of self-report information including obtaining a certificate of confidentiality). There is evidence supporting self-report accuracy of substance abuse in research studies and in those new to SUD treatment (e.g., Chermack et al., 1998; Chermack et al., 2000; Darke, 1998; O'Farrell et al., 2003), and that accuracy of reports of aggression may be higher in treatment samples than in studies using community-based, representative, or forensic samples (Panuzio et al., 2006). Nevertheless, the lack of corroboration of self-report information remains a limitation. Further, a number of distal background variables (history of childhood physical and sexual abuse, family history of problems with alcohol, drugs and depression) were assessed with very brief measures, which could be susceptible to under-reporting.

An additional limitation is that the sample for the present study came from clinics in economically challenged region of a single Midwestern state and included a significant

percentage from residential treatment settings, so caution must be exercised in generalizing the findings to other samples. The demographic characteristics of our sample were compared to those observed in the Treatment Episode Data Set (TEDS), which is a compilation of information on individuals enrolled in substance abuse treatment. Almost 60% of patients in substance abuse treatment from 1995–2005 had never been married (SAMHSA, 2007), which is somewhat higher than the 46% of our sample who had never married. However, the percentage of those finishing high school was lower in our sample than what was seen in TEDS (45.4% and 33.8%, respectively). Moreover, almost 65% of our sample came from residential treatment whereas less than 20% of the TEDS sample came from this type setting. Further, although rates of physical aggression in this sample were similar to other studies (approximately 50%) (Chermack et al., in review; Fals-Stewart, Golden and Schumacher, 2003; O'Farrell and Murphy, 1995) it is possible that rates of psychological aggression and injury in partner relationships could differ in other samples or geographic regions. Finally, although this study more comprehensively measured different forms of aggression than prior studies, the CTS-II does not specifically measure motivational and emotional issues potentially associated with aggressive acts (e.g., establishing control, instigation of aggression, self-defense or retaliation, fear, etc.). Measurement of such issues may be particularly important to understanding gender differences in aggressive behaviors. Finally, this study did not employ structured diagnostic interviews of substance use or mood disorders, and relied on using very brief measures to assess background variables such as the family history of depression or substance use.

In conclusion, given the high rates of participant-to-partner and partner-to-participant physical aggression, psychological aggression, and injury it is critical to assess for these behaviors with clientele who abuse substances. Further, the high levels of aggression continue to illustrate the need for interventions impacting partner violence, such as Behavioral Couples Therapy (O'Farrell and Murphy, 1995; Fals-Stewart et al., 2002) or other approaches when it is not feasible to work with a couple. Further, given evidence that reduced substance use following treatment is related to reduced violence (O'Farrell et al., 2003; O'Farrell et al., 2004; Walton et al., 2002) it may be particularly important to implement SUD treatment engagement and retention interventions (e.g., Motivational Interviewing; Miller and Rollnick, 2002) for men and women with SUDs reporting IPV. The current findings suggest that certain factors, such as having binge drinking, cocaine use and current symptoms of depression, are associated with aggressing towards partners and being the recipient of partner aggression. Attention to these factors may assist clinicians in better identifying these individuals, and could provide additional avenues to explore in designing interventions to target aggression. Future research should continue to identify risk factors for aggression, to clarify the causal relationship between aggression and variables of interest (e.g., depression, alcohol and other drug use), and examine intervention approaches for SUD settings designed to prevent future partner aggression.

Acknowledgments

Funded by NIDA R01 DA017295-01A1.

References

- Archer J. Sex differences in aggression between heterosexual partners: A meta-analytic review. *J Interpers Violence*. 2000; 14:1263–1289.
- Babor TF, Hofman M, Delboca FK, Hesselbrock V, Meyer RE, Dolinsky ZS, Rounsaville B. Types of alcoholics: I. Evidence for an empirically derived typology based on indicators of vulnerability and severity. *Archives of General Psychiatry*. 1992; 49:599–608. [PubMed: 1637250]

- Brown TG, Werk A, Caplan T, Shields N, Seraganian P. The incidence and characteristics of violent men in substance abuse treatment. *Addict Behav.* 1998; 23:573–586. [PubMed: 9768295]
- Cantos AL, Neidig PH, O’Leary KD. Injuries of women and men in a treatment program for domestic violence. *J Fam Violence.* 1994; 9:112–124.
- Cascardi M, Langhinrichsen J, Vivian D. Marital aggression: Impact, injury and health correlates for husbands and wives. *Arch Int Medicine.* 1992; 152:1178–1184.
- Chermack ST, Blow FC. Violence among individuals in substance abuse treatment: the role of alcohol and cocaine consumption. *Drug and Alcohol Depend.* 2002; 66(1):29–37.
- Chermack ST, Giancola PR. The relation between alcohol and aggression: An integrated biopsychosocial conceptualization. *Clin Psych Review, Special Issue: Biopsychosocial Conceptualizations of Human Aggression.* 1997; 17:621–649.
- Chermack ST, Roll J, Reilly M, Davis L, Kilaru U, Grabowski J. Comparison of patient self-reports and urine drug screening results obtained under naturalistic methadone treatment conditions. *Drug Alcohol Depend.* 2000; 59(1):43–49. [PubMed: 10706974]
- Chermack ST, Singer K, Beresford TP. Screening for alcoholism among medical inpatients: How important is corroboration of patient self-report? *Alc Clin Exp Res.* 1998; 22:1393–1398.
- Chermack ST, Walton MA, Fuller BE, Blow FC. Correlates of expressed and received violence across relationship types among men and women substance abusers. *Psych Addict Behav.* 2001; 15(2): 140–151.
- Chermack ST, Wryobeck, Walton MA, Blow FC. Distal and proximal factors related to aggression severity among patients in substance abuse treatment: Family history, alcohol use and expectancies. *Addict Behav.* 2006; 31:845–858. [PubMed: 16002224]
- Darke S. Self-report among injecting drug users: a review. *Drug Alcohol Depend.* 1998; 51:253–263. [PubMed: 9787998]
- Ehrensaft MK, Cohen P, Brown J, Smailes E, Chen H, Johnson JG. Intergenerational transmission of partner violence: A 20-year prospective study. *J Consult Clin Psychol.* 2003; 71:741–753. [PubMed: 12924679]
- El-Bassel N, Gilbert L, Frye V, Wu E, Go H, Hill J, Richman BL. Physical and sexual intimate partner violence among women in methadone maintenance treatment. *Psych Addict Behav.* 2004; 18:180–183.
- Fals-Stewart W, Golden A, Schumacher JA. Intimate partner violence and substance use: A longitudinal day-to-day examination. *Addict Behav.* 2003; 28:1555–1574. [PubMed: 14656545]
- Fals-Stewart W, Kashdan TB, O’Farrell TJ. Behavioral couples therapy for drug-abusing patients. Effects on partner violence. *J Subst Abuse Treat.* 2002; 22:87–97. [PubMed: 11932134]
- Fals-Stewart W, Kennedy C. Addressing intimate partner violence in substance abuse treatment. *J Subst Abuse Treat.* 2005; 29:5–17. [PubMed: 15979527]
- Felson RB, Cares AC. Gender and the seriousness of assaults on intimate partners and other victims. *J Marr Family.* 2005; 67:1182–1195.
- Field CA, Caetano R. Intimate partner violence in the U.S. general population: Progress and future directions. *J Interpers Violence.* 2005a; 20:463–469. [PubMed: 15722502]
- Field CA, Caetano R. Longitudinal model predicting mutual partner violence among White, Black, and Hispanic couples in the United States general population. *Violence Vict.* 2005b; 20:499–511. [PubMed: 16248487]
- Fonseca CA, Schmaling KB, Gutierrez C, Blume AW, Russell ML. Variables associated with intimate partner violence in a deploying military sample. *Mil Med.* 2006; 17:627–631. [PubMed: 16895129]
- Goldstein PJ. The drugs/violence nexus: A tripartite conceptual framework. *J Drug Issues.* 1985; 15:493–506.
- Gondolf EW, Foster RA. Wife assault among VA alcohol rehabilitation patients. *Hosp Commun Psychiatr.* 1991; 42:74–79.
- Halpern LR, Dodson TB. A predictive model to identify women with injuries related to intimate partner violence. *J Am Dent Assoc.* 2006; 137:604–609. [PubMed: 16739539]

- Hamberger LK, Hastings JE. Personality correlates of men who batter and nonviolent men: Some continuities and discontinuities. *J Fam Violence*. 1991; 6:131–147.
- Hamby SL. Measuring gender differences in partner violence: Implications from research on other forms of violence socially undesirable behavior. *Sex Roles*. 2005; 52:725–742.
- Hamby SL, Sugarman DB. Acts of psychological aggression against a partner and their relation to physical assault and gender. *J Marr Family*. 1999; 61:959–970.
- Hastings JE, Hamberger LK. Psychosocial modifiers of psychopathology for domestically violence and nonviolent men. *Psychol Rep*. 1994; 74:112–114. [PubMed: 8153199]
- Hernandez-Avila CA, Song C, Kuo L, Tennen H, Armeli S, Kranzler HR. Targeted versus daily Naltrexone: Secondary Analysis of effects on average daily drinking. *ACER*. 2006; 30:860–865.
- Heru AM, Stuart GL, Rainey S, Eyre J, Recupero PR. Prevalence and severity of intimate partner violence and associations with family functioning and alcohol abuse in psychiatric inpatients with suicidal intent. *J Clin Psychiatry*. 2006; 67:23–29. [PubMed: 16426084]
- Hines DA, Saudino KJ. Gender differences in psychological, physical, and sexual aggression among college students using the Revised Conflict Tactics Scales. *Violence Vict*. 2003; 18:197–217. [PubMed: 12816404]
- Jacobson NJ, Gottman JM, Waltz J, Rushe R, Babcock J, Holtzworth-Munroe A. Affect, verbal content, and psychophysiology in the arguments of couples with a violent husband. *J Consult Clin Psychol*. 1994; 62:982–988. [PubMed: 7806730]
- Jaffe JH, Babor TF, Fishbein DH. Alcoholics, aggression and antisocial personality. *J Stud Alcohol*. 1988; 49:211–218. [PubMed: 3374134]
- Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med*. 2001; 16:606–613. [PubMed: 11556941]
- Kurz D. Separation, divorce, and woman abuse. *Violence against Women*. 1996; 2:63–81. [PubMed: 12348986]
- Lawrence E, Bradbury TN. Physical aggression and marital dysfunction: A longitudinal analysis. *J Fam Psychol*. 2001; 17:115–125.
- Licata A, Berman M, Taylor S, Cranston J. Effects of cocaine on human aggression. *Pharmacol Biochem Behav*. 1993; 45:549–552. [PubMed: 8332615]
- Lowe B, Unutzer J, Callahan CM, Perkins AJ, Kroenke K. Monitoring depression treatment outcomes with the Patient Health Questionnaire-9. *Med Care*. 2004; 42:1194–1201. [PubMed: 15550799]
- Markowitz FE. Attitudes and family violence: Linking intergenerational and cultural theories. *J Fam Violence*. 2001; 16:205–218.
- Maiuro RD, Cahn TS, Vitaliano PP, Wagner BC, Zegree JB. Anger, hostility, and depression in domestically violent versus generally assaultive men and nonviolent control subjects. *J Consult Clin Psychol*. 1988; 56:17–23. [PubMed: 3346444]
- McLellan AT, Alterman AI, Cacciola J, Metzger D, O'Brien CP. A new measure of substance abuse treatment: Initial studies of the treatment services review. *J Nerv Ment Dis*. 1992; 180:101–110. [PubMed: 1737971]
- Menard, S. Applied logistic regression analysis. 2. Vol. 106. Sage Publ; Thousand Oaks, CA: 2001. Series on Quantitative Applications in the Social Sciences
- Miller, WR.; Rollnick, S. *Motivational Interviewing (2nd Edition): Preparing people to change*. Guilford Press; 2002.
- Moore TM, Stuart GL. Illicit substance use and intimate partner violence among men in batterers' intervention. *Psych Addict Behav*. 2004; 18:385–389.
- Moore TM, Stuart GL, Meehan JC, Rhatigan DL, Hellmuth JC, Keen SM. Drug abuse and aggression between intimate partners: A meta-analytic review. *Clin Psy Review*. 2008; 28:247–274.
- Morse BJ. Beyond the conflict tactics scale: Assessing gender differences in partner violence. *Violence Vict*. 1995; 10:251–272. [PubMed: 8703839]
- Murphy CM, O'Farrell TJ. Factors associated with marital aggression in male alcoholics. *J Fam Psychol*. 1994; 8:231–335.
- O'Farrell TJ, Fals-Stewart W, Murphy C. Concurrent validity of a brief self-report drug use frequency measure. *Addict Behav*. 2003; 28:327–337. [PubMed: 12573682]

- O'Farrell TJ, Murphy CM. Marital violence before and after alcoholism treatment. *J Consult Clin Psychol.* 1995; 63:256–262. [PubMed: 7751486]
- O'Farrell TJ, Murphy CM, Stephan SH, Fals-Stewart W, Murphy M. Partner violence before and after couples-based alcoholism treatment for male alcoholic patients: the role of treatment involvement and abstinence. *J Consult Clin Psychol.* 2004 Apr; 72(2):202–17. [PubMed: 15065955]
- O'Hearn HG, Margolin G. Men's attitudes condoning marital aggression: A moderator between family of origin abuse and aggression against female partners. *Cognitive Therapy and Research.* 2000; 24:159–174.
- O'Leary KD, Schumacher JA. The association between alcohol use and intimate partner violence: Linear effect, threshold effect or both? *Addict Behav.* 2003; 28:1575–1585. [PubMed: 14656546]
- O'Leary KD, Williams MC. Agreement about acts of aggression in marriage. *J Fam Psychol.* 2006; 20:656–662. [PubMed: 17176201]
- Panuzio J, O'Farrell TJ, Marshall AD, Murphy CM, Murphy M, Taft CT. Intimate partner aggression reporting concordance and correlates of agreement among men with alcohol use disorders and their female partners. *Assessment.* 2006; 13:266–279. [PubMed: 16880279]
- Quigley, BM.; Leonard, KE. Alcohol, drugs and violence. In: Van Hasselt, V., editor. *Aggression and violence: An introductory text.* Needham Heights, US: Allyn & Bacon; 2000. p. 259-283.
- Shortt JW, Capaldi DM, Kim HK, Owen LD. Relationship separation for young, at-risk couples: Prediction from dyadic aggression. *J Fam Psychol.* 2006; 20:624–631. [PubMed: 17176197]
- Simpson LE, Christensen A. Spousal agreement regarding relationship aggression on the Conflict Tactics Scale-2. *Psychol Assess.* 2005; 17:423–432. [PubMed: 16393009]
- Smith GR, Burnam MA, Mosley CL, Hollenberg JA, Mancino M, Grimes W. Reliability and validity of the substance abuse outcomes module. *Psychiatr Serv.* 2006; 57:1452–1460. [PubMed: 17035565]
- Spitzer RL, Kroenke K, Williams JBW. Validation and utility of a self-report version of PRIME-MD: The PHQ Primary Care Study. *JAMA.* 1999; 282:1737–1744. [PubMed: 10568646]
- Straus, MA. Scoring the CTS2 and CTSPC. 2004. Pubpages.unh.edu/~mas2/CTS28a3.pdf
- Straus, MA.; Gelles, RJ. *Physical violence in American families: Risk factors and adaptations to violence in 8145 families.* New Brunswick, NJ: Transaction Publishers; 1990.
- Straus MA, Hamby SL, Boneh-McCoy S, Sugarman DB. The revised Conflict Tactics Scales (CTS2): Development and preliminary psychometric data. *J Family Issues.* 1996; 17:283–316.
- Straus MA, Sweet S. Verbal/symbolic aggression in couples: Incidence rates and relationships to personal characteristics. *J Marr Family.* 1992; 54:346–357.
- Stets JE, Straus MA. The marriage license as a hitting license: A comparison of assaults in dating, cohabiting, and married couples. *J Fam Violence.* 1989; 4:161–180.
- Substance Abuse and Mental Health Services Administration, Office of Applied Studies. *Treatment Episode Data Set (TEDS): 1995–2005. National Admissions to Substance Abuse Treatment Services.* Rockville, MD: DASIS Series: S-37, DHHS Publication No. (SMA) 07-4234
- Taft CT, O'Farrell TJ, Torres SE, Panuzio J, Monson CM, Murphy M, Murphy CM. Examining the correlates of psychological aggression among a community sample of couples. *J Fam Psychol.* 2006; 20:581–1588. [PubMed: 17176192]
- Testa M, Quigley BM, Leonard KE. Does alcohol make a difference? Within participants comparison of incidents of partner violence. *J Interpers Violence.* 2003; 18:735–743. [PubMed: 14675506]
- Thompson MP, Kingree JB. The roles of victim and perpetrator alcohol use in intimate partner violence outcomes. *J Interpers Violence.* 2006; 21:163–177. [PubMed: 16368759]
- Tjaden P, Thoennes N. Prevalence and consequences of male-to-female and female-to-male intimate partner violence as measured by the Violence Against Women Survey. *Violence against Women.* 2000; 6:142–161.
- Walton MA, Chermack ST, Blow FC. Correlates of Received and Expressed Violence Persistence Following Substance Abuse Treatment. *Drug & Alcohol Dependence.* 2002; 67:1–12. [PubMed: 12062775]
- Wilt S, Olson S. Prevalence of domestic violence in the United States. *Journal of the American Women's Medical Association.* 1996; 51:77–82.

Zorn, CJW. Evaluating zero-inflated and hurdle Poisson specifications. Midwest Political Science Association Conference; 18–20 April, 1996; Ohio State University;

Table 1

Descriptive information regarding the sample

	N	Percentage	M	SD
Participant-to-partner				
Psych. aggression (%+)	488	77.3	23.98	(26.61)
Phy. Aggression (%+)	488	53.6	17.65	(38.82)
Injury (%+)	488	23.2	4.44	(13.95)
Partner-to-participant				
Psych aggression (%+)	488	73.4	19.81	(24.38)
Phy. Aggression (%+)	488	50.9	15.40	(37.03)
Injury (%+)	488	32.5	4.68	(14.32)
Age	488		35.89	(10.83)
Gender	486			
Male		76.1		
Female		23.9		
Ethnicity	489			
Caucasian		54.5		
Non-Caucasian		45.6		
Fam. alcoholism (%+)	489	69.6		
Fam. drug use (%+)	489	51.5		
Fam. depression (%+)	489	49.5		
Physical abuse (%+)	487	32.4		
Sexual abuse (%+)	486	21.0		
Type of Treatment	486			
Residential		71.4		
Outpatient		28.6		
Live with spouse (%+)	489	23.2		
Depression (%+)	489	54.0		
Binge drinking days	486		6.96	(9.46)
Cannabis use days	489		5.86	(9.93)
Cocaine use days	489		7.51	(10.11)
Heroin use days	489		2.74	(7.79)
Illicit opiates/sedatives use days	489		3.06	(9.51)
Illicit stimulants use days	489		0.69	(3.33)

Table 2

Correlations between predictor variables and aggression frequency outcomes

	Participant-to-Partner Psych. Aggression	Participant-to-Partner Physical Aggression	Participant-to-Partner Injury	Partner-to-Participant Psych. Aggression	Partner-to-Participant Physical Aggression	Partner-to-Participant Injury
Age	-0.17**	-0.16*	-0.07	-0.18**	-0.19**	-0.15**
Gender	0.17**	0.10*	-0.00	0.07	0.05	0.10*
Ethnicity	-0.11*	0.03	0.07	-0.09*	-0.01	0.00
Fam. Alcoholism	0.11*	0.11*	0.10*	0.09*	0.10*	0.09
Fam. drug use	0.15**	0.17*	0.10*	0.14**	0.09	0.12**
Fam. depression	0.17**	0.14	0.09*	0.14**	0.14**	0.14**
Physical abuse	0.15**	0.20**	0.16**	0.12**	0.15**	0.10*
Sexual abuse	0.10*	0.12**	0.05	0.06	0.09	0.07
Type of treatment	-0.06	0.06	0.09*	-0.06	-0.00	-0.04
Live with spouse	0.22**	0.07	0.01	0.21**	0.06	-0.10*
Depression	0.26**	0.26**	0.19**	0.17**	0.21**	0.20**
Binge drinking	0.19**	0.21**	0.18**	0.14*	0.21*	0.20**
Cannabis	0.22**	0.23**	0.17**	0.20**	0.22**	0.19**
Cocaine	0.21**	0.20**	0.21*	0.16**	0.15**	0.13**
Heroin	0.11*	0.07	0.03	0.06	0.05	0.05
Illicit Opiates/Sedatives	0.20**	0.21**	0.18**	0.17*	0.21**	0.18**
Illicit Stimulants	0.11*	0.12**	0.09	0.08	0.08	0.05

*
p < .05;**
p < .01

Table 3

Inter-correlations among predictor variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age	1.00																
2. Gender	-0.01	1.00															
3. Ethnicity	0.21**	-0.03	1.00														
4. Fam. Alcoholism	-0.05	0.08	-0.05	1.00													
5. Fam. drug use	-0.09*	0.11*	-0.04	0.40**	1.00												
6. Fam. depression	-0.18**	0.21**	-0.21**	0.29**	0.35**	1.00											
7. Physical abuse	-0.01	0.13**	0.02	0.14**	0.18**	0.22**	1.00										
8. Sexual abuse	0.01	0.37**	0.01	0.10*	0.11*	0.22**	0.41**	1.00									
9. Type of treatment	0.01	-0.24**	0.04	-0.07	-0.11*	-0.12**	0.00	-0.13**	1.00								
10. Live with spouse	-0.05	0.07	-0.06	0.04	0.03	0.01	0.10*	0.03	-0.13**	1.00							
11. Depression	0.01	0.21**	-0.10*	0.20**	0.16**	0.30**	0.21**	0.21**	-0.10*	-0.02	1.00						
12. Binge drinking	-0.01	0.00	-0.10*	0.25**	0.09*	0.09*	0.04	0.06	0.02	-0.02	0.18**	1.00					
13. Cannabis	-0.36**	0.02	0.01	0.06	0.17**	0.21**	0.11**	0.05	-0.14**	0.09	0.11*	0.18**	1.00				
14. Cocaine	0.09*	0.23**	0.08	0.05	0.12**	0.08	0.09*	0.15**	-0.04	0.09*	0.11**	0.12**	0.23**	1.00			
15. Heroin	-0.04	0.10*	-0.16**	-0.01	0.08	0.06	0.04	0.08	0.12**	-0.04	0.17**	-0.02	0.04	0.22**	1.00		
16. Illicit Opiates/Sedatives	-0.12**	0.15**	-0.17**	0.11*	0.09*	0.20**	0.05	0.14**	0.01	0.00	0.22**	0.17**	0.19**	0.23**	0.37**	1.00	
17. Stimulants	-0.14*	0.05	-0.11*	0.08	0.06	0.09	0.11*	0.09*	-0.02	0.02	0.13**	0.15**	0.15**	0.18**	0.25**	0.27**	1.00

* p < .05;

** p < .01

Table 4
Regression Analyses for participant-to-partner physical aggression, injury, and psychological aggression

Predictor Variables	Participant-to-Partner Psychological Aggression			Participant-to-Partner Physical Aggression			Participant-to-Partner Injury		
	Zero-inflation		Incident count	Zero-inflation		Incident count	Zero-inflation		Incident count
	OR	(CI)	IRR	OR	(CI)	IRR	OR	(CI)	IRR
Demographics									
Age	1.03**	(1.01–1.06)	1.00	1.03**	(1.01–1.05)	1.00	1.02	(1.00–1.04)	1.01
Gender	0.79	(0.40–1.56)	1.21*	0.92	(0.56–1.53)	1.07	1.46	(0.82–2.59)	0.65
Race	0.73	(0.44–1.21)	0.81*	0.68	(0.44–1.04)	0.87	0.62*	(0.40–0.96)	0.69
Distal Factors									
Family history of alcoholism	1.22	(0.69–2.15)	1.04	1.24	(0.75–2.03)	1.37	0.86	(0.49–1.49)	1.21
Family history of drug abuse	0.83	(0.48–1.42)	1.05	0.67	(0.43–1.06)	0.88	0.83	(0.51–1.36)	0.77
Family history of depression	0.92	(0.51–1.66)	1.00	0.97	(0.61–1.52)	1.00	0.89	(0.56–1.42)	0.96
Childhood physical abuse	0.98	(0.53–1.82)	1.29**	0.66	(0.41–1.06)	2.19**	0.72	(0.44–1.16)	2.43**
Childhood sexual abuse	1.91	(0.97–3.78)	0.99	1.01	(0.58–1.76)	0.68	1.14	(0.62–2.11)	0.59
Proximal/Recent Factors									
Location	1.14	(0.62–2.09)	1.13	0.71	(0.45–1.13)	1.62*	0.59*	(0.35–0.98)	1.14
Live with spouse	0.12**	(0.05–0.31)	1.01	0.62*	(0.39–0.98)	0.60**	0.91	(0.55–1.51)	0.53*
Evidence of depression	0.46**	(0.26–0.80)	1.25*	0.39**	(0.25–0.59)	0.87	0.48*	(0.30–0.76)	0.87
Binge drinking	0.98	(0.95–1.01)	1.01*	0.97*	(0.95–1.00)	1.00	0.98	(0.96–1.00)	1.00
Cannabis use	0.98	(0.94–1.01)	1.01	0.99	(0.97–1.02)	1.01	0.99	(0.97–1.01)	1.01
Cocaine use	0.97*	(0.94–1.00)	1.00	0.98*	(0.95–1.00)	1.01	0.96**	(0.94–0.98)	1.00
Heroin use	0.98	(0.94–1.03)	1.00	1.00	(0.99–1.01)	0.99	1.01	(0.98–1.05)	0.99
Illicit Opiates/Sedatives	0.97	(0.93–1.02)	1.00	0.98	(0.95–1.01)	1.01	0.99	(0.96–1.01)	1.01
Stimulant use	1.03	(0.91–1.16)	1.00	1.02	(0.95–1.10)	1.02	1.00	(0.93–1.08)	1.04*
Overall model	² (34) = 133.60**			² (34) = 115.97**			² (34) = 104.95**		

* p < .05;

p < .01

Note: Odds ratios in the Zero-inflation columns are for predicting a “certain zero” for the dependent measure. Thus, for significant predictors, odds ratios < 1 indicate a positive relationship between the predictor and the presence of violence (e.g., those with evidence of depression were more likely to experience “any” psychological or physical aggression, and to injure their partner). For the incident count columns, for significant predictors, values > 1 indicate that variable is positively associated with the frequency of the outcome (e.g., history of childhood physical abuse was related to more incidents of aggression and injury).

Table 5
Regression Analyses for partner-to-participant physical aggression, injury, and psychological aggression

Predictor Variables	Partner-to-Participant Psychological Aggression			Partner-to-Participant Physical Aggression			Partner-to-Participant Injury		
	Zero-inflation		Incident count	Zero-inflation		Incident count	Zero-inflation		Incident count
	OR	(CI)	IRR	OR	(CI)	IRR	OR	(CI)	IRR
Demographics									
Age	1.03 *	(1.01–1.05)	0.99	1.03 **	(1.01–1.05)	0.98	1.04 **	(1.01–1.06)	0.99
Gender	1.19	(0.65–2.17)	1.08	1.24	(0.75–2.06)	1.11	0.75	(0.44–1.30)	0.90
Race	0.79	(0.49–1.26)	0.82	0.71	(0.47–1.07)	0.70	0.59 *	(0.38–0.93)	0.58 *
Distal Factors									
Family history of alcoholism	1.05	(0.62–1.78)	1.09	0.86	(0.64–1.68)	0.88	1.07	(0.61–1.86)	0.97
Family history of drug abuse	0.93	(0.56–1.54)	1.23	0.90	(0.55–1.35)	1.16	0.85	(0.52–1.39)	0.90
Family history of depression	1.04	(0.61–1.77)	1.05	0.79	(0.58–1.40)	1.08	0.88	(0.56–1.40)	1.01
Childhood physical abuse	1.03	(0.58–1.83)	1.27 *	0.79	(0.50–1.26)	1.62 *	0.67	(0.41–1.08)	1.88 *
Childhood sexual abuse	1.23	(0.63–2.38)	0.95	1.03	(0.60–1.77)	0.77	1.44	(0.79–2.61)	0.77
Proximal/Recent Factors									
Location	1.08	(0.63–1.85)	1.03	1.12	(0.71–1.78)	1.29	0.81	(0.48–1.36)	1.20
Live with spouse	0.31 **	(0.16–0.57)	1.00	0.70	(0.44–1.10)	0.70	0.91	(0.55–1.51)	0.73
Evidence of depression	0.54 *	(0.33–0.88)	0.99	0.51 **	(0.33–0.77)	0.94	0.65	(0.41–1.04)	1.10
Binge drinking	0.98	(0.96–1.01)	1.00	0.97 *	(0.95–0.99)	1.00	0.95 **	(0.93–0.98)	1.00
Cannabis use	0.98	(0.95–1.01)	1.01	0.99	(0.97–1.02)	1.00	1.00	(0.98–1.02)	1.01
Cocaine use	0.96 **	(0.93–0.99)	0.99	0.98	(0.96–1.00)	1.00	0.97 **	(0.95–0.99)	1.00
Heroin use	1.00	(0.97–1.04)	1.00	1.00	(0.98–1.03)	0.98 *	1.01	(0.98–1.04)	0.98
Illicit Opiates/Sedatives	0.98	(0.94–1.03)	1.00	0.98	(0.96–1.01)	1.01	0.98	(0.96–1.00)	1.01
Stimulant use	1.01	(0.91–1.13)	1.00	1.02	(0.94–1.10)	1.03 *	0.97	(0.91–1.04)	1.04 **
Overall model	² (34) = 86.36 **			² (34) = 71.20 **			² (34) = 86.36 **		

* p < .05;

10 > d
**

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript