

# Psychological Aggression, Physical Aggression, and Injury in Nonpartner Relationships Among Men and Women in Treatment for Substance-Use Disorders\*

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**ABSTRACT. Objective:** This study focused on the prevalence and predictors of psychological aggression, physical aggression, and injury rates in nonintimate partner relationships in a substance-use disorder treatment sample. **Method:** The sample included 489 (76% men, 24% women) participants who completed screening measures for inclusion in a randomized control trial for an aggression-prevention treatment. Primary outcome measures included rates of past-year psychological aggression, physical aggression, and injury (both from the participant to nonpartners and from nonpartners to the participant). Potential predictors included individual factors (e.g., age, gender), developmental factors (e.g., family history of drug use, childhood physical abuse), and recent factors (e.g., depression, cocaine use). **Results:** Rates of participant-to-nonpartner psychological aggression (83%), physical aggression (61%),

and injury (47%) were high, as were rates of nonpartner-to-participant aggression. Bivariate analyses revealed significant relationships between the aggression outcomes and most of the individual, developmental, and recent factors. However, multivariate analyses (zero-inflated Poisson regression) revealed that age, treatment status, current symptoms of depression, heavy periods of drinking, and cocaine use were related most frequently to the occurrence of aggression to and from nonpartners. **Conclusions:** Nonpartner aggression may be as common within a substance-use disorder sample as partner aggression, and it is associated with heavy drinking episodes, cocaine use, and depressive symptoms. The findings highlight the need for the development of effective violence interventions addressing violence in nonpartner relationship types. (*J. Stud. Alcohol Drugs* 69: 896-905, 2008)

**I**N THE YEAR 2000, APPROXIMATELY 4 out of 10 victims of police-reported violence defined their relationship with the perpetrator as that of a friend or acquaintance (Federal Bureau of Investigation, 2002). As reported by the Federal Bureau of Investigation's (2002) National Incident-Based Reporting System, 242,233 individuals were victimized by friends or acquaintances. That number surpasses the number of incidents of reported violence between spouses (110,279) or between dating partners (106,009).

Numerous studies have documented a relationship between substance use and partner aggression, with rates of aggression among substance-use disorder (SUD) patients two to three times higher than that found in community or normative samples (e.g., Chermack et al., 2001; Field and Caetano, 2005). Although the number of studies on aggression and substance use has increased, most of the research has focused on one particular type of interpersonal aggression: intimate-partner violence (IPV; e.g., Brown et al., 1998; Fals-Stewart et al., 2002; Moore and Stuart, 2004). Thus, comparatively little is known about the nature and extent of nonpartner aggression in SUD settings, particularly with regard to psychological aggression and injury.

Results from one of the few studies to focus on this type of aggression showed that 53% of the participants in an SUD treatment sample reported past-year physical aggression toward a nonpartner (Chermack et al., 2000), although that study did not assess psychological aggression or injury. As noted by Chermack et al. (2000), the high rates of nonpartner aggression suggest that individuals in SUD treatment settings may have interpersonal difficulties that extend beyond partner relationships. The present study was designed to address an important gap in the literature on violence in SUD settings by comprehensively examining prevalence rates and predictors of the following types of adult aggression in

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nonpartner relationships: psychological aggression, physical aggression, and injury.

The relationship between alcohol and aggression is complex and can best be understood as deriving from an interface between biopsychosocial vulnerabilities and environmental/contextual factors (Chermack and Giancola, 1997; Graham et al., 1998). As argued by these researchers, it is necessary to examine multiple factors potentially contributing to aggression risk to better understand factors related to aggression and to develop assessment and prevention/intervention strategies. According to prior research and theory (Babor et al., 1992; Chermack and Giancola, 1997; Chermack et al., 2006; Quigley and Leonard, 2000), domains potentially related to aggression include developmental factors (e.g., family history of problems with alcohol, drugs, and violence; history of child abuse), more recent individual differences (e.g., substance use, psychological problems), and social and contextual factors (e.g., involvement with illegal drug use, buying/selling drugs).

Biopsychosocial developmental theories hypothesize that distal factors tend to set the stage for later substance-use and psychological problems and that such problems are related to violence risk (Chermack and Giancola, 1997). The present study focuses on both developmental factors and more recent individual difference factors as they may relate to nonpartner aggression and injury.

Several individual differences and developmental factors have documented relationships with aggression perpetration and victimization. First, younger individuals have frequently been shown to have higher rates of psychological aggression (Chermack et al., 2008) and physical aggression (George, 1999; Moore et al., 2008). Second, although gender differences often have been found to be negligible for physical aggression in partner relationships in SUD samples (e.g., Chermack et al., 2008; Chermack et al., 2001; Walton et al., 2003), there is some evidence to suggest that this finding may not hold true for nonpartner violence (NPV). For example, Chermack and colleagues (2001) found that men in SUD treatment had higher rates of NPV than women (66.7% and 39.5%, respectively), and Walton and colleagues' (2007) emergency department-based study found that men were twice as likely as women to engage in nonpartner aggression.

Racial differences have been noted in several studies, with nonwhites having higher rates of both victimization and perpetration (e.g., Field and Caetano, 2005; Halpern and Dodson, 2006). It should be noted, however, that after controlling for socioeconomic factors, the results of some studies have indicated that the impact of race becomes nonsignificant (e.g., Bassuk et al., 2006; Straus and Smith, 1990).

Finally, numerous studies have documented a relationship between aggressiveness and adverse developmental childhood experiences, such as witnessing parental aggression or family conflict (Doumas et al., 1994; Harachi et al., 2006);

parental alcohol or substance misuse (Baskin-Sommers, 2006); and childhood physical and sexual abuse (Bassuk et al., 2006; Chermack and Walton, 1999; Hughes et al., 2007). In a number of studies, although bivariate relationships frequently have been found between developmental factors and later substance use and/or aggression, more recent life events appear to mediate the impact of childhood abuse (Dutton, 1995; Hughes et al., 2007).

The role of substances in aggressive behavior has been researched extensively. Studies have consistently found relationships between physical aggression, alcohol, and cocaine use (see MacDonald et al., 2003). More specifically, controlled experimental studies, as well as studies of SUD treatment samples, have demonstrated that both acute alcohol and cocaine use and general use patterns are related to aggression (Chermack and Blow, 2002; Chermack and Giancola, 1997; Fals-Stewart et al., 2003; Licata et al., 1993). Similarly, alcohol and cocaine are associated with injury severity (Eronen et al., 1996; Falck et al., 2001; Harrison and Gfroerer, 1992). With regard to other substances, fewer studies have examined the impact of specific substances (e.g., stimulants, opiates, and benzodiazepines) on aggression, and reviews suggest a more mixed relationship between other substances and aggression (see Hoaken and Stewart, 2003). Finally, there is emerging evidence that, among men and women with an SUD, psychiatric factors impact aggression. Several studies document higher rates of co-occurring substance misuse and "psychological problems" (primarily depression and anxiety) in those who engage in aggressive behaviors (e.g., Baskin-Sommers, 2006).

The purpose of this study was to provide comprehensive information regarding aggressive behaviors to and from nonpartners within an SUD population. To date, an understanding of the extent of NPV and the risk factors/correlates of NPV among SUD samples (both to and from nonpartners) has been limited because of the paucity of research targeting nonpartner violence specifically and because prior research on NPV in SUD settings did not examine psychological aggression or injury rates (e.g., Chermack et al., 2001). This study examined factors potentially related to aggression based on previous empirical findings and a biopsychosocial developmental conceptualization of factors related to violence (e.g., Chermack and Giancola, 1997; Chermack et al., 2006; Cunradi et al., 2005).

Based on previous findings and theory, we hypothesized that, with regard to individual factors, younger age and male gender would be associated with higher levels of psychological aggression, physical aggression, and injury (Chermack et al., 2000; Fonseca et al., 2006). Also consistent with previous findings on the role of childhood factors in current aggression (Dutton, 1995; Markowitz, 2001; O'Hearn and Margolin, 2000), we expected that, although childhood factors would be bivariate related to aggression outcomes, such factors would not be significant in multivariate models

owing to the influence of more recent individual factors. We expected that all substances would be bivariately related to aggression, with alcohol and cocaine being the most robust predictors of aggression in multivariate analyses. Finally, based on previous studies on depression and aggression (e.g., Chermack et al., 2008; Walton et al., 2007), we expected that depressive symptoms would be associated with aggression outcomes.

## Method

### *Procedure*

Participants were recruited within 2 weeks of enrolling in SUD treatment programs, including community residential centers, intensive outpatient programs, 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. Inclusion criteria comprised having a past-year history of physical aggression based on responses to a modification of the revised Conflict Tactics Scale (CTS2; see *Measures* section for additional information). The data presented in this article are derived from information obtained from participants screened for inclusion in the RCT. Therefore, the data include information on participants with and without histories of past-year aggression. The purpose of the study 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 \$10 for completing the screening interview. Approximately 95% of the participants who were approached consented to take part in this study. The survey used to screen participants consisted of brief measures of demographics, childhood events, psychiatric symptoms, substance use, and the modified version of the CTS-II.

### *Participants*

Participants in this study were 489 individuals (76% men, 24% women) recruited from SUD treatment programs (71.5% from residential treatment and 28.5% from outpatient centers). The age of the participants ranged from 18 to 63 years, with a mean of 35.9 years. The study participants were white (54.4%), black (35.4%), and of other ethnicities (2.5% Hispanic, 3.9% Native American, 0.4% Asian, 0.2 Middle Eastern, 3.3% other). Regarding marital status, approximately 10.6% were married, 5.3% were separated, 20.0% were divorced, 1.6% were widowed, 10.6% were living with a significant other, and 51.8% had never been married. Fewer than 7% of the participants 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. Approximately

55% of the sample made less than \$10,000 in the last calendar year, 48% were uninsured, and 83% were unemployed (37% of the unemployed participants cited incarceration as the reason why they lost their job).

### *Measures*

*Aggression to and from nonpartners.* The CTS2 (Straus et al., 1996) was used to assess physical aggression for the year preceding this study. The revision of this measure, which was originally designed to assess family violence, allowed for a more thorough understanding of violence by asking more detailed questions related to violent behavior and nonverbal psychological aggression and by including a subscale related to injury (Straus et al., 1996). Physical aggression was assessed by items such as "I slapped someone other than my partner," and injury was assessed with items such as "had a broken bone from a fight with someone other than my partner."

*Psychological aggression,* which the CTS2 defines as "the use of verbal and nonverbal acts which symbolically hurt the other, or the use of threat to hurt the other (p. 77)" was assessed with items such as "I threatened to hit or throw something at someone other than my partner" and "I destroyed something belonging to someone other than my partner." Participants indicated how often these events occurred via a Likert scale that ranged from 0 (never), 1 (one act), 2 (two acts), 3 (3-5 acts), 4 (4-6 acts), 5 (11-25 acts), to 6 (more than 20 times). Aggregate scores for each scale were obtained by adding the midpoints for the response category (e.g., midpoint of response Category 3 is 4). Two types of scores were derived for each scale: prevalence rates (whether the given behavior occurred) and frequency, which is computed from how often the behaviors occurred (Straus et al., 1996).

The CTS2 has demonstrated strong psychometric properties and has been shown to have good internal consistency (for a review see Simpson and Christensen, 2005). The measure was modified to assess nonpartner aggression by asking participants to answer the same items that appear in the CTS2 for nonpartners as well as partners.

*Alcohol and drug consumption.* Alcohol and substance use in the 28 days before entering treatment was assessed by using items from the University of Arkansas Substance Abuse Outcomes Module (SAOM; Smith et al., 1996). Participants were asked to indicate the number of days in which they had engaged in *heavy drinking*, which was defined as the consumption of five or more alcoholic beverages in a day. They also were asked to record the number of days that they used each of the following: marijuana, cocaine or crack, stimulants (prescribed and nonprescribed), opiates (prescribed and nonprescribed), sedatives (prescribed and nonprescribed), and heroin. The SAOM 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 measures of alcohol and drug problem severity measures such as the Addiction Severity Index (McLellan et al., 1992). Although the SAOM asks questions about both prescription use and illicit substance use, the present study focused solely on the illicit use of these substances, whether prescribed or not.

**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 (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 Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (American Psychiatric Association, 1994), 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 cutoff point, participants in this current study were considered to be showing "evidence of depression" if they received a PHQ-9 score of at least 10. 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).

**Distal family background factors.** Family history of substance use and mental health problems were assessed by asking participants to specify if any biological family member(s) had problems with the following: alcoholism, illicit substance use, and depression. Histories of childhood physical and sexual abuse were assessed by asking the following two questions: "Were you ever physically abused as a child?" and "Were you ever sexually abused as a child?"

#### Data analysis

First, rates of nonpartner aggression were obtained through the use of CTS2 prevalence scales, which indicate the percentage of those reporting any aggression. Second, Spearman correlations were conducted to examine relationships among aggression correlates and aggression frequency outcomes. Next, zero-inflated Poisson (ZIP) regression models were used to predict both the presence of and frequency of participant-to-nonpartner aggression and nonpartner-to-participant aggression. When working with event-count data (i.e., data composed of the total number of counts of a specified behavior within a given time period), Zip regression is indicated when there is a high likelihood that there will be multiple scores of 0 (Hernandez-Avila, 2006; Zorn, 1996). Therefore, ZIP regression is the most appropriate approach to account for the large number of zeros that occurred as

the result of using outcome measures involving event-count data for aggression. Essentially, ZIP regression allows for two types of predictions: whether a behavior occurred (e.g., physical aggression; predictor variables interpreted with odds ratios for predicting a certain "zero" for the outcome [e.g., no physical aggression]) and, for those who reported the occurrence of a given behavior, how often it occurred (interpreted with a relative risk ratio). All analyses included the predictors for individual factors (age, gender, race, treatment location [residential or outpatient], employment status); developmental factors (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; and evidence of depression. Finally, we ran multicollinearity diagnostics using SAS (Version 9.1; SAS Institute Inc., Cary, NC) and found no evidence to suggest that multicollinearity was an issue in these analyses.

## Results

### Participant-to-nonpartner aggression

**Descriptive information and bivariate results.** Overall rates of psychological aggression, physical aggression, and

TABLE 1. Descriptive information regarding the sample

Variable	<i>n</i>	%	Mean (SD)
Participant-to-nonpartner (%+)			
Psych. aggression	489	83.0	21.19 (25.20)
Phy. aggression	489	60.5	23.87 (50.71)
Injury	489	46.6	7.67 (7.67)
Nonpartner-to-participant (%+)			
Psych. aggression	489	77.5	15.63 (20.69)
Phy. aggression	489	55.5	14.20 (35.64)
Injury	489	46.4	6.87 (17.42)
Age	488		35.89 (10.83)
Gender	486		
Male		76.1	
Female		23.9	
Race	489		
White		54.5	
Nonwhite		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	487		
Residential		71.5	
Outpatient		28.5	
Employed (%+)	489	16.8	
Depression (%+)	489	54.0	
Heavy drinking	486		6.96 (9.46)
Cannabis	489		5.86 (9.93)
Cocaine	489		7.51 (10.11)
Heroin	489		2.74 (7.79)
Illicit opiates/sedatives	489		3.06 (9.51)
Illicit stimulants	489		0.69 (3.33)

Notes: Psych. = psychological; %+ = percentage who answered affirmatively to the question; phy. = physical; fam. = family.

TABLE 2. Correlations between predictor variables and aggression frequency outcomes

	P-to-NP psych. aggress.	P-to-NP physical aggress.	P-to-NP injury	NP-to-P psych. aggress.	NP-to-P physical aggress.	NP-to-P injury
Age	<b>-.19<sup>†</sup></b>	<b>-.22<sup>†</sup></b>	<b>-.20<sup>†</sup></b>	<b>-.25<sup>†</sup></b>	<b>-.21<sup>†</sup></b>	<b>-.20<sup>†</sup></b>
Male gender	<b>-.12<sup>†</sup></b>	.03	.05	-.06	.02	.06
White race	<b>.13<sup>†</sup></b>	.00	-.02	<b>.10<sup>*</sup></b>	.02	-.01
Fam. alcoholism +	<b>.11<sup>*</sup></b>	<b>.10<sup>*</sup></b>	.05	<b>.10<sup>*</sup></b>	<b>.13<sup>†</sup></b>	.08
Fam. drug use +	<b>.10<sup>*</sup></b>	.02	-.01	<b>.12<sup>*</sup></b>	.05	-.01
Fam. depression +	<b>.18<sup>†</sup></b>	.08	.08	<b>.18<sup>†</sup></b>	<b>.13<sup>†</sup></b>	.06
Physical abuse, yes	<b>.15<sup>†</sup></b>	<b>.11<sup>*</sup></b>	.10 <sup>*</sup>	.15 <sup>†</sup>	.11 <sup>*</sup>	.08
Sexual abuse, yes	<b>.10<sup>*</sup></b>	.04	.01	.08	.07	.02
Residential treatment	.05	<b>.18<sup>†</sup></b>	<b>.18<sup>†</sup></b>	.05	<b>.16<sup>*</sup></b>	<b>.15<sup>†</sup></b>
Employed	-.02	-.05	-.01	.02	-.04	-.01
Depression +	<b>.20<sup>†</sup></b>	<b>.18<sup>†</sup></b>	<b>.16<sup>†</sup></b>	<b>.14<sup>*</sup></b>	<b>.18<sup>†</sup></b>	<b>.15<sup>†</sup></b>
Heavy drinking days	<b>.21<sup>†</sup></b>	<b>.26<sup>†</sup></b>	<b>.28<sup>†</sup></b>	<b>.18<sup>†</sup></b>	<b>.29<sup>†</sup></b>	<b>.25<sup>†</sup></b>
Cannabis use days	<b>.20<sup>†</sup></b>	<b>.25<sup>†</sup></b>	<b>.21<sup>†</sup></b>	<b>.24<sup>†</sup></b>	<b>.23<sup>†</sup></b>	<b>.21<sup>†</sup></b>
Cocaine use days	<b>.14<sup>†</sup></b>	<b>.14<sup>†</sup></b>	<b>.14<sup>†</sup></b>	<b>.14<sup>†</sup></b>	<b>.14<sup>†</sup></b>	<b>.12<sup>†</sup></b>
Heroin use days	<b>.14<sup>†</sup></b>	.08	.08	<b>.10<sup>*</sup></b>	.05	.08
Illicit opiates/sedatives use days <sup>a</sup>	<b>.20<sup>†</sup></b>	<b>.17<sup>†</sup></b>	<b>.19<sup>†</sup></b>	<b>.20<sup>†</sup></b>	<b>.20<sup>†</sup></b>	<b>.16<sup>†</sup></b>
Illicit stimulants use days	<b>.14<sup>†</sup></b>	<b>.14<sup>†</sup></b>	<b>.15<sup>†</sup></b>	<b>.13<sup>†</sup></b>	<b>.13<sup>†</sup></b>	<b>.15<sup>†</sup></b>
P-to-NP psych. agg.	—	<b>.70<sup>†</sup></b>	<b>.56<sup>†</sup></b>	<b>.84<sup>†</sup></b>	<b>.60<sup>†</sup></b>	<b>.54<sup>†</sup></b>
P-to-NP physical agg.	<b>.70<sup>†</sup></b>	—	<b>.85<sup>†</sup></b>	<b>.66<sup>†</sup></b>	<b>.84<sup>†</sup></b>	<b>.82<sup>†</sup></b>
P-to-NP injury	<b>.56<sup>†</sup></b>	<b>.85<sup>†</sup></b>	—	<b>.57<sup>†</sup></b>	<b>.79<sup>†</sup></b>	<b>.93<sup>†</sup></b>
NP-to-P psych. agg.	<b>.84<sup>†</sup></b>	<b>.66<sup>†</sup></b>	<b>.57<sup>†</sup></b>	—	<b>.70<sup>†</sup></b>	<b>.56<sup>†</sup></b>
NP-to-P physical agg.	<b>.60<sup>†</sup></b>	<b>.84<sup>†</sup></b>	<b>.79<sup>†</sup></b>	<b>.70<sup>†</sup></b>	—	<b>.80<sup>†</sup></b>
NP-to-P injury	<b>.54<sup>†</sup></b>	<b>.82<sup>†</sup></b>	<b>.93<sup>†</sup></b>	<b>.56<sup>†</sup></b>	<b>.80<sup>†</sup></b>	—

Notes: **Bold** indicates statistical significance. Fam. = family; + = positive; P = participant; NP = nonpartner; psych. = psychological; agg. = aggression. <sup>a</sup>Nonprescription or illicit use.

\* $p < .05$ ; <sup>†</sup> $p < .01$ .

injuring of nonpartners were 83%, 61%, and 47%, respectively. Similarly, rates of being the recipient of psychological aggression, being the recipient of physical aggression, and being injured by a nonpartner also were quite high (78%, 56%, and 46%, respectively). Table 1 summarizes the descriptive information for the sample.

As shown in Table 2, participant characteristics most often associated with the frequency of nonpartner aggression were being of younger age and being in residential treatment. Gender was related to participant-to-nonpartner psychological aggression, with women reporting a higher frequency of psychologically aggressive behaviors. Race (being white) was associated with a higher frequency of psychological aggression both to and from nonpartners. With regard to background variables, those most frequently related to nonpartner aggression were physical abuse and a family history of alcoholism. More frequent events that were related to all types of nonpartner aggression included current symptoms of depression; heavy drinking; and the use of cannabis, cocaine, illicit opiates/sedatives, and illicit stimulants.

*ZIP regression analyses for participant-to-nonpartner aggression.* As shown in Table 3, the ZIP regression analyses were significant for all three models. The “Zero inflation” columns specify whether a variable is related to the occurrence of aggression, and the “Incident count” columns indicate variables significantly related to how often the behavior occurred. With regard to participant characteristics, younger

age was associated with the frequency with which psychological aggression occurred and was related to whether physical aggression and injury took place. Race was related to whether psychological aggression occurred, with whites being more likely to report engaging in this type of behavior. Developmental factors were not significant in these models, with the exception being that participants who reported a family history of drug use were less likely to have injured a nonpartner.

Current symptoms of depression and treatment location were significant in two of the three models. Specifically, participants with past-30-day symptoms of depression had a greater likelihood of being physically aggressive and of injuring nonpartners, and those in residential treatment centers were apt to be more physically aggressive and to injure nonpartners in addition to reporting more incidents of both behaviors. Heavy drinking and cocaine use increased the likelihood of the occurrence of physical aggression and injury, and the frequency of heavy drinking and cannabis use was related to more incidents of physical aggression. With regard to other substances, frequency of stimulant use was associated with more incidents of psychological aggression, physical aggression, and injury. Finally, heroin use was related to the number of incidents of psychological aggression.

*ZIP regression analyses for nonpartner-to-participant aggression.* As shown in Table 4, the ZIP regression analyses

TABLE 3. ZIP regression participant-to-nonpartner aggression

Predictor variables	Participant-to-nonpartner psychological aggression		Participant-to-nonpartner physical aggression		Participant-to-nonpartner injury	
	Zero inflation OR (CI)	Incident count IRR (CI)	Zero inflation OR (CI)	Incident count IRR (CI)	Zero inflation OR (CI)	Incident count IRR (CI)
<b>Individual factors</b>						
Age	1.01 (0.99-1.04)	<b>0.98<sup>†</sup> (0.97-0.99)</b>	<b>1.04<sup>‡</sup> (1.02-1.06)</b>	1.00 (0.98-1.01)	<b>1.04<sup>‡</sup> (1.02-1.07)</b>	0.99 (0.98-1.01)
Gender	0.48 (0.22-1.05)	1.04 (0.83-1.32)	1.17 (0.66-2.06)	0.92 (0.59-1.45)	1.56 (0.89-2.73)	0.74 (0.47-1.16)
Race	<b>1.82* (1.05-3.17)</b>	1.03 (0.83-1.27)	0.86 (0.57-1.30)	1.12 (0.76-1.63)	0.69 (0.46-1.05)	1.06 (0.70-1.60)
Location	0.65 (0.36-1.15)	1.16 (0.93-1.44)	<b>0.52<sup>†</sup> (0.33-0.84)</b>	<b>1.92<sup>†</sup> (1.18-3.13)</b>	<b>0.52<sup>†</sup> (0.32-0.84)</b>	<b>1.90<sup>†</sup> (1.18-3.06)</b>
Employed	1.26 (0.65-2.43)	0.98 (0.76-1.26)	1.10 (0.65-1.86)	1.15 (0.71-1.88)	0.98 (0.56-1.70)	1.11 (0.65-1.88)
<b>Developmental factors</b>						
Fam. history of alcoholism	0.94 (0.53-1.66)	0.99 (0.78-1.27)	0.75 (0.46-1.22)	0.94 (0.59-1.49)	1.07 (0.66-1.75)	0.98 (0.58-1.65)
Fam. history of drug use	1.14 (0.64-2.01)	1.04 (0.84-1.28)	1.56 (0.99-2.47)	1.18 (0.80-1.75)	<b>1.92<sup>†</sup> (1.19-3.09)</b>	1.41 (0.94-2.11)
Fam. history of depression	1.04 (0.56-1.93)	1.12 (0.90-1.40)	0.89 (0.56-1.42)	0.77 (0.52-1.15)	0.77 (0.49-1.22)	0.71 (0.48-1.06)
Childhood physical abuse	0.73 (0.38-1.41)	1.18 (0.97-1.45)	0.94 (0.57-1.54)	1.29 (0.90-1.84)	0.75 (0.47-1.20)	1.23 (0.83-1.81)
Childhood sexual abuse	0.99 (0.45-2.17)	0.99 (0.78-1.26)	0.88 (0.49-1.59)	0.99 (0.63-1.55)	1.18 (0.67-2.10)	1.07 (0.65-1.76)
<b>Recent factors</b>						
Evidence of depression	0.70 (0.39-1.26)	1.12(0.89-1.40)	<b>0.58* (0.37-0.91)</b>	1.13 (0.76-1.68)	<b>0.50<sup>†</sup> (0.32-0.78)</b>	0.95 (0.61-1.46)
Heavy drinking	0.97 (0.94-1.00)	1.01 (1.00-1.02)	<b>0.97* (0.95-1.00)</b>	<b>1.02* (1.00-1.03)</b>	<b>0.96<sup>†</sup> (0.93-0.98)</b>	1.01 (0.99-1.03)
Cannabis use	0.99 (0.95-1.02)	1.01 (1.00-1.02)	0.99 (0.96-1.01)	<b>1.02* (1.00-1.04)</b>	0.99 (0.97-1.01)	1.02 (1.00-1.04)
Cocaine use	0.98 (0.95-1.01)	1.00 (0.99-1.01)	<b>0.98* (0.96-1.00)</b>	1.01 (0.99-1.02)	<b>0.97<sup>†</sup> (0.95-0.99)</b>	1.00 (0.98-1.01)
Heroin use	0.95 (0.90-1.01)	<b>1.01* (1.00-1.02)</b>	0.98 (0.96-1.01)	1.00 (0.98-1.02)	0.99 (0.96-1.02)	1.00 (0.98-1.02)
Sedative or opiate use <sup>a</sup>	1.01 (0.97-1.05)	1.00 (0.99-1.00)	1.00 (0.98-1.03)	0.99 (0.98-1.00)	0.99 (0.96-1.01)	0.99 (0.98-1.01)
Stimulant use	1.01 (0.90-1.14)	<b>1.02* (1.00-1.04)</b>	1.01 (0.94-1.08)	<b>1.05<sup>‡</sup> (1.03-1.07)</b>	1.00 (0.93-1.06)	1.06 <sup>‡</sup> (1.04-1.08)
Overall model	$\chi^2 = 124.6, \ddagger 34$ df		$\chi^2 = 116.6, \ddagger 34$ df		$\chi^2 = 112.1, \ddagger 34$ df	

Notes: **Bold** indicates statistical significance. OR = odds ratio; CI = confidence interval; IRR = incidence rate ratios; fam. = family. <sup>a</sup>Nonprescription or illicit use.

\* $p < .05$ ; <sup>†</sup> $p < .01$ ; <sup>‡</sup> $p < .001$ .

were significant for all three models. With regard to demographic characteristics, younger participants were more likely to experience all three types of aggression and experienced more episodes of psychological aggression. Furthermore, gender was related to whether a participant was injured by a nonpartner (men were less likely to be injured). Developmental variables (family history factors and abuse history) were not significant in any model.

Treatment setting and current symptoms of depression were significant in two of the models (physical aggression, injury), and both were related to whether the behavior occurred. Treatment location (residential) also was related to a higher frequency with which injuries occurred. In terms of substance use, heavy drinking and cocaine use were related to physical aggression and to being injured. The frequency of cannabis use was related to the frequency with which all aggressive behaviors occurred, whereas stimulant use was related to the frequency of nonpartner-to-participant physical aggression and being injured. Finally, participants who reported heroin use experienced more acts of psychological aggression.

## Discussion

The extent to which NPV occurred in our sample is alarming: 83% of participants engaged in psychological aggression, more than 60% reported physical aggression, and approximately 47% reported injuring a nonpartner. The rates

of perpetration were higher than what has been observed in some IPV studies from SUD treatment samples (41%-54%; e.g., Chermack et al., 2001; Fals-Stewart et al., 2002), in a prior study of an SUD treatment sample examining NPV (53%; Chermack et al., 2000), in community-based samples (28% -35%) (Ehrensaft et al., 2003; O'Leary and Williams, 2006), and in the CTS-II normative college sample (49% males, 35% females; Straus et al., 1996). Moreover, rates of injury in our study were approximately four times higher than the 13% reported by college students in the CTS-II (Straus et al., 1996) and higher than the 33% found in a sample of women reporting IPV within a 2-year time frame (Frye et al., 2006). In addition to high rates of aggression toward nonpartners, our sample also reported high rates of being the recipient of aggression and being injured by nonpartners: 78% psychological aggression, 56% physical aggression, and 46% injury.

Prior studies of partner violence in college students (Hammock, 2003) and in community samples (Taft et al., 2006) have suggested similar predictors for psychological and physical aggression. The present study of NPV, however, found that predictors of physical aggression and injury were more similar and that, overall, there were relatively few predictors of psychological aggression. Specifically, the findings suggest that substance use and evidence of depression were consistently associated with physical aggression and injury, with little evidence that such factors were related to psychological aggression. This study provides a unique

TABLE 4. ZIP regression nonpartner-to-participant aggression

Predictor variables	Nonpartner-to-participant psychological aggression		Nonpartner-to-participant physical aggression		Nonpartner-to-participant injury	
	Zero inflation OR (CI)	Incident count IRR (CI)	Zero inflation OR (CI)	Incident count IRR (CI)	Zero-inflation OR (CI)	Incident count IRR (CI)
<b>Individual factors</b>						
Age	<b>1.03* (1.01-1.05)</b>	<b>0.99* (0.98-1.00)</b>	<b>1.04‡ (1.02-1.07)</b>	1.00 (0.98-1.02)	<b>1.04‡ (1.02-1.06)</b>	0.99 (0.97-1.01)
Gender	1.04 (0.54-2.01)	1.12 (0.84-1.49)	1.65 (0.96-2.84)	1.24 (0.74-2.06)	<b>1.89* (1.09-3.25)</b>	1.06 (0.65-1.74)
Race	1.42 (0.85-2.34)	1.01 (0.80-1.27)	0.80 (0.53-1.23)	0.98 (0.66-1.45)	0.74 (0.49-1.12)	0.97 (0.64-1.47)
Location	0.74 (0.44-1.25)	1.16 (0.91-1.49)	<b>0.54* (0.34-0.87)</b>	1.71 (0.97-3.01)	<b>0.57* (0.35-0.91)</b>	<b>1.62* (1.02-2.57)</b>
Employed	1.15 (0.63-2.09)	0.99 (0.78-1.26)	1.15 (0.67-2.00)	1.07 (0.62-1.87)	0.96 (0.56-1.63)	0.96 (0.57-1.61)
<b>Developmental factors</b>						
Fam. history of alcoholism	0.83 (0.49-1.40)	1.03 (0.79-1.33)	0.89 (0.55-1.44)	1.55 (0.87-2.77)	0.84 (0.52-1.35)	1.10 (0.67-1.80)
Fam. history of drug use	1.02 (0.61-1.68)	0.99 (0.80-1.22)	1.35 (0.85-2.14)	0.98 (0.68-1.42)	1.54 (0.97-2.44)	0.98 (0.66-1.45)
Fam. history of depression	0.78 (0.45-1.36)	1.12 (0.89-1.41)	0.66 (0.42-1.04)	0.75 (0.48-1.16)	0.87 (0.55-1.36)	0.73 (0.50-1.07)
Childhood physical abuse	0.65 (0.35-1.18)	1.21 (0.97-1.50)	0.87 (0.54-1.39)	1.24 (0.80-1.93)	1.04 (0.66-1.64)	1.27 (0.87-1.86)
Childhood sexual abuse	0.79 (0.38-1.66)	0.91 (0.69-1.19)	0.74 (0.41-1.34)	0.75 (0.45-1.27)	0.83 (0.47-1.46)	0.80 (0.48-1.35)
<b>Recent factors</b>						
Evidence of depression	0.71 (0.42-1.19)	0.89 (0.71-1.11)	<b>0.57* (0.37-0.89)</b>	0.98 (0.63-1.53)	<b>0.58* (0.37-0.90)</b>	1.06 (0.70-1.62)
Heavy drinking	0.98 (0.95-1.01)	1.01 (0.99-1.02)	<b>0.96‡ (0.94-0.98)</b>	1.02 (1.00-1.04)	<b>0.97† (0.94-0.99)</b>	1.01 (0.99-1.03)
Cannabis use	0.99 (0.96-1.02)	<b>1.01† (1.00-1.03)</b>	0.99 (0.97-1.02)	<b>1.02* (1.00-1.04)</b>	0.99 (0.97-1.01)	<b>1.02* (1.00-1.04)</b>
Cocaine use	0.97 (0.95-1.00)	1.00 (0.99-1.01)	<b>0.98* (0.96-1.00)</b>	1.01 (0.99-1.02)	<b>0.98* (0.96-1.00)</b>	1.01 (0.99-1.02)
Heroin use	0.99 (0.96-1.03)	<b>1.01* (1.00-1.02)</b>	0.99 (0.96-1.02)	1.00 (0.97-1.02)	0.99 (0.96-1.01)	0.99 (0.97-1.01)
Sedative or opiate use <sup>a</sup>	1.02 (0.99-1.05)	1.00 (1.00-1.01)	1.00 (0.97-1.02)	1.00 (0.98-1.02)	0.99 (0.97-1.02)	1.00 (0.99-1.01)
Stimulant use	0.99 (0.88-1.10)	1.00 (0.98-1.03)	1.01 (0.93-1.08)	<b>1.04† (1.01-1.07)</b>	0.98 (0.91-1.05)	<b>1.05‡ (1.03-1.07)</b>
Overall model	$\chi^2 = 101.3, † 34$ df		$\chi^2 = 76.5, † 34$ df		$\chi^2 = 117.0, † 34$ df	

Notes: **Bold** indicates statistical significance. OR = odds ratio; CI = confidence interval; IRR = incidence rate ratio; fam. = family. <sup>a</sup>Nonprescription or illicit use.

\* $p < .05$ ; † $p < .01$ ; ‡ $p < .001$ .

contribution to the literature by suggesting that NPV may occur as frequently as IPV and is endemic within the SUD population.

Consistent with other research, younger age was related to greater incidents of physical aggression and injury, which may partially be explained by findings that younger individuals might be more likely to congregate in more violent social contexts (e.g., “violent bars;” Quigley et al., 2003). In multivariate analyses, it was found that women were more likely to be injured by a nonpartner than were men. It is possible that, within SUD populations, women are exposed to situations, such as prostitution, that have a higher potential for violence and resultant injury (Church et al., 2001; Farley and Barkan, 1998; Romero-Daza et al., 2003). They may be seen as easier targets for violence in drug buying/selling situations; and/or they may be more likely to be injured physically because of smaller stature, particularly if the aggressor is male (Straus, 1993).

In the current study, we were not able to ascertain details regarding situational factors potentially associated with NPV or the gender of the nonpartners. Future studies should continue to explore potential differences in injury rates by focusing on gender differences (or similarities) between the aggressor and the victim and on the relationship between the two.

Although some developmental factors (e.g., physical abuse, family alcoholism) were bivariate related to higher rates of perpetration and victimization, they generally were

not significant in multivariate models. Although the items used to assess these factors were certainly not ideal (see limitations), the findings are consistent with those of Dutton (1995) and Hughes et al. (2007), in which more recent events (e.g., adult psychopathology, substance use) mediated the association between parent-to-child family of origin violence and the use of physical aggression with a current partner (male and female aggressors).

Bivariate findings indicated that, with the exception of heroin, the substances assessed in our study were significantly related to all aggression and injury measures. Multivariate findings suggest that the use of certain substances is related to both the occurrence of aggression and the frequency with which it takes place. For example, heavy drinking and cocaine use were related to whether certain types of aggression occurred but typically not to the number of incidents (with the exception that heavy drinking was related to the frequency of physical aggression to nonpartners). These findings replicate clinical and laboratory studies, which generally have found a relationship between physical aggression, alcohol, and cocaine (see Chermack and Blow, 2002; Chermack and Giancola, 1997; Licata et al., 1993; MacDonald et al., 2003). With other substances, however, the pattern of findings was different; stimulants (and to a lesser degree marijuana) were related to the frequency of aggressive behaviors.

Given the cross-sectional design of this study, it is not possible to establish the direction of causality between the

substance use and aggression/injury measures. Several potential factors could account for the observed associations, including the role of acute alcohol and drug intoxication, withdrawal effects, or psychological/contextual factors, or being exposed to violence may lead to increased substance use. However, both laboratory research (Chermack and Giancola, 1997; Hoaken and Stewart, 2003; Licata et al., 1993) and SUD treatment research (using calendar approaches examining acute intoxication) support the role of acute intoxication for cocaine and alcohol use in relation to aggression (Chermack and Blow, 2002; Fals-Stewart, 2003).

Alternatively, obtaining and/or using illegal substances involves a social/environmental context with people and places where nonpartner violence is likely to occur. It is possible that specific drugs are associated more with certain environments (e.g., "drug subcultures;" Goldstein, 1985) that encourage or tolerate violence. Baskin-Sommers and Sommers (2006) have suggested that aggression may be partially explained by the tendency of drug users to become more exposed to and desensitized by violence because of interactions with individuals already immersed in the often violent drug culture. Thus, users of illicit substances may have greater opportunities to be exposed to violence.

Our findings about the relationship between the frequency of substance use and the frequency of aggression could reflect potential pharmacological mechanisms, greater exposure to more dangerous social contexts owing to frequent drug use, or even that those experiencing frequent aggression may show increases in substance use. Replication of our findings is certainly required, given the novelty of these findings for specific substances, combined with the modest strength of these relationships. Nevertheless, it appears reasonable to conclude that treatment targeting reduction in substance use and related social contexts would likely reduce violence.

Participants who reported recent symptoms of depression had increased odds of physical aggression and injury both to and from nonpartners. Because of the design of this study, it is impossible to determine the causal relationship between depressive symptoms and aggression. In other words, it is impossible to know whether these symptoms are substance induced, whether they are indicative of a depressive disorder, or whether they are spuriously correlated with aggression. Hypotheses that have been proffered to explain this relationship include the idea that some patients with depressive disorders have increased levels of agitation, irritability, and hostility (for a review, see Painuly et al., 2005), which could potentially lead to aggressive behavior. Conversely, some recipients of interpersonal aggression may experience depressed mood because they blame themselves for the occurrence of aggression (e.g., Calveti et al., 2007) or because of perceptions of being vulnerable to more abuse and/or being unable to leave the abusive relationship (Nurius et al., 2003). Although our study cannot help resolve this question,

to our knowledge it is the first study to illustrate the relative importance of current depression as it relates to nonpartner aggression (both to and from) within an SUD sample.

It should be noted that it is possible that other types of psychiatric symptoms or psychiatric distress in general may be related to NPV. For example, a prospective study of individuals initially recruited from SUD treatment programs found that higher levels of general psychiatric distress predicted maintenance of aggressive behaviors 2 years after treatment (Walton et al., 2003).

We were unable to screen for a wide array of psychiatric disorders in our screening survey. Future studies should focus on studying the relationship between aggression and various psychiatric symptoms to help explicate the mechanisms underlying this association.

Although our study provides important information on rates of nonpartner aggression and associated factors, several limitations need to be addressed. The first limitation is that, because of the nature of a cross-sectional design and variation in measurement time frames, we were unable to infer causality or to make conclusions regarding relationships between aggression and associated variables.

Second, although our modification of the CTS2 enabled us to ask questions about nonpartner aggression, it did not provide information regarding the context of the aggression. Thus, we were unable to offer details about social/contextual factors, motivations, or reasons behind the aggressive acts (e.g., self-defense, retaliation, aggression in furtherance of a criminal act, gender of nonpartner). Also, the CTS2 does not allow for more in-depth analyses of physical aggression and injury. More specifically, there is no way to ascertain the degree of overlap between these events in terms of whether they describe separate incidents or conflicts. Similarities in findings between physical aggression and injury may partially be explained if subjects are reporting on the same incident. Future studies using calendar approaches to measure substance use and nonpartner aggression could address the aforementioned limitations by providing parallel time frames, determining the proximal timing of substance use in relation to aggression, and helping tease apart physical aggression from injury.

Third, these data came from SUD treatment settings (primarily residential) in a single midwestern state, thereby potentially limiting the generalizability of our findings. When compared with the Treatment Episode Data Set (TEDS; national data set of information related to individuals in SUD treatment), rates of being employed were lower in our sample, when compared with those entering treatment for the first time (36% in TEDS vs 17% in our sample). However, these rates were more in line with what was seen in those who had one to four treatment episodes (26%) and five or more episodes (14%).

Fourth, items related to childhood events were brief and did not allow for any detailed examination of the events



of interest. Furthermore, the self-labeling of what is considered abusive may be susceptible to response bias or underreporting.

Finally, we were unable to confirm our participants' self-report of aggression perpetration and victimization. Although the lack of collateral information may underdepict the prevalence of nonpartner aggression, it should be noted that previous studies have found that self-report in SUD populations is relatively accurate (e.g., Darke, 1998) and that the reporting of aggression by SUD populations tends to be higher in treatment samples (e.g., O'Farrell et al., 2003, Panuzio et al., 2006).

In summary, the rates of perpetration and victimization in nonpartner psychological aggression, physical aggression, and injury were alarming. To date, the majority of research has focused on intimate partner aggression, although there is evidence to suggest that NPV occurs as frequently, if not more so, than IPV. Our findings indicate that current symptoms of depression may be a marker of involvement with nonpartner aggression. One interesting commonality between NPV and IPV is that, with the exception of injury, gender differences were negligible. This finding suggests that nonpartner aggression-prevention interventions appear indicated for both men and women in SUD treatment. Practically speaking, treatment programs should assess both men and women for both IPV and NPV, particularly when heavy drinking and cocaine use are involved. Additional longitudinal research is needed to examine the impact of SUD treatment outcomes on nonpartner aggression, and to develop and test interventions that address nonpartner aggression.

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