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The Role of Illicit Substance Use in a Conceptual Model of Intimate Partner Violence in Men Undergoing Treatment for Alcoholism

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Abstract

Illicit substance use (ISU) predicts intimate partner violence (IPV) above and beyond alcohol use and other known IPV correlates. Stuart and colleagues (2008) provided evidence for a theoretical framework by which ISU contributes both directly and indirectly to IPV. We sought to replicate and extend their findings using data from 181 married or cohabiting heterosexual couples in which the male had recently begun a substance abuse treatment program and met criteria for alcohol dependence (97%) or abuse (3%). Using SEM, we found that (a) Stuart et al.'s model provided a good fit to the data; (b) men's cocaine use and women's sedative use emerged as particularly relevant to their respective perpetration of IPV; (c) a positive association between men's antisociality and physical aggression was mediated by increased stimulant use; and (d) the specific pattern of IPV predicted by women's sedative use differed across levels of aggression severity. These findings not only highlight the direct role of ISU in relationship aggression, but also support a larger theory-driven model comprising various proximal and distal precursors of IPV.

Keywords

Violence; Intimate Partners; Substance Use; Substance Abuse; Drugs

The exchange of psychologically and physically aggressive acts between intimate partners is not uncommon (e.g., Tjaden & Thoennes, 2000). There is also a substantial literature

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attesting to their deleterious consequences across myriad dyadic and individual outcomes (e.g., symptoms of posttraumatic stress; Nixon, Resick & Nishith, 2004). Research highlights illicit substance use (ISU) as a predictor of psychological and physical aggression above and beyond other known determinants (e.g., alcohol use; Moore & Stuart, 2004). However, this empirical association does not translate smoothly into explanatory formulations (see Pernanen, 1993), as ISU and other candidate precursors of intimate partner violence (IPV) are highly interconnected and the nature of their associations complex. This state of theoretical affairs "underscores the importance of examining the network of interacting processes and feedback loops that associate substance abuse and violence" (Boles & Miotto, 2003; p. 156). Given that such efforts are necessary for continued progress (see Leonard, 1993)1, it is somewhat surprising that the unique role of ISU has gone relatively unexplored in the context of larger theoretical networks containing other likely antecedents of IPV.

Notably, a recent study by Stuart et al. (2008) extended Leonard's (1993) heuristic conceptual framework on alcohol use as a precursor of IPV to include ISU. A synthesis of prior theoretical and empirical work, Leonard's model posits several direct and indirect pathways linking alcohol use with relationship aggression in the context of both distal and individual influences (e.g., stable personality traits) and proximal determinants (e.g., dyadic behaviors during conflict). Using SEM, Stuart et al. found that their adaptation of Leonard's model - comprising perpetrators' antisocial characteristics, trait anger, and relationship discord as distal factors - provided a good overall fit to the data in a sample of men and women arrested for domestic violence and court-referred for treatment. Importantly, male perpetrators' antisocial characteristics predicted increased stimulant and cannabis use, which in turn predicted higher frequencies of physically aggressive behaviors toward their female counterparts. These findings suggest that individuals higher in antisociality aggress more frequently in part because they are more inclined to use particular illicit substances. In addition, they found that sedative use and stimulant use by male perpetrators' partners was associated, respectively, with their receipt of psychological and physical aggression. This is especially interesting given that Stuart et al. controlled for the perpetrator's level of aggression, suggesting that there are unprovoked instances of aggression by the abused partner that go without retaliation from the identified perpetrator.

Stuart et al.'s (2008) findings coincide with growing evidence on the unique impact of ISU on aggression between intimate partners (for a meta-analytic review, see Moore, Stuart, Meehan, Rhatigan, Hellmuth, & Keen, 2008). Moreover, they provide empirical support for a theory-driven model specifying the place of ISU amongst other relevant variables in the causal chain. However, the population from which they sampled comprised men and women court-referred for violence intervention programs, leaving in question the generalizability of their specific findings (and of the structural model) to other populations also at risk for perpetrating relationship aggression. Also, notwithstanding the more general importance of replication in scientific inquiry (see Rosenthal, 1991), cross-validation of structural models helps ensure that a model's goodness-of-fit was not due to sample idiosyncrasies and that it can generalize across different populations (see Bagozzi & Yi, 1988). In the present study, we attempted to replicate Stuart et al.'s findings regarding the incremental utility of ISU in predicting relationship aggression using a sample also at risk for perpetrating IPV; namely, men receiving treatment for a diagnosed alcohol abuse or dependence disorder (O'Farrell & Murphy, 1995; Rice, Moore, Del Boca, Mattson, Young, & Brady, 2001; Stith, Crossman, & Bischof, 1991). Specifically, we hypothesized that: (a) men's marijuana and stimulant use would predict increases in their use of physical aggression, whereas their alcohol use

[1]Note that Leonard's (1993) comments were made with respect to the effects of alcohol misuse on relationship violence, but are equally as applicable to the hypothesized roles of ISU in relationship aggression (see Stuart et al., 2008).

problems would be associated with increased perpetration of psychological aggression; (b) a history of antisocial behavior would predict men's increased physical aggression indirectly by way of increased alcohol, cannabis, and stimulant use; and (c) female partners' alcohol, sedative and stimulant use would predict their own use of psychological aggression, with their stimulant use also being associated with increases in their perpetration of physical aggression.

We further extended Stuart et al.'s (2008) findings in four ways. First, we examined whether particular classes of illicit substances differentially predict more or less severe forms of IPV. We separately analyzed minor and severe forms of aggression on the basis of evidence suggesting that they are functionally distinct (Mattson, O'Farrell, Monson, Panuzio, & Taft, 2010) and may correlate differently across types of illicit substances (e.g., Cunradi, Caetano, & Schafer, 2002). Second, we used alternative indicators for the latent constructs of men's antisocial behaviors and alcohol use and use-related problems, as well as a different measure of relationship discord. Robust findings across different indicators strengthen existing support for the role of ISU as an etiological determinant of relationship aggression, as well as for the overall theoretical model more generally. Third, in order to reduce potential reporting biases, we collected data from both dyad members; Stuart et al. gathered information from only the court-referred partner. Last, although Stuart et al. controlled for reciprocated violence (by specifying feedback loops), the exchange of aggressive behaviors between partners is an important process in its own right. As such, we also explored whether or not ISU would indirectly influence the reciprocal perpetration of physically or psychologically aggressive behavior by one's partner through its direct effect on the user's own relationship aggression. These analyses were exploratory; no specific predictions were made about the nature of these effects.

Method

See Mattson et al. (2010) for a full description of the methods.

Participants and Procedures

The sample comprised 181 married (n = 117) or cohabiting (n = 64) heterosexual couples in which the man had recently begun a substance abuse treatment program and met criteria for alcohol dependence (n = 175 = 97%) or abuse (n = 6 = 3%) using the Structured Clinical Interview for the DSM-IV (SCID-II; First et al., 1996). Male participants were drawn from one of four substance abuse treatment centers in Massachusetts, where they attended an average of 9.5 (SD = 11.3) days of inpatient, residential, or intensive outpatient substance use treatment and 2.1 days (SD = 3.3) of outpatient counseling for substance use in the 30 days prior to assessment. Dyad members were individually screened for participation eligibility and, following informed consent, were separately interviewed and administered the study questionnaires. (Participation of both dyad members was a prerequisite for inclusion in the study). Couples were required to be living together at the time of and for at least the last 12 months prior to the assessment (M = 10.6 years; SD = 9.0) and not planning separation or divorce.

Forty-one percent of men and 7% of women met criteria for either drug dependence or abuse. The sample was predominantly Caucasian (85% for both men and women) and high-school educated. Mean years of education was 12.6 (SD = 2.3) and 13.5 (SD = 2.4) for men and women, respectively. The average age of men and women was 42.7 (SD = 8.9) and 39.9 (SD = 9.3), respectively. With regard to men's employment, 51% were employed full-time, 9% were employed part-time, 35% were unemployed, 3% were retired, and 1% were students. Female partners were predominantly employed full-time (58%), with 18% working part-time, 23% unemployed, and 1% endorsing the category of "other." During the 6 months

prior to the baseline assessment, 41% of men earned $19,999 or less, 44% earned between $20,000 and $49,999, and 15% earned over $50,000. During the same 6-month time period, 53% of female partners reported earning under $19,999, 40% earned between $20,000 and $49,999, and 7% earned over $50,000.

Measures

Men's trait anger and history of antisocial behaviors—Men's trait anger was measured with 10 four-point Likert items from the Trait Anger subscale of the State-Trait Anger Expression Inventory (STAXI; Spielberger, 1988), which yielded a sample mean of 22.5 (*SD* = 6.7) and an coefficient alpha of .89. Men's history of antisocial behavior was assessed using one indicator of criminality (lifetime number of arrests unrelated to alcohol) and two indicators of general violence: (1) lifetime frequency of fights with someone other than an intimate partner or relative; and (2) lifetime frequency of arrests for fights with someone other than an intimate partner or relative. Approximately 39% of the sample endorsed at least 1 arrest unrelated to alcohol. The majority of men (78%) reported engaging in a physical altercation with someone other than a partner or relative; 32% of men endorsed at least one arrest pursuant to such behavior. Arrests unrelated to alcohol were appreciably kurtodid and required a log transformation to achieve normality. Only a small percentage of men (7.7%) reported being arrested for domestic abuse in six months prior to treatment.

Alcohol and substance use—The frequency of men's and women's alcohol intoxication was assessed using a modified version of the Quantity-Frequency scale (Q-F; Calahan, Cisin, & Crosby, 1969); the frequency of drinking until intoxication in the prior 6 months was rated on an 8 point scale ranging from 0 ("never) to 7 ("every day"). The total number and type of drugs used over the same assessment period was assessed with a brief self-report drug use measure (O'Farrell, Fals-Stewart, & Murphy, 2003). Both partners reported on their own and their partner's substance use and the highest reports for each category were selected for the final data set. Women in this sample reported no use of stimulants (other than cocaine) or inhalants during the assessment interval, and both men and women reported no use of phencyclidine. Specific drugs were combined into the same categories used by Stuart et al. (2008). Specifically, stimulants and cocaine were combined into a single category (stimulants); as were sedatives, tranquilizers, hypnotics, and opiates (sedatives); and marijuana use comprised its own category. Similar to Stuart et al.'s sample, cocaine use accounted for the majority of the stimulants category for men and women (90% and 100%, respectively). Also of note, the use of sedatives, hypnotics, or tranquilizers - as opposed to opiates (men = 33%; women = 33%) or heroine use (men = 20%; women = 4%) – accounted for the majority of the sedative use category for men (47%) and women (63%). The approximate percentage of men using marijuana, sedatives, or stimulants to some degree was 41%, 73%, and 40%, respectively. Approximately 33%, 32%, and 10% of women endorsed some use of marijuana, sedatives, or stimulants, respectively. Approximately 86% of men and women endorsed some use of at least one illicit substance. Log transformations successfully normalized the moderate skew and kurtosis found for women's stimulant use, whereas a square root transformation was used to normalize women's frequency of intoxication.

In addition to the frequency of intoxication, the extent of men's and women's alcohol use problems were also assessed with the Alcohol Dependence Scale (ADS; Skinner & Horn, 1984) and the Short Index of Problems (SIP; Miller, Tonigan, & Longabaugh, 1995). With respect to the former, we used the abbreviated ADS developed by Kahler, Strong, Hayaki, Ramsey, and Brown (2003) using IRT, which lists 12 indicators of alcohol dependence (e.g., delirium) that respondents endorse as present (1) or not (0). The mean ADS score for men and women was 8.1 (*SD* = 4.8; α = .81) and 2.4 (*SD* = 4.6; α = .83), respectively. The SIP

contains 15 items each of which were rated on a scale ranging from *never* (1) to *daily* (4), and focuses on alcohol-related problems (e.g., car accidents) occurring within the six months prior to assessment. Mean SIP values were 38.7 (*SD* = 12.9; α = .95) and 17.3 (*SD* = 6.0; α = .95) for men and women, respectively, with higher scores indicating greater alcohol-related problems. A logarithmic transformation corrected for the skew and kurtosis found for women's SIP total scores.

Relationship aggression—Physical and psychological aggression directed toward relationship partners was assessed using the Psychological Aggression and the Physical Assault subscales, respectively, of the Conflict Tactics Scale-R (CTS-R; Straus et al., 1996). The frequency of each partner's behavior was measured using the following anchors: (0) *Never*; (1) *1 time*; (2) *2 times*; (3) *3–5 times*; (4) *6–10 times*; (5) *11–20 times*; and (6) *more than 20 times*. Participants reported on their own and their partner's behavior; the highest report of the two was selected for analysis.2 Responses were summed into minor and severe subscales for both psychological and physical aggression based on the component structure reported by Mattson et al. (2010). For women, the minor psychological and minor physical aggression subscales had means of 12.5 (*SD* = 5.0) and 3.3 (*SD* = 5.6), respectively; whereas women's severe psychological and severe physical aggression subscales had means of 2.0 (*SD* = 3.3) and .45 (*SD* = 2.5), also respectively. For men, the minor psychological and minor physical aggression subscales had means of 13.5 (*SD* = 5.7) and 3.1 (*SD* = 6.1), respectively; whereas their mean severe psychological aggression subscale was 3.0 (*SD* = 4.3) and their mean severe physical aggression subscale was .65 (*SD* = 2.1). All of the CTS-R variables but men's and women's minor psychological aggression were log transformed.

Relationship discord—This construct was assessed with four items from the Dyadic Adjustment Scale (DAS; Spanier, 1976) found to be particularly informative on the basis of IRT analysis (Sabourin, Valois, & Lussier, 2005). Item stems ("*How often do you feel things are going well?*") are evaluated using a 6-point Likert scale ranging from 0 (*never*) to 5 (*all the time*); lower scores indicate greater levels of relationship discord. The mean value for men's and women's DAS was 13.3 (*SD* = 3.8; α = .80) and 11.7 (*SD* = 4.3; α = .83), respectively.

Planned Analyses

We applied Stuart et al.'s (2008) model to the current sample by designating the man with the alcohol use disorder as the "perpetrator" and his partner as the "victim"; deriving the hypothesized model (presented in Figure 1) from the significant effects reported by Stuart et al. However, we also compared the incremental fit of the hypothesized model to one specifying all paths from men's and women's drug and alcohol use variables to the relationship aggression variables and men's relationship satisfaction, and from men's relationship satisfaction to their own use of psychological aggression (as per Stuart et al.'s initially posed model). In addition, although the indirect effects of antisociality were of primary interest, we specified a path from this latent factor to men's physical aggression in order to explore the possibility of direct effects. Except for indicators of the same latent variables, significantly correlated variables that were without pre-specified regression paths were allowed to associate so that the model could account for their shared variability. Arrows between correlated terms are omitted from figures for cosmetic purposes.

[2]We selected this approach on the basis that men in this population tend to underreport their perpetration of physical aggression and receipt of psychological aggression (Panuzio et al., 2006), and that victim reports of relationship aggression are generally less biased (e.g., Riggs, Murphy, & O'Leary, 1989)

We estimated the model using the generalized least squares (GLS) method because it performs better than alternatives in smaller samples (Hu, Bentler, & Kano, 1992). The mediation analyses for men's history of antisocial behaviors were tested with the distribution of the product method (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Pituch, Whittaker, & Stapleton, 2005) using the PRODCLIN program (see MacKinnon, Fritz, Williams, & Lockwood, 2007). This approach enabled the indirect paths from antisocial characteristics to relationship aggression to be tested separately for each illicit substance (e.g., cannabis). We used a bootstrapping approach (Arbuckle & Wothke, 1999) to assess the indirect effects of substance use variables on relationship aggression, which is appropriate when multiple indirect pathways exist between the variables of interest (Preacher & Hayes, 2004). Based upon the recommendations of Nevitt and Hancock (1998), we set the number of bootstrap samples to 200. We evaluated model fit using the comparative fit index (CFI; Bentler, 1988), the root mean square error of approximation (RMSEA; Steiger & Lind, 1980); the goodness-of-fit index (GFI; Bentler, 1983) and adjusted GFI (AGFI; Tanaka & Huba, 1989), the Tucker-Lewis index (TLI; Tucker & Lewis, 1973), Akaike's information criteria (AIC; Akaike, 1987), and the expected cross-validation index (ECVI; Browne & Cudeck, 1989).

Results

Preliminary Analyses

We tested minor and severe forms of aggression in separate models (a) to conserve statistical power and because (b) there is no research to guide any specific tailoring of Stuart et al.'s (2008) model to accommodate the separated aggression variables. Nevertheless, to justify our approach, we ran a preliminary model containing only the aggression variables and their hypothesized causal relationships. No direct causal pathways were specified between behaviors of differing severity levels (e.g., men's *minor* physical aggression did not predict women's *severe* psychological aggression), and paths between aggression indices within severity levels conformed to Stuart et al.'s model (e.g., women's use predicting men's use of *minor* psychological aggression and vice versa; see Figure 1). Note that the residual terms for the aggression indices were permitted to intercorrelate within individuals (e.g., *men's minor* physical aggression was allowed to correlate with *men's severe* psychological aggression). This models the hypothesized causal relationships within minor and severe forms of aggression as separate dyadic processes while preventing overlapping error variance at the individual level from depreciating model fit.3 The results indicated that this model provided a good fit to the data; $x^2(8) = 12.43$, $p = .13$; CFI = .977; RMSEA = .055; $x^2/df = 1.554$; GFI = .983; AGFI = .922; TLI = .921; AIC = 68.43; ECVI = .380 (CI90% = .356 – .456).

Preliminary analysis of the full model (including the proximal and distal predictors) demonstrated that women's SIP scores had negative error variance (which can lead to arbitrary solutions) and that women's ADS scores caused the covariance matrix to be not positive definite (which can yield incorrect results).4 We remedied these problems by using

[3]Some individuals are more violent than others and therefore may respond to the same dyadic event (e.g., an act of psychological aggression) in more or less violent ways. Although this reliable variance may be accounted for by the predictors in the hypothesized model (e.g., antisociality), it is not otherwise accounted for by the dyadic processes specified in the preliminary model. As a result, these individual differences will be partitioned into the error terms across aggression indicators and thus create intercorrelations among the residuals. Not accounting for this effect would depreciate model fit, but not because the causal paths were incorrectly specified (or because some pathways between men's and women's minor and severe aggression were not). From a theoretical standpoint, this model tests whether the dyadic processes specified within minor and severe aggression fit the data when controlling for expected individual differences in these behaviors across participants. If it does not fit, then excluding causal pathways across severe and minor aggression (i.e., analyzing them in separate models) becomes theoretically untenable. If the fit is acceptable, then modeling severe and minor aggression as separable processes is at least consistent with the present data.

frequency of intoxication as the only indicator for women's alcohol problems. For the structural model, allowing men's anger and cannabis use to correlate created similar estimation problems. Because the offending parameter was conceptually nonessential and its removal did not substantively alter the model (i.e., vary in ways that change interpretation); it was treated as a specification error and consequently omitted. Given the presence of feedback loops, we inspected stability indices to ensure that the obtained solution was admissible. Although the model for severe relationship aggression yielded a stable solution, the feedback loop between men's and women's minor psychological aggression yielded stability index values well outside the acceptable range (see Bentler & Freeman, 1983; Fox, 1980). Omitting the regression paths between men's and women's minor psychological aggression and instead allowing their residual errors to correlate stabilized the solution.

Although some of the individual and relationship demographic variables, as well as days in treatment prior to assessment, were correlated with the variables of primary interest, consistent with Stuart et al.'s (2008) findings, including these associations in the model did not substantively change fit or the path coefficients and were therefore omitted from the model for the sake of parsimony. Similarly, though not included in Stuart et al.'s study, we examined whether or not to add partner's relationship satisfaction to our model in a preliminary analysis. We specified paths from (a) men's and women's alcohol and substance use variables to women's relationship satisfaction; (b) women's relationship satisfaction to their use of psychological aggression; and (d) men's psychological aggression to women's relationship satisfaction. There were no significant direct or indirect effects associated with these added parameters and their inclusion did not substantively alter the model fit or pattern of effects obtained in their absence. As such, we decided to exclude this variable and its associated parameters to maintain greater consistency with Stuart et al.'s model. We detected several univariate and multivariate outliers; removing these cases also did not affect model fit or the path coefficients and so they were retained.

Unique Association between Illicit Drug Use and Relationship Aggression

The results for the minor and severe relationship aggression structural models are presented in Figure 2.

Minor relationship aggression—The hypothesized model for minor relationship aggression provided a good fit to the data $x^2(112) = 129.2$, $p = .13$; CFI = .942; RMSEA = .029; $x^2/df = 1.153$; GFI = .924; AGFI = .872; TLI = .911; AIC = 285.172; ECVI = 1.584 (CI90% = 1.489 – 1.764). The following regression paths in the hypothesized model were significantly different from zero: (a) men's antisocial behavior predicting men's anger and drug use; (b) men's increased stimulant use predicting men's increased minor physical aggression; (c) men's anger predicting men's relationship discord; (d) women's increased sedative use predicting women's increased minor psychological aggression; (e) increased men's and women's psychological aggression predicting increases in their respective physically aggressive behaviors; and (f) women's minor physical aggression predicting men's minor physical aggression. Higher frequencies of antisocial behavior indirectly increased men's usage of minor physical aggression by way of increased stimulant use, $z_\alpha z_\beta$(CI95%) = .01 – .54, $p < .05$. There was also an indirect effect such that women's sedative use increased their perpetration of minor physical aggression, CI95% = .001 – .02, $p < .05$. The model specifying all paths from men's and women's drug and alcohol use to

[4]A correlation or covariance matrix that is not positive definite implies there is negative or zero variance. As these are not possible population values, a matrix that is not positive definite renders any corresponding findings of suspect validity. With respect to women's SIP and ADS, imposing constrains on their variance did not correct the problem, nor did removing multivariate outliers from the solution. As colinearity due to variable redundancy remained a possible cause of the estimation problems (for an accessible discussion, see Schumacker & Lomax, 1996; p. 25 – 27), we decided to omit the offending indicators from the model.

relationship aggression and men's satisfaction did not provide an appreciably better fit; $x^2_{diff}(24) = 26.5$, *ns*; AIC = 294.70; ECVI = 1.630 (CI90% = 1.589 – 1.797). The significant effects found previously in the hypothesized model remained so and, of the added pathways, only the association between women's cannabis use and their partner's relationship satisfaction ($b = .17$) attained statistical significance ($p < .05$). However, there was no indirect influence of cannabis use on relationship aggression.

Severe relationship aggression—The hypothesized model for severe relationship aggression was also a reasonable fit to the data $x^2(111) = 126.33$, $p = .15$; CFI = .937; RMSEA = .028; $x^2/df = 1.138$; GFI = .926; AGFI = .874; TLI = .903; AIC = 284.33; ECVI = 1.580 (CI90% = 1.494 – 1.757). The same pattern of significant effects from the previous model emerged when examining severe forms of intimate partner aggression with two exceptions: (1) women's severe psychological aggression predicted behaviors of the same kind by their male counterparts; and (2) women's increased sedative use did not directly associate with their use of severe psychological aggression. With regard to this latter finding, note that the total effect (i.e., direct plus indirect effects) was statistically significant, CI95% = −.038 to −.001, $p < .05$, even though the constituent estimates were not when tested in isolation of the other. Increased sedative use by women was indirectly predictive of decreases in their own and their partner's perpetration of severe physical aggression, CI95% = −.005 to −.0002 and −.02 to −.001, respectively, and their use of severe psychological aggression was indirectly predictive of increases in men's use of severe physical aggression, CI95% = .11 – .32, *p*s < .05. The indirect effect of men's antisociality on their severe physical aggression by way of stimulant use again was significant, $z_{\alpha}z_{\beta}$(CI95%) = .01 – .31, $p < .05$. As with minor relationship aggression, the fully specified model did not provide a significantly better fit; $x^2_{diff}(18) = 20.65$, *ns*; AIC = 299.68; ECVI = 1.665 (CI90% = 1.594 – 1.829); and afforded no further explanatory gains by way of the added pathways.

Combined minor and severe aggression—For comparative purposes, we ran the hypothesized model with reports of severe and minor IPV combined into singular indices for psychological and physical aggression. The model provided a good fit to the data; $x^2(110) = 127.00$, $p = .13$; CFI = .940; RMSEA = .028; $x^2/df = 1.155$; GFI = .918; AGFI = .860; TLI = .886; AIC = 287.00; ECVI = 1.594 (CI90% = 1.500 – 1.773). Inconsistent with our previous findings, however, (a) women's psychological aggression did not significantly predict men's psychological aggression (c.f., the severe aggression model), and (b) the direct and indirect effects of women's sedative use dropped out. This latter result is somewhat unsurprising, however, given that the significant effects for this parameter were in opposite directions across the minor and severe models. All other previously significant pathways remained so and no additional significant findings were uncovered.

Discussion

The present findings for the hypothesized structural model were overall consistent with those of Stuart et al. (2008). Model fit was robust across different variable indicators and when using both dyad members as informants, which bolsters confidence in more substantive interpretations of the observed effects for both studies. Moreover, Stuart et al. studied partner violent offenders, some of whom did not use alcohol or illicit drugs, whereas the current sample examined men who were selected for the presence of alcohol use disorders, some of whom did not perpetrate intimate partner violence. Thus, these findings not only support the causal ordering from the extended version of Leonard's (1993) model, but further suggest that its validity generalizes across different, albeit potentially overlapping populations.

We also replicated the finding that higher stimulant usage uniquely predicts more frequent IPV across levels of aggression severity. It is possible that the pharmacological effects of stimulant intoxication and/or withdrawal lead to alterations in mood such as irritability, anxiety, and paranoia (Gold, Washton, & Dackis, 1985), to psychotic symptoms (Harris & Batki, 2000), or to shifts in information processing involving memory, problem-solving, and perceptual-motor speed (Beatty, Katzung, Moreland, & Nixon, 1995) that may escalate otherwise benign exchanges into severe and potentially violent conflicts (Boles & Miotto, 2003; Licata et al., 1993). The findings of Murphy, O'Farrell, Fals-Stewart, & Feehan (2001) corroborate this notion; days of stimulant use were significantly and substantially higher among those who perpetrated IPV in a sample of alcoholic men entering treatment. However, there are several ways to account for these findings without giving causal priority to the pharmacological consequences of stimulant use. For instance, it is possible that individuals with pre-existing aggressive intentions used illicit substances to disinhibit or potentially rationalize aggressive behaviors (Lennings, Copeland, & Howard, 2003; also see Chermack, Fuller, & Blow, 2000). In any case, it is interesting that the current effects of antisocial characteristics on IPV were almost entirely mediated by stimulant use. Although some posit that psychoactive substances may only exacerbate IPV risk for individuals already prone to aggression (e.g., those with antisocial personality characteristics; Fals-Stewart, Leonard, & Birchler, 2005), the present findings indicate that such individuals may be more prone to IPV in part because they use stimulants more frequently (c.f., Feingold, Kerr, & Capaldi, 2008).

We also found that women's sedative use had a direct effect on their perpetration of minor psychological aggression. Not surprisingly, there are a number of models that explain how sedative use may affect psychological (and physical) aggression. For example, it is possible that intoxication increases the likelihood of violence by inducing irritability or rapid shifts in mood (Smith & Wesson, 2004). Furthermore, individuals misusing sedatives may be experiencing high levels of anxiety or stress and/or trying to compensate for impulsive-aggressive temperaments.

Regardless of the exact mechanism, it is notable the effects of women's sedative use on female-to-male minor psychological aggression indirectly influenced their use of minor forms of physical aggression as well. This is not only consistent with evidence that psychological aggression begets its physical counterpart both proximally (e.g., Leonard & Roberts, 1998) and over time (e.g., Murphy & O'Leary, 1989; Schumacher & Leonard, 2005), but further implies that variability in this pattern for some women is associated with the frequency of their sedative use. Moreover, as the bidirectional associations between men's and women's IPV were statistically controlled, these behaviors represent nonreciprocal acts of female-to-male aggression. Although frequently cited motives for female-perpetrated acts of IPV implicate reciprocation (e.g., self-defense; Dasgupta, 2002; Hamberger & Guse, 2002), the present results further support that other, perhaps more instrumental functions for these behaviors also exist, such as coercion or expression of frustration (Graham-Kevan & Archer, 2005), and are for some reason likelier to occur for women using sedatives more frequently. These findings also indicate that men were not retaliating for minor acts of physical or psychological aggression (sedative-related or otherwise) initiated by their female counterparts. The absence of men's physical retaliation may be due to prohibitive social mores or the increased likelihood of injury (Whitaker, Haileyesus, Swahn, & Saltzman, 2007), whereas unreciprocated psychological aggression could represent the familiar demand-withdrawal conflict pattern demonstrated by female and male partners in distressed relationships, respectively (Eldridge & Christensen, 2002; Klinetob & Smith, 1996). But men's conflict withdrawal may have its limits; we found that increases in women's severe psychological aggression indirectly increased physical violence perpetrated by their male counterparts.

The effects for women's sedative use on their perpetration of severe psychological and physical aggression were somewhat surprising, especially in light of the positive associations emerging with minor forms of these behaviors. We offer three plausible explanations that are not mutually exclusive. First, it is possible that these contrasting effects resulted because the different psychoactive substances contained in this category (e.g., opiates versus benzodiazepines) associated with more or less severe forms of aggression. Second, the effects of these drugs may change over time; the sedating effects of some drugs (e.g., tranquilizers) following administration may lower severe acts of aggression, whereas withdrawal symptoms may render minor forms of aggression more likely. Third, there is evidence that certain drugs in this class (e.g., benzodiazepines) directly link to aggressive behaviors in experimental settings and clinical populations (e.g., Ben Porath & Taylor, 2002). This may have increased women's use of minor acts of psychological aggression, but more severe acts of this kind were inhibited because of their association with severe physical reciprocity by their male counterparts. Although other potential explanations exist, these findings nonetheless provide additional evidence that minor and severe forms of IPV differ in at least some of their antecedents (also see, Cunradi et al., 2002) and, therefore, support the notion they may represent two separable, albeit related, phenomena. Furthermore, a particular antecedent may have opposite effects across severity levels (e.g., women's sedative use), so failure to distinguish between these forms of relationship aggression may wash out otherwise detectable effects.

The present findings for sedative use also highlight the theoretical utility of modeling the reciprocal influences of dyad members' aggressive behavior. Perhaps most notably, we found that only the total (but not direct) effect for women's sedative use predicted their use of severe psychological aggression, even though we specified no direct paths between women's sedative use to the other aggression variables. This may suggest that an initially marginal direct effect on severe psychological aggression became amplified in the context of mutual influence: small decreases in women's psychological aggression - resulting from increased sedative use - decreased the otherwise pursuant reciprocation and escalation of aggression between partners that could, in turn, lead to additional instances of severe psychological aggression by women. In other words, women's use of severe psychological aggression may have, in part, predicted itself by way of dyadic interaction; women using sedatives were much less likely to employ severe forms of aggression and thereby to initiate this iterative process. This would also explain why higher levels of women's sedative use were also indirectly associated with lower levels of physical aggression by both men and women. That is, the initial kindling needed for more violent behavior was absent due to women's sedation.

Of Stuart et al.'s (2008) findings that did not replicate, most conspicuous is that men's alcohol problems did not predict their use of relationship aggression. This does not necessarily imply that alcohol use problems were noncontributory to IPV perpetration, just that they did not account for individual differences in psychological and physical aggression amongst alcoholic men. Indeed, individuals in this population have alcohol use problems by definition; as such, predicting variability in aggressive behavior therein may require some dimension upon which its members more clearly differentiate (e.g., stimulant use). However, it is also possible that some other dimension of alcohol use relevant to IPV perpetration went currently unexplored (e.g., dyad-level patterns of alcohol use; Leadley, Clark, & Caetano, 2000), or that some moderating variable contextualized the effects of alcohol use problems on IPV.

There were several limitations to the present study. First, a major limitation of SEM is that other, considerably different structural models may fit the same set of data equally well. As the comparison between alternative models was not the focus on the present research, our

findings only support that the currently hypothesized one is at least plausible (Bullock, Harlow, & Mulaik, 1994). Second, although the current model proceeds from a sound theoretical and empirical basis, the data are correlational and therefore cannot provide definitive conclusions regarding the causal nature or directions for the observed effects. Third, we did not include all variables posited in Leonard's (1993) initial framework or that are shown elsewhere to be relevant to IPV perpetration (e.g., attitudes towards IPV; Deal & Wampler, 1986), as our hypothesized model followed directly from Stuart et al.'s (2008) findings. As such, both the present findings and those of Stuart et al. likely provide an incomplete explanation of the associations between distal and proximal determinants of relationship aggression.

Conclusion

In summary, the present findings support that ISU - particularly men's stimulant and women's sedative use - is a uniquely relevant predictor of relational aggression, and that Stuart et al.'s (2008) adaptation of Leonard's (1993) model is consistent with observations from a sample of male alcoholics and their female partners. The current results further highlight the need to differentiate between levels of aggression severity, the importance of modeling partner ISU and the mutual influence of IPV across partners, and the insights gained from exploring both the direct and indirect effects within a larger theory-driven structural model.

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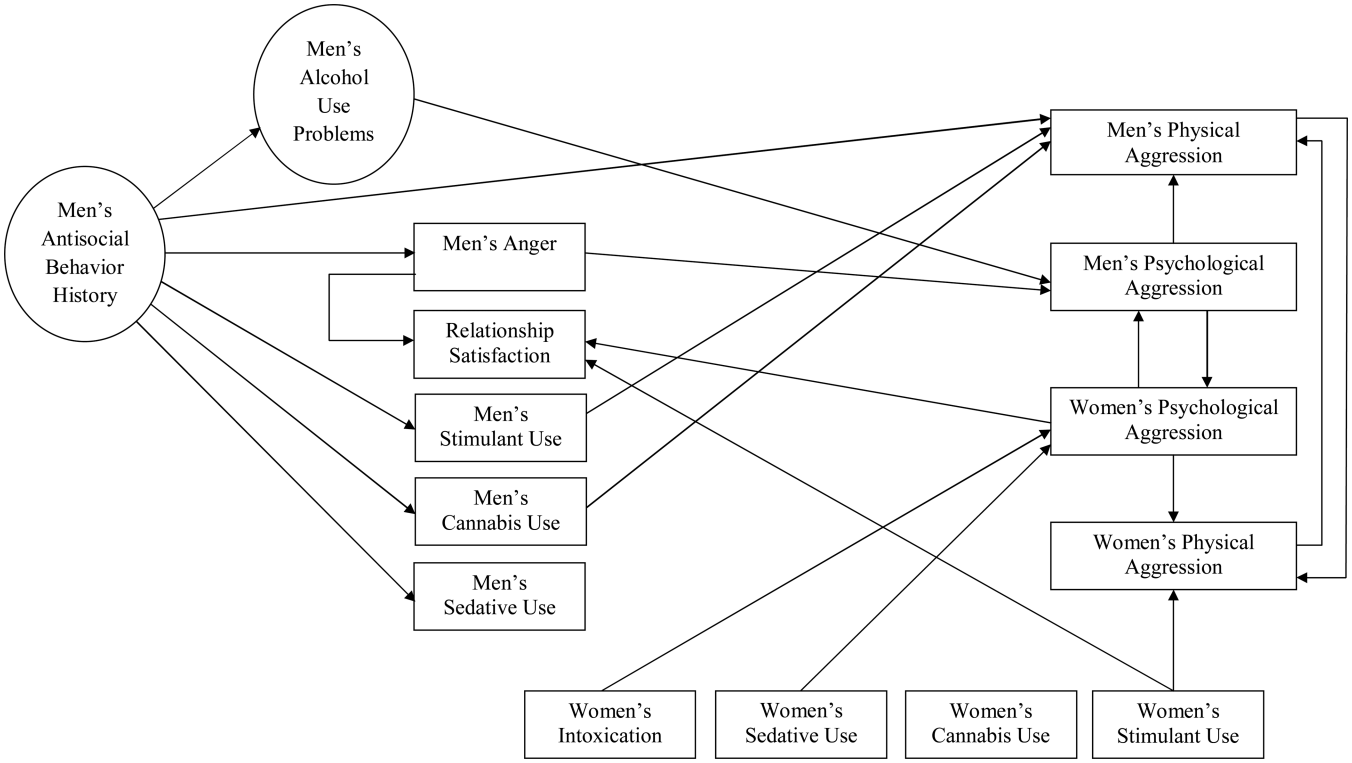

Figure 1.
Hypothesized structural model for the proximal and distal predictors of relationship aggression based on the findings of Stuart et al. (2008).

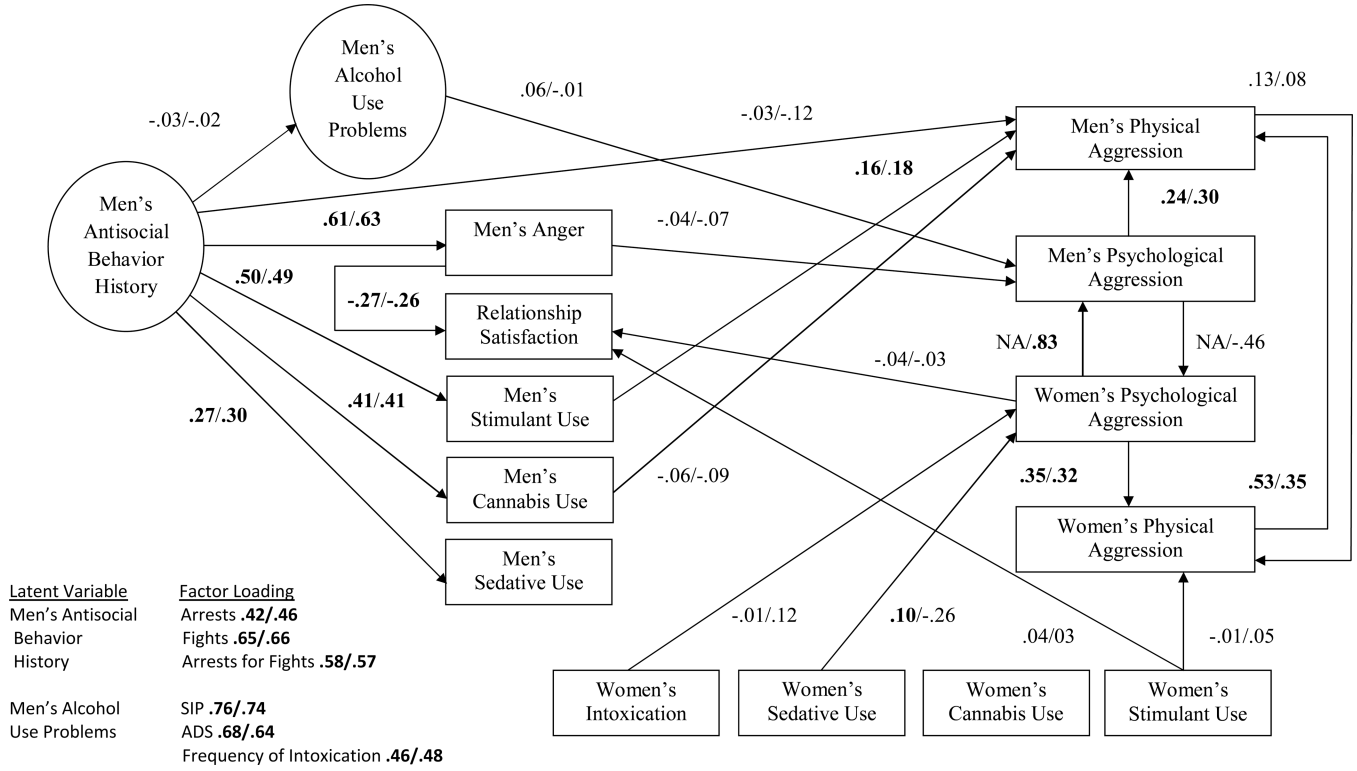

Figure 2.

Standardized path coefficients for the minor/severe relationship aggression models. SIP = Short Inventory of Problems; ADS = Alcohol Dependence Scale; and NA = Not applicable (feedback loops were removed because of estimation problems). Bolded coefficients represent significant direct effects; $p < .05$ (two-tailed). $N = 181$.