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EMPIRICAL RESEARCH

A Moderator Model of Alcohol Use and Dating Aggression among Young Adults

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Abstract Dating aggression has been identified as a priority public health concern. Although alcohol use is a known robust risk factor for dating aggression involvement, such usage is neither necessary nor sufficient for dating aggression involvement. As such, a growing topic of interest is a better understanding of when, and for whom, alcohol use increases risk. A theoretical moderator model posits that associations between alcohol use and dating aggression involvement vary depending on both background (e.g., psychopathology) and situational (e.g., relationship characteristics) risk factors. Alcohol use is thought to be more strongly associated with dating aggression in the context of these other risk factors. Using an intensive longitudinal design, we collected six waves of data spanning 6 months from 120 participants (60 females; *M* age W1 = 22.44). Alcohol use and relationship risk were both associated with increases in dating aggression involvement. Consistent with a moderator model, interactions emerged between alcohol use and relationship risk for subsequent dating aggression involvement. The findings underscore the importance of alcohol use and relationship risk for the development of intervention and prevention programs.

Keywords Dating aggression · Dating violence · Alcohol use · Relationship qualities · Relationship characteristics · Substance use

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Introduction

Dating aggression is a prevalent and costly public health concern. Rates of physical dating aggression range from 28–50% in an individual's lifetime, and rates of sexual aggression range from 30–40% (Breiding et al. 2014; Hickman et al. 2004; Murray and Kardatzke 2007; Young and Furman 2008). Rates of psychological aggression are even higher, with as many as 80% of young adults reporting experiencing psychological aggression in the previous 12 months (Shorey et al. 2008). In tandem with these alarmingly high prevalence rates, dating aggression is associated with poorer health outcomes, physical health risks, and psychological consequences (for a review, see Lawrence et al. 2012). Strikingly, the annual cost of interpersonal violence in the United States was estimated to be as high as $67 billion (1993 dollars) (Miller et al. 1996). Indeed, because of the high prevalence rates, the consequences for individuals, and the public health costs, dating aggression has been identified as a priority public health concern (Breiding et al. 2014).

During adolescence and young adulthood, victimization and perpetration are highly correlated and most often co-occur (O'Leary and Slep 2003; Whitaker et al. 2007; Williams et al. 2008). Indeed, mutual aggression is associated with the greatest risk of injury and more severe aggression (Temple et al. 2005). Thus, for the purposes of the current study, we conceptualized dating aggression in terms of involvement, which includes victimization, perpetration, and mutual aggression (Collibee and Furman 2016; Connolly et al. 2010; Williams et al. 2008). Given the high incidence of dating aggression involvement, there has been a significant increase in research aiming to better understand potential risk factors for dating aggression involvement (Vagi et al. 2013).

Alcohol use is regarded as one such risk factor for dating aggression (Rothman et al. 2011). Indeed, among college students reporting incidents of physical dating aggression, as many as 67% report they had been drinking at the time of the physical aggression (Saewyc et al. 2009). Further, the odds of perpetrating physical and psychological aggression are higher on days when young adults report drinking (Moore et al. 2011). However, this work has been limited by its emphasis on simple main effects of alcohol use and dating aggression (Rothman et al. 2011). Indeed, for many individuals, drinking does not result in interpersonal aggression (Kantor and Straus 1987; Schumacher et al. 2003). Further, aggression can occur in the absence of alcohol consumption (Foran and O'Leary 2008a). Thus, a moderator model of the associations between alcohol use and aggression (which is sometimes called a multiple threshold model) aims to account for why alcohol is more highly associated with aggression for some individuals but not others (Chermack and Giancola 1997; Leonard 1993; Leonard and Senchak 1996; Rothman et al. 2011).

Specifically, a moderator model posits that the association between alcohol use and aggression is moderated by other individual and relationship risk factors. This model theorizes that alcohol use will have the most pronounced effect on individuals with higher levels of other risk factors (e.g., individual psychopathology). In contrast, individuals with continuously lower levels of other risk factors will demonstrate a smaller association between alcohol use and aggression because they do not have enough other risk factors to exceed a threshold for aggression (Foran and O'Leary 2008a; Leonard 1993; Rothman et al. 2011). A moderator model theorizes that if individuals do not have other risk factors, then they may be unlikely to have an increased risk for dating aggression involvement as a function of drinking (Foran and O'Leary 2008b). That is, individuals without other risk factors may have additional socioemotional resources to rely upon in the context of alcohol use, and as such, they are protected against the robust associations between alcohol use dating aggression involvement. In contrast, as other risk factors increase, the stronger an association between alcohol use and dating aggression involvement becomes. Specifically, the moderator model posits that other risk factors may heighten the intensity and frequency of conflict, and then alcohol use functions as a proximal risk factor, distorting interactions with the partner and reducing inhibitions (Leonard and Quigley 1999). In this way, alcohol use and these other risk factors work in tandem contributing to escalation into physical or psychological dating aggression involvement (Leonard 1993; Foran and O'Leary 2008). The broad patterns hypothesized by a moderator model have been found in clinical and community samples (Collibee et al. 2017; Foran and O'Leary 2008a; Parrott and Giancola 2004; Reyes et al. 2012).

Despite the growing body of work examining a moderator model of alcohol use and aggression, the literature continues to be limited in several substantive ways. First, most of this work has examined this model among married adults (Foran and O'Leary 2008b); only a few studies have examined these associations among young adults (Rothman et al. 2011). Yet, understanding the associations between dating aggression and alcohol use is especially pertinent during young adulthood (ages 18–25). Among young adults in this developmental period, 67–73% report using alcohol in the last 30 days, an increase from the 12th grade (Johnston et al. 2003; Windle 2003). The increase in alcohol use during this developmental period is mirrored by increased risk for dating aggression. Specifically, physical aggression increases between the ages of 15–25, with the peak risk occurring around 25 years old (Feingold et al. 2015; Morse 1995; O'Leary 1999). Indeed, among men and women who have experienced intimate partner violence, between 39 and 47% report that the first incident occurred between the ages of 18 and 24, higher percentages than during any other developmental period (Breiding et al. 2014). As such, a better understanding of the links between aggression and alcohol in young adulthood is particularly necessary.

A second limitation in the current literature is the scope of moderators examined. A moderator model of the associations between alcohol use and aggression theorizes that individual and relationship risk factors will exacerbate or attenuate the associations between alcohol use and dating aggression (Foran and O'Leary 2008a; Leonard and Senchak 1993 Rothman et al. 2011). Much of the focus regarding such moderator models has been on individual risk factors, such as individual psychopathology (Foran and O'Leary 2008a). However, understanding the interplay of relationship risk with alcohol use may be especially necessary to understand the associations between alcohol use and aggression (Capaldi et al. 2012; Foran and O'Leary 2008a). One theoretical framework that complements a moderator model, and incorporates both individual and relationship risk factors for dating aggression, is Riggs and O'Leary's (1989) background-situational theory. Regarded as one of the more promising theories of dating aggression (Luthra and Gidycz 2006), the background-situational theory is rooted in social learning and conflict theory and has two components: background risk factors and situational risk factors. Background risk factors consist of risk factors that an individual may be bringing to a relationship, such as psychopathology. In contrast, situational risk factors are ones that are specific to the context of aggression, such as romantic relationship features (Riggs and O'Leary 1989). Thus far, research assessing a moderator model of alcohol

use and dating aggression has examined the role of background or situational factors in isolation. That is, the literature has examined each sphere of risk independently, such as individual psychopathology (Foran and O'Leary 2008a), relationship satisfaction (Moore et al. 2011) or only relationship risk factors (Collibee et al. 2017). Thus, both a theoretically driven selection of risk factors and the simultaneous examination of both background and situational risk factors in a moderator model are needed.

We selected depressive symptoms, trauma symptoms, internalizing symptoms, and externalizing symptoms as measures of individual psychopathology because of the strong empirical and theoretical literature linking these forms of psychopathology to dating aggression involvement (Capaldi et al. 2012; Riggs and O'Leary 1989). Specifically, each of these risk factors is theorized to increase risk for both dating violence victimization and perpetration by exacerbating vulnerability related to entering or remaining in aggressive relationships, an increased likelihood of negative partner selection, or increased risk of involvement due to their symptoms (e.g., irritability) (Brooks-Russell et al. 2013; Halpern et al. 2009; Maas et al. 2010; Whiting et al. 2009).

We selected negative interactions, relationship satisfaction, jealousy, and relationship maintenance as measures of relationship risk. These relationship risk factors are theorized to contribute to risk by reducing potential protective features and exacerbating hostile patterns of communication which may then escalate into dating aggression (Riggs and O'Leary 1989). Indeed, negative interactions, in particular, is thought to be a proximal relationship risk factor preceding dating aggression (Riggs and O'Leary 1989). In addition, these risk factors have also been empirically shown to be associated with dating aggression involvement (Collibee and Furman 2016; Kaura and Lohman 2007; O'Keefe 1997; O'Leary and Slep 2003).

A third limitation in this literature is the reliance on cross-sectional designs. A meta-analysis examining the associations between alcohol use and dating violence among youth reported that 82% of studies assessing these links are cross-sectional (Rothman et al. 2011). Additionally, longitudinal studies examining these associations often have lengthy temporal lags between assessments (e.g., 6 months to a year) (Rothman et al. 2011), making it difficult to examine the associations between alcohol use and aggression. In particular, longer temporal lags require greater retrospection, thereby reducing one's capacity to accurately estimate behaviors. Furthermore, shorter time periods between assessments of alcohol use have been recommended for studies of youth, due to youth's more sporadic or opportunistic consumption of alcohol (Schulenberg and Maggs 2002). Recently, the extant literature has partially addressed these concerns by incorporating short temporal lags; for example, several investigators have conducted daily diary studies spanning a 1 month period (Moore et al. 2011; Shorey et al. 2014). Such studies are designed to capture small periods of time within a relationship and examine the more immediate associations between alcohol use and dating aggression involvement. Nonetheless, temporal delays that are short enough to reduce retrospection and account for developmentally expected changes in relationships and alcohol use but span long enough to provide sufficient opportunities for dating aggression to occur in a substantial number of relationships are particularly needed.

Current Study

The current study tests a longitudinal moderator model by examining how individual psychopathology, relationship risk, and alcohol use predict *increases* in dating aggression involvement as well as how they interact to predict *changes*. We address these theoretically derived questions using an intensive longitudinal design with a 1 month period between assessments, allowing for a more accurate assessment of both dating aggression and alcohol use. The study spanned 6 months, which is a sufficient period to allow for change (Bolger and Laurenceau 2013), and is also an appropriate length to capture relationship development, as the average romantic relationship for young adults ages 18–23 is 10.5 months (Giordano et al. 2009).

First, consistent with a background-situational theory of dating aggression, we predicted that individual psychopathology and relationship risk, as well as alcohol use, would be significantly related to increases in psychological, physical, and sexual dating aggression involvement. Second, we hypothesized individual psychopathology and relationship risk would moderate the longitudinal associations between alcohol use and dating aggression involvement, such that the associations between alcohol use and *changes* in dating aggression involvement would be stronger within the context of greater risk (i.e., higher levels of psychopathology, higher levels of relationship risk).

Methods

Participants

The participants were part of an intensive longitudinal study investigating romantic relationship development within a high risk sample. Participants were recruited through local online postings in a large Western metropolitan area (e.g., Craigslist's volunteer section) as well as various other printed communications (i.e., brochures placed in local

coffee shops, light rail, bus stops). Those interested in participating completed an electronically administered screening questionnaire through Qualtrics. Participants who began the screening questionnaire were entered into a raffle ($100 Amazon Card giveaway). Eligibility for the larger longitudinal study was based on the following criteria: (a) being between the ages of 18 and 25; (b) reporting that they were in a current romantic relationship for at least 1 month but not married or engaged; (c) endorsing any perpetration or victimization of psychological, physical, or sexual aggression in a current or past romantic relationship. Of the 440 individuals who completed the screening questionnaire, 132 were eligible and were invited to participate in the longitudinal study. Of the 308 individuals who were deemed ineligible, 37% were ineligible because they did not have a history of dating violence involvement, 62% were deemed ineligible because of quota constraints, and 1% were deemed ineligible because they failed to answer enough questions to determine if they were eligible. Regarding the quota constraints, we selected to have a representative number of genders from different ethnic/races. Once we met our quota for a particular category (e.g. Hispanic females), additional individuals from that group were deemed ineligible. Of the 132 eligible participants, 120 completed the initial longitudinal assessment.

The longitudinal sample consisted of 60 males and 60 females between the ages of 18 and 25 (M age Wave 1 = 22.44, $SD = 2.20$). The sample included 10% African Americans, 17.5% Hispanics, .8% Native Americans, 6.7% Asian Americans, 1.7% biracial, and 62.5% White, non-Hispanics. At the initial wave of data collection, 87.5% of participants said they were heterosexual/straight, whereas the other participants said they were bisexual, gay, or lesbian. One participant reported being transgender and was included in analyses as the identified gender.

The sample consisted of 10% of participants reporting having a high school degree or less, 4.2% reporting having obtained an associate degree or attending a trade school, 48.3% reporting currently attending undergraduate college, 17.5% reporting having obtained an undergraduate degree, and 19.9% reporting some graduate school or more.

Procedure

The longitudinal study consisted of completing electronic questionnaires each month for 6 months. Eligible participants were emailed a password protected link to provide consent and complete the first wave of measurement. No differences were found between those who participated and those who did not on any screening questionnaire variables, including age, ethnicity, or dating aggression involvement.

The Wave 1 assessment took approximately 1 h to complete. Participants were then electronically contacted each month for 5 additional 1 month follow-ups, each taking approximately 45 min to complete. Participants were paid $25 for the Wave 1 assessment and $15 for each additional assessment they participated in. For the purposes of this study, all variables were assessed at each time point. Participant retention was as follows: (Wave 1: $N = 120$; Wave 2: $N = 116$ Wave 3: $N = 111$, Wave 4: $N = 110$, Wave 5: $N = 104$, Wave 6: $N = 99$). There were no differences on the variables of interest between those who did and did not remain in the study.

The study was approved by the local Institutional Review Board.

Measures

Dating aggression

Physical, sexual, and psychological violence in participants' current dating relationships were assessed with the Revised Conflict Tactics Scale (CTS2; Straus et al. 1996). This measure was adapted to account for the 30-day assessment window of the present design. Participants rated the frequency with which they or their partner engaged in each example of aggression during the past month (psychological aggression involvement $M\ \alpha = .93$; physical aggression involvement $M\ \alpha = .97$; sexual aggression involvement $M\ \alpha = .95$). Based on an involvement model of dating aggression (Connolly et al. 2010; Williams et al. 2008), we combined ratings of victimization and perpetration. Consistent with this conceptualization, 84% of psychological aggression, 75% of physical aggression, and 61% of sexual aggression was mutual.

Alcohol use

Daily drinking questionnaire The Daily Drinking Questionnaire (DDQ; Collins et al. 1985) was used as a diary measure to assess alcohol use during the previous 30 days. Participants reported both the number of drinks and the number of hours spent drinking for each day of a "typical" week, as well as each day of their heaviest drinking week in the last month ($M\ \alpha = .85$ and $M\ \alpha = .83$, respectively).

NIAAA task force on recommended sets of alcohol consumption questions

Binge drinking was assessed using the NIAAA Task Force on Recommended Sets of Alcohol Consumption Questions, using their National Advisory Council 2004 definition of a binge. A 30 day time window was used per their recommendation for use with youth and to be consistent with our broader study design. Participants responded to six items,

such as "During the last month, how often did you have 5 or more (males) or 4 or more (females) drinks containing any kind of alcohol in within a two-hour period?" (M $\alpha = .90$).

Relationship risk factors

Negative interactions Participants completed the Network of Relationships Inventory: Behavioral Systems Version (NRI; Furman and Buhrmester 2009) to assess negative interactions in their romantic relationship in the last month. The short version of the NRI includes six items regarding negative interactions. Participants used a 5 point scale to rate how much each description was characteristic of their romantic relationship, and negative interaction scores were derived by averaging the relevant items (M $\alpha = .96$).

Romantic relationship satisfaction Relationship satisfaction was assessed through a version of Norton's (1983) Quality of Marriage Inventory, which was adapted to assess relationship satisfaction among young adults (Baxter and Bullis 1986). An example of a question is "My relationship with my romantic partner makes me happy" which the participant then responds to on a 7 point Likert scale (1 = "strongly disagree/not at all true" to 7 = "strongly agree/very true"; M $\alpha = .93$).

Jealousy Jealousy was measured using Pfeiffer and Wong's (1989) Multidimensional Jealousy Scale (MJS). The measure was adapted to include additional questions reflecting modern practices (e.g., "I look through my romantic partner's cell phone") and to include questions regarding their partners' experiences of jealousy as well. In total, participants were asked to complete 52 questions assessing cognitive, emotional, and behavioral jealousy. Participants rated their responses on a five-point Likert scale (1 = never to 5 = all the time). An example of an original item is: "I question my romantic partner about his or her whereabouts." The 26 participant items were averaged to derive a participant jealousy score, and the 26 partner items were averaged to derive a partner jealousy score (M $\alpha = .95$ and M $\alpha = .95$, respectively).

Relationship maintenance The Relationship Maintenance Behavior Measure (Stafford 2011) was used to assess relationship maintenance. The 28 item relationship maintenance instrument assessed seven maintenance factors including positivity, assurances, tasks, networks, understanding, relationship talk, and self-disclosure. Participants responded on a seven-point Likert scale to questions such as the extent to which his/her romantic partner "has talks about the relationship." Items were averaged to derive a total relationship maintenance score (M $\alpha = .96$).

Individual psychopathology risk factors

Depressive symptoms Participants completed the Beck Depression Inventory-II to assess depressive symptoms over the past 2 weeks (BDI-II; Beck et al. 1996) (M $\alpha = .96$). The M score at Wave 1 = 11. 29 ($SD = 10.14$), a mean of 9.14 ($SD = 8.45$) is found among a normative sample of college students (Whisman and Richardson 2015). On the BDI-II, scores of 0–13 are considered in the minimal range and 14–19 are considered in the moderate range (Beck et al. 1996).

Trauma symptoms The Trauma Symptom Checklist (TSC-40; Elliott and Briere 1992) is a self-report assessment that measures a broad range of trauma-related symptoms. Participants respond to 40 items indicating how often they experienced each symptom within the last month on a 4-point scale that ranges from 0 (never) to 3 (very often) (M $\alpha = .97$). The M score at Wave 1 was 24.66 ($SD = 20.30$), a mean of 22.3 ($SD = 11.6$) on the TSC is found in a normative sample (Elliott and Briere 1992).

Internalizing and externalizing symptoms Participants completed Achenbach's (2005) Adult Self-Report, which assessed internalizing and externalizing symptoms in the last 30 day (M T score range = 58–60) (M $\alpha = .95$ and .95, respectively).

Derivation of composites

The various measures utilized to create composites of relationship risk, individual risk, and alcohol use had different numbers of points on their scales. Such differences among measures present problems in deriving composite measures, as the scores from the different measures in the composite are not comparable. Thus, we derived these composites through several steps. First, we standardized scores on each measure *across* all waves to render the scales comparable with one another. In other words, all the data across the six waves were compiled for each measure, and one set of standardized scores for all waves of each individual measure was derived. For example, we formed a data set that consisted of all six waves of data on the Beck Depression Inventory, determined the overall mean and standard deviation for that data set, and then used this mean and standard deviation to calculate a standardized score for each participant's Beck Depression score at each of the six waves. This procedure of standardizing variables across waves is recommended as it retains differences in means and variance across the six waves, and neither changes the shape of the distribution, nor changes the patterns of associations among the variables (Little 2013).

After each measure was standardized across waves we generated several composites. These composites were developed using a background-situational theoretical framework. Accordingly, BDI scores, Achenbach internalizing symptoms, Achenbach externalizing symptoms, and TSC scores were combined to derive a composite index of individual psychopathology. The mean correlation of the individual psychopathology variables at Wave 1 supported our use of a composite ($M\ r = .78$, range = .72–.80) Relationship satisfaction and relationship maintenance behaviors were reverse scored and then combined with relationship jealousy, negative interactions scores to derive a composite index of relationship risk. The mean correlation of the relationship variables at Wave 1 was also consistent with a composite ($M\ r = .63$, range $r = .50$–.74). Confirmatory factor analyses revealed that a two factor solution of psychopathology risk factors and relationship risk factors was a significant improvement over a one factor model and provided a satisfactory fit to the data ($\Delta X^2 = 9.24$, $p < .01$; $X^2 = 16.84$; CFI = .99; RMSEA = .07). Each variable significantly loaded onto its corresponding factor. Finally, we averaged the participants' reports of binge drinking and frequency of drinking as reported on the DDQ and NIAAA Questions to derive a composite index of alcohol use.

Analytic Strategy

Our hypotheses regarding a moderator model were assessed through a series of multilevel models (MLMs) using the statistical program MPlus v.6.11 (Muthén and Muthén 1998–2011). Multiple imputation (MI) procedures were used to estimate missing data (Schafer and Graham 2002). Relevant auxiliary variables were included in our multiple imputations to maximize the likelihood of meeting the assumption that the data were missing at random (Collins et al. 2001). Multiple imputation provides a powerful alternative to listwise deletion and protects against bias in analyses (Graham et al. 2007; Little et al. 2014). One hundred multiple imputation datasets were generated using the software program Amelia II (Honaker et al. 2011), and the results of the analyses of the 100 datasets were averaged using MPlus. When participants did not have a romantic relationship at a certain wave due to a breakup, relationship risk factors (e.g., jealousy) were entered as missing. However, those participants who did not have a romantic relationship in a certain wave provided information on other variables of interest, including individual psychopathology and alcohol use. Thus, existing data from all waves from all participants were used.

To test our hypotheses examining changes in dating aggression involvement and a moderator model, the following model was used.

$$\text{Level 1}: Y_i = \beta_0 + \beta_1(Age\,T1)$$
$$+ \beta_2(Relationship\,Length\,T1) + \beta_3(Alcohol\,Use\,T1)$$
$$+ \beta_4(Psychopathology\,Risk\,T1) + \beta_5(Relationship\,Risk\,T1)$$
$$+ \beta_6(Corresponding\,Risk\,T1)$$
$$+ \beta_7(Alcohol\,Use\,T1\,X\,Psychopathology\,Risk\,T1)$$
$$+ \beta_8(Alcohol\,Use\,T1\,X\,Relationship\,Risk\,T1) + r_i$$

$$\text{Level 2}: \beta_0 = \gamma_{00} + \gamma_{01}(gender) + u_0$$
$$\beta_1 = \gamma_{10}$$
$$\beta_2 = \gamma_{20}$$
$$\beta_3 = \gamma_{30}$$
$$\beta_4 = \gamma_{40}$$
$$\beta_5 = \gamma_{50}$$
$$\beta_6 = \gamma_{50}$$
$$\beta_7 = \gamma_{70}$$
$$\beta_8 = \gamma_{80}$$

We used a two-step model to examine these associations, with age, relationship length, alcohol use, psychopathology risk, and relationship risk grand mean centered. First, we conducted a model with gender, age, relationship length, psychopathology risk, and relationship risk. Next, we examined the interaction effects after the main effects to avoid concerns of conditionality (Little 2013).

Results

Outliers were Winsorized to fall 1.5 times the interquartile range below the 25th percentile or above the 75th percentile. All variables had acceptable levels of skew and kurtosis

Table 1 Mean risk factors and dating aggression involvement (with standard deviations in parentheses)

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Alcohol use	0.09 (0.93)	0.05 (.83)	0.04 (1.05)	0.02 (.97)	−0.08 (.88)	−0.32 (0.79)
Psychopathology risk	0.10 (0.77)	0.03 (0.84)	0.07 (0.87)	0.06 (1.00)	0.01 (0.99)	−0.05 (0.84)
Relationship risk	−0.02 (0.81)	−0.03 (0.75)	−0.00 (0.70)	−0.02 (0.72)	−0.00 (0.78)	0.02 (0.80)
Psychological aggression	0.86 (1.16)	0.84 (1.14)	0.79 (1.12)	0.73 (1.10)	0.67 (1.04)	0.75 (1.01)
Physical aggression	0.31 (0.75)	0.39 (1.02)	0.43 (0.99)	0.42 (0.99)	0.42 (0.93)	0.44 (0.96)
Sexual aggression	0.43 (0.98)	0.43 (1.07)	0.40 (0.99)	0.45 (0.97)	0.42 (0.95)	0.41 (0.91)

Table 2 Correlations among the study variables at wave 1

	Age	Relationship length	Alcohol use	Psychopathology risk	Relationship risk	Psychological aggression	Physical aggression
Age							
Relationship length	.36*						
Alcohol use	.11	.21*					
Psychopathology risk	.03	.24*	.47*				
Relationship risk	−.04	.23*	.39*	.44*			
Psychological aggression	.03	.31*	.49*	.61*	.59*		
Physical aggression	.07	.32*	.51*	.56*	.38*	.85*	
Sexual aggression	.06	.33*	.57*	.59*	.38*	.80*	.84*

*$p < .05$

(Behrens 1997). Descriptive statistics can be found in Table 1 and correlations among the study variables can be found in Table 2. Regarding stability of the relationships, 21 participants reported at least 1 breakup over the course of the study. Of those, 12 did not enter into any new relationships whereas 9 reported on multiple partners. At Wave 1, 78% of participants reported some dating aggression (i.e., psychological, physical, or sexual) in their current relationship whereas 22% reported only dating aggression involvement in a prior relationship. During the 6 month study period, 90% of participants reported at least one incident of psychological aggression involvement, 52% reported at least one incident of physical aggression involvement, and 49% reported at least one incident of sexual aggression involvement. These rates are consistent with prior work that found between 52–61% of participants in a high risk sample reported physical dating aggression involvement within the previous 6 months (Rothman et al. 2012).

Table 3 reports the results of the primary analyses. Though all the effects are presented together, the regression coefficients and standard errors are the values at the step in which these terms were first entered in the model. First we examined the main effects of age, relationship length, and risk factors for dating aggression (alcohol use, psychopathology, and relationship risk) for each type of dating aggression involvement. Alcohol use and relationship risk factors were positively associated with all forms of dating aggression involvement. Psychopathology risk was not associated with changes in dating aggression involvement.

Next, we examined the hypotheses related to a moderator model. We hypothesized that a significant interaction would emerge between alcohol use and individual psychopathology in association with dating aggression involvement. Contrary to hypotheses, no significant interactions between psychopathology risk and alcohol use emerged for any form of dating aggression involvement. We also hypothesized that there would be a significant interaction between alcohol use and relationship risk in association with dating aggression involvement. Indeed, consistent with a moderator model, significant interactions did emerge between relationship risk factors and alcohol use with physical and sexual dating aggression involvement.

To further interpret these interactions, we used Preacher et al.'s (2006) computational tools to plot the estimated effects of alcohol use on physical dating aggression involvement for three values of relationship risk: 1 SD below the mean, the mean level, and 1 SD above the mean. As seen in Fig. 1, alcohol use was most strongly associated with increases in physical aggression involvement for those at high levels of relationship risk ($B = .16$, $t(600) = 2.92$, $p = .004$) but was still significant at the mean levels of

Table 3 Multilevel models testing the moderator model

	Psychological aggression	Physical aggression	Sexual aggression
Intercept (β_0)	0.83 (.09)	0.39 (.08)	0.29 (.08)
Gender (γ_{01})	−0.07 (.05)	−0.04 (.05)	0.02 (.05)
Age (β_1)	−0.03 (.01) [−.07]	−0.02 (.01) [−.05]	−0.01 (.01) [−.01]
Relationship length (β_2)	0.00 (.00) [.00]	0.00 (.00) [.01]	0.00 (.00) [−.01]
Alcohol use (β_3)	0.10* (.04) [.09]	0.10* (.04) [.11]	0.07* (.03) [.07]
Psychopathology risk (β_4)	0.07 (.05) [.06]	0.04 (.08) [.04]	−0.02 (.07) [−.03]
Relationship risk (β_5)	0.10* (.05) [.07]	0.11* (.05) [.10]	0.07* (.04) [.06]
Corresponding aggression time 1	0.69*** (.05) [.75]	0.67*** (.14) [.69]	0.73*** (.07) [.81]
Psychopathology × alcohol use (β_6)	0.04 (.03) [.05]	0.02 (.03) [.03]	−0.01 (.03) [−.01]
Relationship risk × alcohol use (β_7)	−0.00 (.05) [−.00]	0.11* (.06) [.10]	0.10* (.05) [.09]

Notes: The first numbers in the table are the unstandardized coefficients for the fixed effects

Standard errors are in parentheses.

The standardized coefficients are in brackets.

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

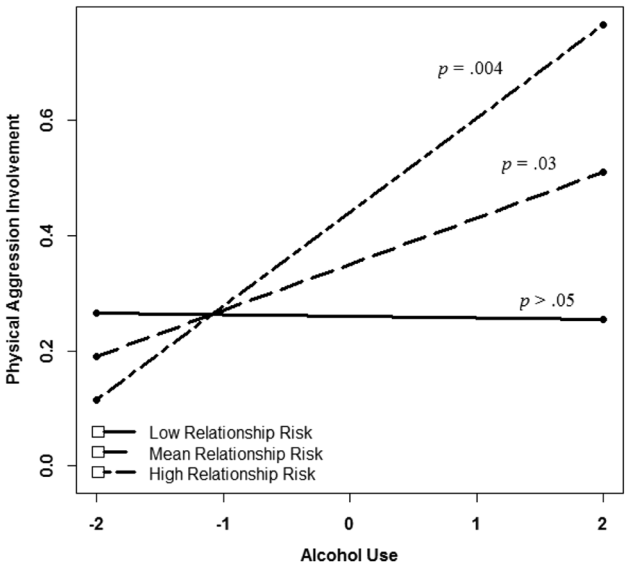

Fig. 1 Interaction between alcohol use and relationship risk factors on physical dating aggression. The three lines depict the association between alcohol use and physical dating aggression at one SD below the mean of relationship risk, the mean of relationship risk, and one SD above the mean of relationship risk

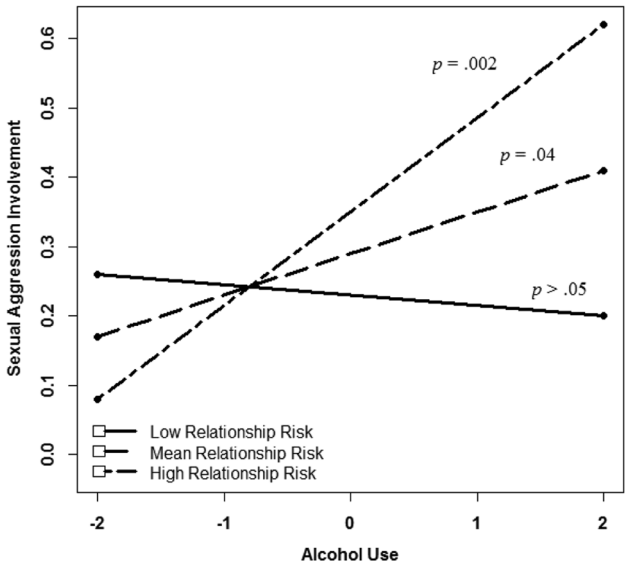

Fig. 2 Interaction between alcohol use and relationship risk factors on sexual dating aggression involvement. The three lines depict the association between alcohol use and sexual dating aggression at one SD below the mean of relationship risk, the mean of relationship risk, and one SD above the mean of relationship risk

relationship risk ($B = .08$, $t(600) = 2.14$, $p = .03$). There was no significant association between alcohol use and physical dating aggression involvement at the low level of relationship risk. Similarly, as seen in Fig. 2, alcohol use was associated with greater sexual dating aggression involvement for those at high levels of relationship risk ($B = .14$, $t(600) = 3.00$, $p = .002$) as well as those at mean levels of relationship risk ($B = .06$, $t(600) = 2.00$, $p = .04$). There was no significant association between alcohol use and sexual dating aggression involvement in the context of low levels of relationship risk. No gender differences emerged for any form of dating aggression involvement.

A series of sensitivity analyses were also conducted. First, we examined interactions between alcohol use and each of the specific psychopathology and relationship risk variables independently. The broad patterns of results remained the same as those obtained when the psychopathology and relationship composites had been used. We also examined these patterns with a composite of dating aggression involvement. The general pattern of results was

the same as when we examined each of the three types of dating aggression separately. We also tested if differences would emerge if we examined our theoretical predictions using only the relationships that existed at the onset of the study. To do this, relationship variables for new relationships were treated as missing. No differences in findings emerged. Finally, given a dearth of main effects for individual psychopathology, we tested it independently from relationship risk to determine if effects would emerge; however, no main effects of individual psychopathology emerged with dating aggression involvement. All supplemental results are available from corresponding author upon request.

Discussion

Despite the recent increase in research examining dating aggression involvement, little is understood about how dating aggression develops and escalates. The current findings help elucidate these processes by examining a longitudinal moderator model and testing how individual psychopathology, relationship risk, and alcohol use interact to predict changes in dating aggression involvement. Using an intensive longitudinal design spanning 6 months, main effects of alcohol use and relationship risk predicting increases in dating aggression involvement emerged, which were consistent with prior cross-sectional studies (Rothman et al. 2011; Collibee and Furman 2016). Daily diary studies have previously evidenced proximal associations between alcohol use and dating aggression involvement, including greater odds of involvement on days when alcohol is used (Moore et al. 2011; Shorey et al. 2014). However, these findings are concurrent, making the directionality of associations unclear. The current study expands upon this work, providing evidence that alcohol use is associated with increases in psychological, physical, and sexual aggression involvement 6 month later. Further, findings supported a theoretical moderator model of alcohol use and relationship risk and dating aggression involvement. That is, in some cases the effects of relationship risk and alcohol use were qualified by their interaction.

As hypothesized, the association between alcohol use and physical dating aggression involvement varied depending on the degree of relationship risk. Similarly, the association between alcohol use and sexual dating aggression involvement also varied depending on the level of relationship risk. Specifically, the association between alcohol use and dating aggression involvement was strongest for those at high levels of relationship risk, followed by a smaller association at mean levels of relationship risk. In contrast, alcohol use was not associated with increases in physical or sexual dating aggression involvement for those with low levels of romantic relationship risk (i.e., positive relationship qualities). Thus, although alcohol use is a robust risk factor, it is not a uniform risk factor. Notably, the protective function of higher relationship qualities was found even though the current sample was a higher risk sample. That is, participants needed prior involvement in dating aggression to qualify, and approximately 50% of participants were involved in physical or sexual dating aggression during the duration of the study. In that way, many participants may already be above a threshold for dating aggression involvement in their current relationship, making significant associations at all levels of risk more likely. However, the interaction patterns suggest that even in this higher risk sample, low relationship quality continues to exacerbate risk and higher relationship quality continues to weaken associations between alcohol use and dating aggression involvement. As odds of revictimization are strikingly high, such variation in these patterns is noteworthy (Exner-Cortens et al. 2013; Young and Furman 2008). The longitudinal findings are also consistent with the idea that these moderation patterns are not only immediate or temporary; rather, because the current findings are longitudinal, they indicate that these moderation patterns are also lasting. That is, alcohol use within the context of increased relationship risk may also contribute to an increased frequency and severity of conflict, ultimately resulting in subsequent dating aggression involvement.

Indeed, evidence of a moderator model with relationship risk factors and alcohol use also has important implications for the development of intervention and prevention programs. Although empirical research examining dating aggression development has increased recently, dating violence prevention programs have only minimal success at reducing aggression itself (Shorey et al. 2012). Current dating violence prevention programs may place less emphasis on alcohol use and relationship skills (Shorey et al. 2011, 2012); yet, the current findings suggest both alcohol use and relationship skills may be promising and malleable targets of program development. Indeed, motivational interviewing to reduce alcohol use has been successful in reducing aggression among college students (Woodin and O'Leary 2010). Further, among married adults, intervention programs targeting improvements in couple functioning demonstrate declines in interpersonal violence and alcohol use (McCollum and Stith 2008; Murphy and Ting 2010; O'Farrell et al. 2003). Thus, the current findings suggest that interventions for married adult couples that target multiple spheres of risk may be adapted for young adults. Although dating relationships differ in important ways from marriage, it is clear that romantic relationship skill training may be a beneficial intervention during this developmental period.

Contrary to hypotheses, there were no main effect of individual psychopathology on dating aggression involvement and evidence of a moderator model of alcohol use and dating aggression was not found for individual psychopathology. The lack of effects for psychopathology may be because psychopathology is more stable, and thus less likely to predict more immediate changes. Indeed, other longitudinal work examining the effects of individual psychopathology and dating aggression involvement have longer temporal delays, allowing for change to occur (Capaldi et al. 2012). The lack of moderation effects are also a departure from prior work that has found the hypothesized interaction patterns between alcohol use and individual psychopathology within the marital literature (for review, Foran and O'Leary 2008b). To our knowledge no other study has examined the moderator model of alcohol use and individual psychopathology within dating relationships. Thus, it is possible that distal risk factors, like individual psychopathology, intersect more with alcohol use within marital relationships. Indeed, prior work has found developmental differences such that broader moderation patterns for dating aggression involvement emerge more frequently as adolescents and young adults get older (Collibee et al. 2017; Reyes et al. 2012). Thus, although a moderator model is theorized to apply to both individual and relationship risk factors, the current findings indicate that alcohol use and relationship characteristics may intersect in such a way that a moderator model may be especially pertinent to relationship risk factors in young adulthood. Future work should aim to replicate these patterns.

The present study addressed several important limitations within the existing literature by examining a moderator model of alcohol use and dating aggression using an intensive longitudinal design. Although a needed contribution to the literature, there are several noteworthy limitations as well. First, although the current study provides some evidence for temporal relationships between risk factors and dating aggression involvement, the study is still not an experimental one and firm causal inferences cannot be made.

Though the current study assessed both aggression perpetration and victimization, reports were made only by one member of the dyad. That is, relationship risk was based on only one member of the dyad's reports. Single reporter perceptions of both dating aggression involvement and the relationship may not provide a full picture; thus, dyadic reports would be an important future contribution. It would be especially interesting to better understand how different members of a dyad may report on both risk and dating aggression involvement differently, as well as what impact those differences may have. Only by doing so can intervention and prevention efforts be informed regarding the consequences of targeting only one member of a dyad, which is the common approach during this developmental period (Weisz and Black 2009).

Additionally, the current study found that the majority of dating aggression involvement was mutual. The presence of predominately bidirectional aggression is itself notable as studies rarely examine whether mutuality exists within shorter temporal delays, instead assessing these patterns across relationships and longer time periods (Bowen and Walker 2015). However, the predominance of bidirectional aggression in the current study did not allow for analyses examining unidirectional perpetration and victimization. Future work should aim to replicate these patterns within the context of unidirectional perpetration and victimization as well.

Finally, the current study is limited by its reliance on self-report assessments of both relationship risk factors and dating aggression. Act based self-report assessments are constrained by a lack of context as well as potential desirability biases. Future research should strive to examine relationship risk factors and dating aggression with multiple methods, including a greater incorporation of observations of dyads as well as interviews, to further understand these processes.

Conclusion

A theoretical moderator model posits that associations between alcohol use and dating aggression involvement will be greatest in the context of background (e.g., psychopathology) and situational (e.g., relationship characteristics) risk factors. The current study extends prior work on a moderator model and explicitly tests the idea that alcohol use, individual psychopathology, and relationship interact and predict increases in dating aggression involvement. It addresses notable limitations in the current literature by testing this theoretical model among young adults, selecting theoretically driven moderators, and using an intensive longitudinal design. The results indicate that relationship risk and alcohol use are especially pertinent targets for intervention and prevention programming, as they are related to *changes* in future involvement, particularly when both relationship risk and alcohol use are present. Taken together, the findings move beyond identifying what factors are associated with increased risk concurrently, and instead illustrate how more immediate changes in dating aggression involvement occur.

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Authors' Contributions C.C. and W.F. conceived of the study together. C.C. performed the statistical analyses, interpretation of the data, and drafted the manuscript. W.F. also participated in the interpretation of the data and contributed to the writing of the manuscript. Both authors read and approved the final manuscript.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no competing interests.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

Achenbach, T. M., Krukowski, R. A., Dumenci, L., & Ivanova, M. Y. (2005). Assessment of adult psychopathology: Meta-analyses and implications of cross-informant correlations. *Psychological Bulletin*, *131*, 361–382.

Baxter, L., & Bullis, C. (1986). Turning points in developing romantic relationships. *Human Communication Research*, *12*, 469–493. doi:10.1111/j.1468-2958.1986.tb00088.x.

Beck, A. T., Steer, R. A., Ball, R., & Ranieri, W. F. (1996). Comparison of beck depression inventories-IA and-II in psychiatric outpatients. *Journal of Personality Assessment*, *67*, 588–597.

Behrens, J. T. (1997). Principles and procedures of exploratory data analysis. *Psychological Methods*, *2*(2), 131–160. doi:10.1037/1082-989X.2.2.131.

Bolger, N., & Laurenceau, J. P. (2013). *Intensive longitudinal methods: An introduction to diary and experience sampling research*. New York, NY: Guilford.

Bowen, E., & Walker, K. (2015). *The psychology of violence in adolescent romantic relationships*. UK: Palgrave Macmillan.

Breiding, M. J., Chen, J., & Black, M. C. (2014). *Intimate partner violence in the United States — 2010*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.

Brooks-Russell, A., Foshee, V. A., & Ennett, S. T. (2013). Predictors of latent trajectory classes of physical dating violence victimization. *Journal of Youth and Adolescence*, *42*, 566–580. doi:10.1007/s10964-0129876-2.

Capaldi, D. M., Knoble, N. B., Shortt, J. W., & Kim, H. K. (2012). A systematic review of risk factors for intimate partner violence. *Partner Abuse*, *3*, 231–280. doi:10.1891/1946-6560.3.2.231.

Chermack, S. T., & Giancola, P. R. (1997). The relation between alcohol and aggression: An integrated biopsychosocial conceptualization. *Clinical Psychology Review*, *17*, 621–649. doi:10.1016/S0272-7358(97)00038-X.

Collibee, C., & Furman, W. (2016). Chronic and acute relational risk factors for dating aggression in adolescence and young adulthood. *Journal of Youth and Adolescence*, *45*, 763–776.

Collibee, C., Furman, W., & Novak, J. (2017). *Risky interactions: Relational and developmental moderators of substance use and dating aggression*. Unpublished manuscript.

Collins, R. L., Parks, G. A., & Marlatt, G. A. (1985). Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology*, *53*, 189–200.

Collins, L. M., Schafer, J. L., & Kam, C. M. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods*, *6*, 330–351.

Connolly, J., Friedlander, L., Pepler, D., Craig, W., & Laporte, L. (2010). The ecology of adolescent dating aggression: Attitudes, relationships, media use, and socio-demographic risk factors. *Journal of Aggression, Maltreatment & Trauma*, *19*, 469–491. doi:10.1080/10926771.2010.495028.

Elliott, D. M., & Briere, J. (1992). Sexual abuse trauma among professional women: Validating the trauma symptom checklist-40 (TSC-40). *Child Abuse & Neglect*, *16*, 391–398.

Exner-Cortens, D., Eckenrode, J., & Rothman, E. (2013). Longitudinal associations between teen dating violence victimization and adverse health outcomes. *Pediatrics*, *131*, 71–78.

Feingold, A., Washburn, I. J., Tiberio, S. S., & Capaldi, D. M. (2015). Changes in the associations of heavy drinking and drug use with intimate partner violence in early adulthood. *Journal of Family Violence*, *30*, 27–34. doi:10.1007/s10896-014-9658-6.

Foran, H. M., & O'Leary, K. D. (2008a). Alcohol and intimate partner violence: A meta-analytic review. *Clinical Psychology Review*, *28*, 1222–1234. doi:10.1016/j.cpr.2008.05.001.

Foran, H. M., & O'Leary, K. D. (2008b). Problem drinking, jealousy, and anger control: Variables predicting physical aggression against a partner. *Journal of Family Violence*, *23*, 141–148.

Furman, W., & Buhrmester, D. (2009). The network of relationships inventory: Behavioral systems version. *International Journal of Behavioral Development*, *33*, 470–478.

Giordano, P. C., Flannigan, C. M., Manning, W. D., & Longmore, M. A. (2009). Developmental shifts in the character of romantic relationships from adolescence to early adulthood. *National Center for Family & Marriage Research Working Paper Series*.

Graham, J. W., Olchowski, A. E., & Gilreath, T. D. (2007). How many imputations are really needed? Some practical clarifications of multiple imputation theory. *Prevention Science*, *8*, 206–213. doi:10.1007/s11121-007-0070-9.

Halpern, C. T., Spriggs, A. L., Martin, S. L., & Kupper, L. L. (2009). Patterns of intimate partner violence victimization from adolescence to young adulthood in a nationally representative sample. *Journal of Adolescent Health*, *45*, 508–516. doi:10.1016/j.jadohealth.2009.03.011.

Hickman, L. J., Jaycox, L. H., & Aronoff, J. (2004). Dating violence among adolescents: Prevalence, gender distribution, and prevention program effectiveness. *Trauma, Violence, & Abuse*, *5*, 123–142. doi:10.1177/1524838003262332.

Honaker, J., King, G., & Blackwell, M. (2011). Amelia II: A program for missing data. *Journal of Statistical Software*, *45*, 1–47.

Jeličić, H., Phelps, E., & Lerner, R. M. (2009). Use of missing data methods in longitudinal studies: The persistence of bad practices in developmental psychology. *Developmental Psychology*, *45*, 1195–1199.

Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2003). *Monitoring the future: National survey results on drug use, 1975–2000. Volume 1. Secondary school students*. Bethesda: NIH Publication. No-06-5883. National Institute on Drug Abuse.

Kantor, G. K., & Straus, M. A. (1987). The "drunken bum" theory of wife beating. *Social Problems*, *34*, 213–230. doi:10.2307/800763.

Kaura, S. A., & Lohman, B. J. (2007). Dating violence victimization, relationship satisfaction, mental health problems, and acceptability of violence: A comparison of men and women. *Journal of Family Violence*, *22*, 367–381. doi:10.1007/s10896-007-9092-0.

Lawrence, E., Orengo-Aguayo, R., Langer, A., & Brock, R. L. (2012). The impact and consequences of partner abuse on partners. *Partner Abuse*, *3*, 406–428. doi:10.1891/1946-6560.3.4.406.

Leonard, K. E. (1993). Drinking patterns and intoxication in marital violence: Review, critique, and future directions for research. *Alcohol and interpersonal violence: Fostering multidisciplinary perspectives* (pp. 253–280). Bethesda, MD: National Institute of Justice.

Leonard, K. E., & Quigley, B. M. (1999). Drinking and marital aggression in newlyweds: An event-based analysis of drinking and the occurrence of husband marital aggression. *Journal of Studies on Alcohol*, *60*, 537–545.

Leonard, K. E., & Senchak, M. (1993). Alcohol and premarital aggression among newlywed couples. *Journal of Studies on Alcohol*, *11*, 96–108.

Leonard, K. E., & Senchak, M. (1996). Prospective prediction of husband marital aggression within newlywed couples. *Journal of Abnormal Psychology*, *105*, 369–380. doi:10.1037/0021-843X.105.3.369.

Little, T. D. (2013). *Longitudinal structural equation modeling*. New York, NY: Guilford.

Little, T. D., Jorgensen, T. D., Lang, K. M., & Moore, E. W. G. (2014). On the joys of missing data. *Journal of Pediatric Psychology*, *39*, 151–162. doi:10.1093/jpepsy/jst048.

Luthra, R., & Gidycz, C. A. (2006). Dating violence among college men and women: Evaluation of a theoretical model. *Journal of Interpersonal Violence*, *21*, 717–731. doi:10.1177/0886260506287312.

Maas, C. D., Fleming, C. B., Herrenkohl, T. I., & Catalano, R. F. (2010). Childhood predictors of teen dating violence victimization. *Violence and Victims*, *25*, 131–149. doi:10.1891/0886-6708.25.2.131.

McCollum, E. E., & Stith, S. M. (2008). Couples treatment for interpersonal violence: A review of outcome research literature and current clinical practices. *Violence and Victims*, *23*, 187–201. doi:10.1891/0886-6708.23.2.187.

Miller, T. R., Cohen, M. A., & Wiersema, B. (1996). *Victim costs and consequences: A new look*. Washington DC: US Department of Justice, Office of Justice Programs, National Institute of Justice.

Moore, T. M., Elkins, S. R., McNulty, J. K., Kivisto, A. J., & Handsel, V. A. (2011). Alcohol use and intimate partner violence perpetration among college students: Assessing the temporal association using electronic diary technology. *Psychology of Violence*, *1*, 315 doi:10.1037/a0025077.

Morse, B. J. (1995). Beyond the conflict tactics scale: Assessing gender differences in partner violence. *Violence and Victims*, *10*, 251–272.

Murphy, C. M., & Ting, L. (2010). The effects of treatment for substance use problems on intimate partner violence: A review of empirical data. *Aggression and Violent Behavior*, *15*, 325–333.

Murray, C. E., & Kardatzke, K. N. (2007). Dating violence among college students: Key issues for college counselors. *Journal of College Counseling*, *10*, 79–89. doi:10.1002/j.2161-1882.2007.tb00008.x.

Muthén, L. K, Muthén, B. O. (1998–2011). Mplus user's guide. 6th edn. Los Angeles, CA: Muthén & Muthén.

Norton, R. (1983). Measuring marital quality: A critical look at the dependent variable. *Journal of Marriage and the Family*, *45*, 141–151.

O'Farrell, T. J., Fals-Stewart, W., Murphy, M., & Murphy, C. M. (2003). Partner violence before and after individually based alcoholism treatment for male alcoholic patients. *Journal of Consulting and Clinical Psychology*, *71*, 92–102.

O'Keefe, M. (1997). Predictors of dating violence among high school students. *Journal of Interpersonal Violence*, *12*, 546–568. doi:10.1177/088626097012004005.

O'Leary, K. D. (1999). Developmental and affective issues in assessing and treating partner aggression. *Clinical Psychology: Science and Practice*, *6*, 400–414. doi:10.1093/clipsy.6.4.400.

O'Leary, K. D., & Slep, A. M. (2003). A dyadic longitudinal model of adolescent dating aggression. *Journal of Clinical Child and Adolescent Psychology*, *32*, 314–327. doi:10.1207/S15374424JCCP3203 01.

Parrott, D. J., & Giancola, P. R. (2004). A further examination of the relation between trait anger and alcohol-related aggression: The role of anger control. *Alcoholism: Clinical and Experimental Research*, *28*, 855–864.

Pfeiffer, S. M., & Wong, P. T. P. (1989). Multidimensional jealousy. *Journal of Social and Personal Relationships*, *6*, 181–196. doi:10.1177/026540758900600203.

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, *31*, 437–448. doi:10.3102/10769986031004437.

Reyes, H. L. M., Foshee, V. A., Bauer, D. J., & Ennett, S. T. (2012). Heavy alcohol use and dating violence perpetration during adolescence: Family, peer and neighborhood violence as moderators. *Prevention Science*, *13*, 340–349. doi:10.1007/s11121-011-0215-8.

Riggs, D. S., & O'Leary, K. D. (1989). The development of a model of courtship aggression. In M. A. Pirog-Good & J. E. Stets (Eds.), *Violence in dating relationships: Emerging social issues* (pp. 53–71). New York, NY: Praeger.

Rothman, E. F., Reyes, L. M., Johnson, R. M., & LaValley, M. (2011). Does the alcohol make them do it? Dating violence perpetration and drinking among youth. *Epidemiologic Reviews*, *34*, 103–119. doi:10.1093/epirev/mxr027.

Rothman, E. F., Stuart, G. L., Winter, M., Wang, N., Bowen, D. J., Bernstein, J., & Vinci, R. (2012). Youth alcohol use and dating abuse victimization and perpetration: A test of the relationships at the daily level in a sample of pediatric emergency department patients who use alcohol. *Journal of Interpersonal Violence*, *27*, 2959–2979. doi:10.1177/0886260512441076.

Saewyc, E. M., Brown, D., Plane, M., Mundt, M. P., Zakletskaia, L., Wiegel, J., & Fleming, M. F. (2009). Gender differences in violence exposure among university students attending campus health clinics in the United States and Canada. *Journal of Adolescent Health*, *45*, 587–594. doi:10.1016/j.jadohealth.2009.03.024.

Schafer, J. L., & Graham, J. W. (2002). Missing data: our view of the state of the art. *Psychological Methods*, *7*, 147–177.

Schulenberg, J. E., & Maggs, J. L. (2002). A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol and Drugs*, *14*, 54–70. doi:10.15288/jsas.2002.s14.54.

Schumacher, J. A., Fals-Stewart, W., & Leonard, K. E. (2003). Domestic violence treatment referrals for men seeking alcohol treatment. *Journal of Substance Abuse Treatment*, *24*, 279–283. doi:10.1016/S0740-5472(03)00034-5.

Shorey, R. C., Cornelius, T. L., & Bell, K. M. (2008). A critical review of theoretical frameworks for dating violence: Comparing the dating and marital fields. *Aggression and Violent Behavior*, *13*, 185–194. doi:10.1016/j.avb.2008.03.003.

Shorey, R. C., Stuart, G. L., & Cornelius, T. L. (2011). Dating violence and substance use in college students: A review of the literature. *Aggression and Violent Behavior*, *16*, 541–550. doi:10.1016/j.avb.2011.08.003.

Shorey, R. C., Stuart, G. L., McNulty, J. K., & Moore, T. M. (2014). Acute alcohol use temporally increases the odds of male perpetrated dating violence: A 90-day diary analysis. *Addictive behaviors*, *39*, 365–368. doi:10.1016/j.addbeh.2013.10.025.

Shorey, R. C., Zucosky, H., Brasfield, H., Febres, J., Cornelius, T. L., Sage, C., & Stuart, G. L. (2012). Dating violence prevention programming: Directions for future interventions. *Aggression and Violent Behavior*, *17*, 289–296. doi:10.1016/j.avb.2012.03.001.

Stafford, L. (2011). Measuring relationship maintenance behaviors: Critique and development of the revised relationship maintenance behavior scale. *Journal of Social and Personal Relationships*, *28*, 278–303.

Straus, M. A., Hamby, S. L., Boney-McCoy, S., & Sugarman, D. B. (1996). The revised conflict tactics scales (CTS2) development and preliminary psychometric data. *Journal of Family Issues*, *17*, 283–316.

Temple, J. R., Shorey, R. C., Fite, P., Stuart, G. L., & Le, V. D. (2013). Substance use as a longitudinal predictor of the perpetration of teen dating violence. *Journal of Youth and Adolescence*, *42*, 596–606. doi:10.1007/s10964-012-9877-1.

Temple, J. R., Weston, R., & Marshall, L. L. (2005). Physical and mental health outcomes of women in nonviolent, unilaterally violent, and mutually violent relationships. *Violence and Victims*, *20*, 335.

Vagi, K. J., Rothman, E. F., Latzman, N. E., Tharp, A. T., Hall, D. M., & Breiding, M. J. (2013). Beyond correlates: A review of risk and protective factors for adolescent dating violence perpetration. *Journal of Youth and Adolescence*, *42*, 633–649. doi:10.1007/s10964-013-9907-7.

Weisz, A. N., & Black, B. M. (2009). *Programs to reduce teen dating violence and sexual assault: Perspectives on what works*. New York, NY: Columbia University Press.

Whisman, M. A., & Richardson, E. D. (2015). Normative data on the beck depression inventory–second edition (BDI-II) in college students. *Journal of Clinical Psychology*, *71*, 898–907. doi:10.1002/jclp.22188.

Whitaker, D. J., Haileyesus, T., Swahn, M., & Saltzman, L. S. (2007). Differences in frequency of violence and reported injury between relationships with reciprocal and nonreciprocal intimate partner violence. *American Journal of Public Health*, *97*, 941–947.

Whiting, J. B., Simmons, L. A., Havens, J. R., Smith, D. B., & Oka, M. (2009). Intergenerational transmission of violence: The influence of self-appraisals, mental disorders, and substance abuse. *Journal of Family Violence*, *24*, 639–648. doi:10.1007/s10896-009-9262-3.

Williams, T. S., Connolly, J., Pepler, D., Craig, W., & Laporte, L. (2008). Risk models of dating aggression across different adolescent relationships: a developmental psychopathology approach. *Journal of Consulting and Clinical Psychology*, *76*, 622–632. doi:10.1037/0022-006X.76.4.622.

Windle, M. (2003). Alcohol use among adolescents and young adults. *Population*, *45*, 15–19.

Woodin, E. M., & O'Leary, K. D. (2010). A brief motivational intervention for physically aggressive dating couples. *Prevention Science*, *11*, 371–383. doi:10.1007/s11121-010-0176-3.

Young, B. J., & Furman, W. (2008). Interpersonal factors in the risk for sexual victimization and its recurrence during adolescence. *Journal of Youth and Adolescence*, *37*, 297–309.

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