Journal of Family Violence (2024) 39:651–664
https://doi.org/10.1007/s10896-023-00513-x

ORIGINAL ARTICLE

Problem Drinking is Associated with Intimate Partner Cyber Abuse Perpetration but is Buffered by High Relationship Satisfaction

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Accepted: 7 February 2023 / Published online: 14 February 2023

Abstract

Purpose Intimate partner cyber abuse (IPCA) is a prevalent form of intimate partner violence (IPV) that has detrimental effects on victims' well-being. Although research has documented associations with other forms of IPV perpetration, additional research is needed to identify IPCA perpetration risk factors. One of the most common risk factors for offline IPV is perpetrators' alcohol use; however, less is known about how this translates to online contexts. There is also a need to identify protective factors that mitigate the effects of alcohol.

Methods This study evaluated associations between drinking, relationship satisfaction, and IPCA perpetration via self-report questionnaires within a longitudinal framework. Participants included 544 adults in an intimate relationship ($n = 296$ at T2).

Results Results indicated that relationship satisfaction buffered the effects of problem drinking on IPCA perpetration at T1, but not at T2. Further, 20.2% of individuals who perpetrated IPCA at T1 drank alcohol during at least one incident, and these individuals reported more problem drinking and more frequent IPCA perpetration compared to those who reported IPCA without alcohol.

Conclusion Results from this study provide insight into both risk and protective factors for IPCA perpetration among adults and have the potential to guide concurrent prevention strategies that target intersections between problem drinking, IPCA, and offline IPV, and promote healthy and satisfying intimate relationships.

Keywords Intimate partner cyber abuse · Alcohol · Problem drinking · Perpetration · Relationship satisfaction

As technology advances, new means are available for individuals to gain power and control over their intimate partners. This includes behaviors such as monitoring partners' online activities, controlling access to online banking, and sending threatening messages, among others, which fall under the umbrella of intimate partner cyber abuse (IPCA). IPCA[1] is "the use of communication technologies to attempt, threaten, or complete physical, sexual, or psychological harm against an intimate partner or to monitor, coerce, or control an intimate partner's behavior" (Fissel et al., 2021, p. 979). Recent research has found that IPCA significantly impacts victims' mental health and well-being (Fernet et al., 2019) and tends to co-occur with offline "traditional" intimate partner violence (IPV) (Borrajo et al., 2015a; Marganski & Melander, 2018; Temple et al., 2016). Relatively little is known, however, about those who perpetrate IPCA, thus prompting a need to understand perpetration risk and protective factors.

Because IPCA is a relatively new phenomenon, research investigating its precursors is limited compared to research on offline forms of IPV. Emerging research suggests that cyber and offline partner violence have common risk factors (Borrajo et al., 2015a), but studies are still needed to better understand the unique role of these known risk factors in IPCA perpetration. One important risk factor that warrants further investigation is alcohol use, which is one of the most studied predictors of offline IPV perpetration (Abbey et al., 2014; Eckhardt et al., 2015; Foran & O'Leary, 2008; Stith et al., 2004). It is also necessary to assess protective factors

[1] Taylor and Xia's (2018) systematic review found that 25 different terms were used to label abusive behaviors between intimate partners using technologies. For this paper, we use IPCA to capture all of these terms.

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that buffer alcohol's possible deleterious effects on IPCA perpetration. In the current study, we consider the role of relationship satisfaction, which has previously been shown to protect against offline IPV perpetration (Dardis et al., 2020; Petit et al., 2017). This integration of relational and situational risk and protective factors has the potential to provide more insight into our understanding of IPCA perpetration and guide eventual prevention and intervention strategies targeting IPCA and its consequences.

Intimate Partner Cyber Abuse Perpetration

The increasing everyday use of cell phones, email, and social media provides great societal and relational advantages, but also facilitates new opportunity to aggress against intimate partners. Generally, IPCA includes behaviors such as monitoring partners' location, controlling their social media use and other online activities, controlling online financial activity, using technology to make threats, and engaging in cyber sexual coercion (Caridade et al., 2019; Fissel et al., 2021; Taylor & Xia, 2018). In recent systematic reviews of IPCA, perpetration estimates ranged from 8.1 to 93.7%, with variability attributable to differences in methodology, measurement, and definitions, including which specific behaviors are assessed (Caridade et al., 2019; Taylor & Xia, 2018). Studies indicate that some IPCA behaviors are more common than others. For example, Lee et al. (2014) found that only 1.5% changed or took over their ex-partner's electronic identity or persona, while other studies have found that the overwhelming majority of participants (90.3%) engaged in *any* type of cyber abuse behavior (Borrajo et al., 2015a). Across studies, psychological IPCA ranges from 34% (Watkins et al., 2018) to 64% (Morelli et al., 2018), and cyber control perpetration ranges from 49.6% (Van Ouytsel et al., 2020) to 88.4% (Borrajo, Gámez-Guadix, & Calvete, 2015b).

Although IPCA has gained scholarly attention, many questions remain unanswered. While many studies have identified the prevalence of IPCA victimization and perpetration (Caridade et al., 2019; Kellerman et al., 2013), and others have focused on delineating the effects of IPCA on victims' well-being (Cantu & Charak, 2022; Duerksen & Woodin, 2021; Toplu-Demirtaş et al., 2022), there is a relative lack of research on predictors of IPCA perpetration (Branson & March, 2021; Deans & Bhogal, 2019). Existing studies have found that individual difference characteristics, including narcissism, psychopathy, hostility, jealousy, hegemonic masculinity, and sexual aggression myths are significantly associated with increased IPCA perpetration risk (Branson & March, 2021; Deans & Bhogal, 2019; March et al., 2021). Studies also generally suggest that IPCA occurs at similar rates across genders (Leisring & Giumetti, 2014; Taylor & Xia, 2018; Wolford-Clevenger et al., 2016), although some have found a higher perpetration prevalence among men compared to women (e.g., Deans & Bhogal, 2019). Due to the high rate of IPCA identified in many studies (e.g., Borrajo, Gámez-Guadix, & Calvete, 2015b; Caridade et al., 2019; Morelli et al., 2018), there is a need for additional studies that investigate risk factors, including examining the potential importance of known risk factors for offline IPV perpetration to determine the extent to which they translate to online contexts.

Alcohol and IPV

One of the most studied and robust predictors of offline IPV perpetration is alcohol use (Foran & O'Leary, 2008; Stith et al., 2004). Meta-analytic reviews indicate that alcohol use operationalized in various ways, including frequency and quantity of use, heavy drinking, and problem drinking, is positively associated with IPV (Devries et al., 2014; Foran & O'Leary, 2008; Stith et al., 2004). These findings extend across different populations and types of IPV, including physical (Foran & O'Leary, 2008), psychological (Moore et al., 2011), and sexual IPV (Shorey et al., 2015), and stalking (Logan et al., 2000). Most research on alcohol and IPV focuses on proximal effects, in which the myopic effects of alcohol may lead to decreased ability to process distant risk cues and facilitate aggression due to an increased focus on salient aggressive or negative cues (Chermack & Giancola, 1997; Curtin & Fairchild, 2003; Davis et al., 2007; Foran & O'Leary, 2008; Giancola et al., 2009; Steele & Josephs, 1990). However, in addition to the impact of alcohol in the moment, many studies have shown that drinking patterns in general predict offline IPV perpetration. Specifically, research indicates that problem drinking, defined as heavy or hazardous drinking placing individuals at risk for alcohol use disorder (National Institute on Alcohol Abuse and Alcoholism, 2016), is associated with higher rates of IPV perpetration (Bacchus et al., 2018; Cafferky et al., 2018; Foran & O'Leary, 2008; Leadley et al., 2000; White & Chen, 2002). This may be in part explained by the presence of third variables, including the social context that underlies this link between drinking patterns and IPV. For example, heavy drinking has been shown to indirectly predict sexual assault perpetration through impersonal sex, sexual misperception (Abbey et al., 2011), alcohol expectancies (Tuliao & McChargue, 2014), and low self-control (Testa & Cleveland, 2017). Perpetrators also drink more in dating and sexual situations (Abbey et al., 2001), and attend bars and parties more frequently where alcohol use is common (Testa & Cleveland, 2017). Nonetheless, problem drinking patterns are consistently linked to IPV perpetration (Davis

et al., 2016; Grigorian et al., 2020; O'Leary & Schumacher, 2003; Shorey et al., 2011; Shorey et al., 2015; Stuart et al., 2006). Problem drinking measures also typically capture the frequency and quantity of alcohol use (e.g., Saunders et al., 1993), which may therefore also reflect a greater tendency to drink in all contexts, including those characterized by relationship conflict (Cunradi et al., 2014; White & Chen, 2002; Wilson et al., 2017). However, research linking problem drinking to IPCA specifically remains limited.

Problem alcohol use can facilitate violence through its interaction with individual differences and interpersonal risk factors for IPV by decreasing inhibition. These ideas have been described in the I^3 model, a process-oriented metatheory that provides a framework for understanding the push and pull factors that influence aggressive behavior (Finkel, 2007; Finkel & Hall, 2018). The I^3 model integrates instigators, impellors, and inhibitors of aggression (Finkel, 2007): instigating factors encompass immediate environmental stimuli such as partner provocation or relationship conflict, impelling factors include situational or dispositional factors that impact the likelihood that or intensity with which instigators and impellors will be overridden (e.g., executive control, alcohol use). Thus, relationship factors such as low relationship satisfcation (characterized by conflict) may represent an instigating factor that, when paired with the disinhibiting effects of alcohol, may increase the likelihood of IPV perpetration.

Although the effects of alcohol on IPCA may operate similarly as they do on offline IPV, empirical investigations have only recently begun to explore the relationship between alcohol use and IPCA. For example, contextualized within the I^3 framework, Brem and colleagues (2019a) found that problem alcohol use was associated with psychological and physical IPV perpetration among men arrested for domestic violence, but only when cyber monitoring behaviors were high. Another study found that problem alcohol use was associated with cyber privacy invasion against a partner (Crane et al., 2018). Investigations specific to online contexts are critical. Many theoretical models linking alcohol use to violence perpetration consider alcohol as a situational risk factor that exerts its effects (either directly or indirectly by exacerbating the effects of other risk factors) in the moment (e.g., Chermack & Giancola, 1997; Steele & Josephs, 1990). However, IPCA is fundamentally different in that abusive acts occur without face-to-face contact between the victim and perpetrator. Although it is possible and perhaps just as likely that alcohol would impact IPCA in the moment, these interactions often lack direct verbal communication and body language, reactions from partners may not occur in real-time, and therefore the instigating, impelling, and inhibiting cues that facilitate aggression may differ substantially (Dehue et al., 2008; Postmes et al., 1998; Watkins et al., 2018). Therefore, the role of alcohol use in the moment of IPCA perpetration remains an empirical question.

A recent meta-analysis by Crane et al. (2021) reviewed the association between IPCA perpetration and substance use, concluding that alcohol poses a greater risk for IPCA perpetration compared to all other substances. The authors reviewed 18 studies, although only 10 studies were specific to the association between alcohol (vs. other substances) and aggression targeting an intimate partner (vs. a peer). Across the studies reviewed, there were not significant differences in perpetration based on gender, and adults were more likely to perpetrate compared to adolescents. Although the population sampled and the definition of both alcohol use and IPCA varied, findings across these 10 studies overwhelming provided support for the notion that increased alcohol use is associated with IPCA perpetration (Brem et al., 2019b; Crane et al., 2018; Melander, 2010; Peskin et al., 2017; Singh et al., 2015; Van Ouytsel et al., 2017; Watkins et al., 2018). However, each of these studies were cross-sectional. This work provides important preliminary evidence for links between alcohol and IPCA but precludes us from making conclusions about temporal associations. Further, less is known about the role of alcohol intoxication at the time of IPCA perpetration. Therefore, these effects must be replicated and extended to assess temporal associations and drinking during perpetration. Finally, there is a pressing need to evaluate factors that enhance or buffer the impact of alcohol on IPCA.

Relationship Satisfaction

Although alcohol use is associated with both offline and online forms of IPV perpetration, not everyone who drinks alcohol (either at all or heavily) will perpetrate IPV. As described above, the I^3 model (Finkel, 2007) indicates that the effects of alcohol are dependent on other personality and relational risk factors. Specifically, alcohol is most likely to be related to perpetration in contexts characterized by high instigation or low inhibition (Quigley et al., 2018). In addition to risk factors that increase the likelihood of IPCA perpetration, it is also important to identify protective factors that promote resilience and buffer against the effects of alcohol. One important potential protective factor to consider is relationship satisfaction.

IPCA is an inherently relational phenomena, and the consideration of relational risk and protective factors is essential to understanding the circumstances under which IPCA perpetration occurs. Existing research indicates that low relationship satisfaction is associated with offline IPV perpetration (Lawrence & Bradbury, 2007; Ulloa & Hammett,

2015). It has been proposed that low relationship satisfaction results in more distress within a relationship and anger directed at the partner, thus making perpetration more likely (Halmos et al., 2021; Renshaw et al., 2010). Findings from relationships science further provide support for the idea that investment model constructs (i.e., low relationship satisfaction, investment, and commitment, and high quality of relationship alternatives) are associated with IPV perpetration (Dardis et al., 2020; Rusbult et al., 1998). Several recent studies have considered the role of relationship satisfaction together with participants' alcohol use. In one sample of heavy drinking couples, relationship dissatisfaction was associated with greater physical IPV (Halmos et al., 2021), and in a similar dyadic study of heavy drinking couples, relationship dissatisfaction was identified as a mechanism partially explaining the alcohol-IPV association (Bresin et al., 2020). However, existing studies in this domain have focused on offline IPV, and no studies to our knowledge have evaluated the joint impact of problem drinking and relationship satisfaction on IPCA specifically. Accordingly, based on existing theory and empirical findings, we hypothesize that the association between problem drinking and IPCA perpetration will be attenuated by higher relationship satisfaction.

Current Study

The aim of this study is to assess associations between alcohol and IPCA perpetration via self-report questionnaires within a longitudinal framework. Specifically, we aim to assess the association between past-year problem drinking and the frequency of baseline IPCA perpetration (T1) and evaluate the extent to which this association is buffered by relationship satisfaction. We hypothesize that greater problem drinking will be associated with more frequent IPCA perpetration, and that this association will be weaker when relationship satisfaction is high. As a supplemental aim and to corroborate these findings, we evaluate the association between past-year problem drinking and IPCA perpetration (presence vs. absence of IPCA) one month later (T2) while statistically controlling for T1 IPCA perpetration, and hypothesize that problem drinking will predict a greater likelihood of IPCA perpetration. Finally, given the dearth of existing research on alcohol use in the moment during IPCA, we aim to provide descriptive information on the prevalence of alcohol use during IPCA perpetration incidents. Results from this work will provide insight into how alcohol may impact IPCA among adults and have the potential to guide appropriate prevention strategies targeting IPCA perpetration.

Method

Procedures

Data collection took place in fall 2020 via an online self-report survey as part of a study on "cyber behaviors in intimate partner relationships". Participants were recruited from Amazon Mechanical Turk (MTurk) using CloudResearch pro features which blocks low quality and "bot-like" responses automatically and ensure recruitment from a vetted group who pass basic system attention checks to enhance data quality. Individuals were eligible if they were between the ages of 18 and 50 years, lived in the United States, and were in an intimate relationship at the time of study. Individuals were directed to the survey on Qualtrics and were provided with an IRB approved explanation of research. If they consented to participate, they proceeded with the baseline (T1) study. Participants who completed the T1 survey were invited to participate in a follow up (T2) survey one month later. Due to budgetary constraints, only 315 participants were recruited for T2. The T2 survey was available for all T1 participants, and once 315 individuals participated, the study was closed to recruitment.[2]

Participants

A total of 600 individuals accessed the T1 survey. However, 56 either did not make it far enough to complete the IPCA measure ($n=8$) or failed data quality attention checks (e.g., "select strongly agree for this question"; $n=48$) and were excluded from analyses, resulting in an analytic sample of $N=544$. For the T2 survey ($n=315$), data for 7 participants were excluded due to missing data for the IPCA measure. An additional 12 were excluded based on data quality checks at T1, resulting in an analytic sample of $n=296$.

Participants for T1 ranged between 18 and 50 years of age ($M=35.68$, $SD=7.86$), and 57.2% ($n=311$) identified as a woman (all cisgender), 41.2% ($n=224$) identified as a man (1 transgender, 223 cisgender), and 1.5% ($n=8$) identified as genderfluid or gender non-conforming. The majority of participants (86.2%, $n=469$) described their sexual orientation as heterosexual or straight, and 13.8% ($n=75$) as gay or lesbian, bisexual, asexual, queer, or questioning. Participants' self-reported race is as follows: 76.7% ($n=417$) White, 7.9% ($n=43$) Black or African American, 9.4% ($n=51$) Asian, 0.6% ($n=3$) American Indian or Alaska Native, and 5.5% ($n=30$) multi-racial or identified another way. For analyses,

[2] Participants who participated in T2 (vs. only participated in T1) were older, $F(1,542)=10.81$, $p=.001$, and were more likely to be women $\chi^2(1)=9.22$, $p=.002$. There were no significant differences on any other variable included in the model, including IPCA frequency, problem drinking, and relationships satisfaction.

Table 1 Demographic information, relationship characteristics, and IPCA

	T1 ($N=544$)		T2 ($n=296$)	
Continuous variables	*M (Sd)*	Range	*M (SD)*	Range
Age	35.68 (7.86)	18–50	36.67 (7.65)	18–50
Relationship length (months)	92.45 (50.58)	1-156	95.09 (49.06)	3-156
Frequency variables	*n* (%)		*n* (%)	
Gender				
Men	225 (41.4%)		106 (35.7%)	
Women	311 (57.2%)		188 (63.3%)	
Nonbinary	8 (1.5%)		3 (1.0%)	
Partner gender				
Same as participant	22 (4.0%)		12 (4.0%)	
Different from participant	522 (96.0%)		285 (96.0%)	
Race				
Black	43 (7.9%)		24 (8.1%)	
White	417 (76.7%)		226 (76.1%)	
Asian	51 (9.4%)		29 (9.8%)	
Another identity or multiracial	33 (6.1%)		18 (6.1%)	
Ethnicity				
Hispanic or Latino/a/x	58 (10.7%)		31 (10.5%)	
Education				
Bachelor's degree of higher	323 (59.4%)		174 (58.9%)	
Annual household income				
$49,999 or less	170 (31.4%)		89 (30.0%)	
$50,000 - $99,999	216 (39.7%)		115 (38.9%)	
$100,000 or more	157 (28.9%)		92 (31.1%)	
Children in home				
Yes	283 (52.0%)		161 (54.2%)	
IPCA				
Total	41.5% (226)		32.4% (96)	
Sexual Coercion	4.4% (24)		2.0% (6)	
Financial Control	27.4% (149)		22.6% (67)	
Cyber Control	7.9% (43)		5.1% (15)	
Cyber monitor	26.5% (144)		19.6% (58)	
Cyber direct aggression	5.5% (30)		2.4% (7)	

Note. Age and relationship length were not reassessed at T2: descriptive statistics presented reflect the T1 assessment for the T2 subsample

the 3 American Indian or Alaska Native participants were combined with the "another racial identity" group due to the low group size. A separate question assessed whether participants were of Hispanic or Latino/a/x origin, which was endorsed by 10.7% ($n=58$) of participants. Additional demographic information for the full sample and for the T2 subsample is provided in Table 1.

Measures

IPCA Perpetration

IPCA perpetrated over the past 6 months was assessed with an adapted version of the Intimate Partner Cyber Abuse Instrument (Fissel et al., 2021). This measure was designed to assess IPCA victimization; however, we rephrased questions to be focused on perpetration. Convergent, discriminant, and predictive validity were established in a comparable sample to the one in the current study (i.e., MTurk sample of 1,500 adults in an intimate partner relationship; Fissel et al., 2021). Participants were provided with a list of 33 behaviors, 27 of which are part of the Intimate Partner Cyber Abuse Instrument, and were asked to, "Please indicate how often you have done any of the following using communication technologies in the context of your current intimate partner relationship within the last 6 months (without your partner's permission)." Responses were assessed on a 9-point scale and included: 0 (this never happened or happened but not in the past 6 months), 1 (once or twice in the past 6 months), 2 (every other month), 3 (once per month), 4 (2–3 times per month), 5 (once per week), 6 (2–3 times per week), 7 (4–6 times per week), and 8 (every day or nearly every day.) Responses were averaged to create a mean score for the frequency of all IPCA perpetration over the past 6 months ($\alpha=0.95$) to be used in the primary analyses. Higher values indicate more frequent perpetration. For descriptive purposes, mean scores were computed for the five subscales developed by Fissel et al. (2021): cyber financial control (5 items; $\alpha=0.82$); cyber sexual coercion (3 items; $\alpha=0.85$); cyber control (5 items; $\alpha=0.88$); cyber monitor (5 items; $\alpha=0.84$); cyber direct aggression (9 items; $\alpha=0.97$).

If participants reported any ICPA, they were asked to report whether they were drinking alcohol before or during any of the behaviors they reported (response options: no; don't remember; yes on rare occasion; yes on most occasions; yes every time or nearly every time). This was asked once at the end of the IPCA measure, not for each individual item. Due to low cell frequencies, this was dichotomized such that 0 = the absence of drinking and 1 = the presence of drinking on any occasion ("I don't know" responses coded as missing.)

IPCA questions were in reference to participants' *current* intimate relationship. If participants were in relationships with multiple partners, they were asked to answer questions about the partner they had been with the longest. Because we did not have exclusion criteria based on relationship length, as well as the possibility that some participants may not be in monogamous relationships, we considered the potential for some individuals to perpetrate IPCA against

multiple people. Therefore, for anyone who endorsed any IPCA behavior, we asked whether or not they engaged in any of these behaviors with another person in the same time frame (coded as 0 "no" or 1 "yes').

IPCA perpetration at T2 was assessed to capture IPCA that participants reported between the two surveys. Given the low frequency of IPCA, T2 IPCA was dichotomized such that 0 = the absence of perpetration and 1 = the presence of perpetration.

Problem Alcohol Use

The Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993), which has been extensively validated and used across various populations, was used to assess participants' problem alcohol use over the past year. Participants reported drinking frequency on a scale from 0 (never) to 4 (four or more times a week), drinking quantity on typical days that they drink on a scale from 0 (0 drinks) to 4 (10 or more drinks), and the frequency of eight problems (e.g., "How often during the last year have you found that you were not able to stop drinking once you had started?) with response options ranging from 0 (never) to 4 (daily or almost daily). The 10 items were summed in accordance with the original score specifications such that higher scores indicate greater problem alcohol use (α = .85).

At T2, participants responded to the AUDIT-C (Bush et al., 1998), a 3-item abbreviated version of the AUDIT, which was adapted for the current study's purposes to assess past month (rather than past year) alcohol use. Participants reported (1) how often they had a drink containing alcohol over the past month (since the previous survey), (2) how many drinks they had on a typical day when drinking over the past month, and (3) how often they had 6 or more drinks on a single occasion of the past month. The 3 items were summed in accordance with the original score specifications such that higher scores indicate greater alcohol use (α = 0.70). Alcohol use at T2 was included for the purposes of descriptive and correlational analyses.

Relationship Satisfaction

To assess participants' relationship satisfaction with their current partner at T1, they completed the 7-item Relationship Assessment Scale (RAS; Hendrick et al., 1998). This measure includes questions about how well their partner meets their needs, how satisfied they are with their relationship, how good their relationship is compared to most, how often they wish they hadn't gotten into this relationship, the extent to which the relationship has met their original expectations, how much they love their partners, and how many problems there are in their relationship. This measure has been used to evaluate relationship satisfaction in multiple types of relationships and reliability and validity have been established in multiple studies (Hendrick et a., 1998; Renshaw et al., 2011; Vaughn et al., 1999). Items were each assessed on a 1 to 5 scale and averaged such that higher scores indicate higher relationship satisfaction (α = 0.91).

Demographics

Participants self-reported their age, gender identity, race, ethnicity, highest level of education, and annual household income at T1. These questions were included to provide descriptive information.

Relationship Characteristics

At T1, participants reported their current relationship status, the length of the relationship (in months), partner's gender identity (same vs. different as respondent's gender), and children with the partner (yes or no). At T2, participants reported whether they were still in a relationship with their T1 partner. If they indicated that they were no longer in that relationship, they were asked to provide information about the breakup and information about their new partner if they had one.

Analytic Plan

Analyses for the current study followed a multi-step procedure. First, we assessed descriptive statistics including means, standard deviations, frequencies, and correlations. Then, a moderation analyses was conducted to assess the interaction between problem drinking and relationship satisfaction on past 6-month IPCA perpetration (all at T1) using the PROCESS macro for SPSS Version 4.0 (Hayes, 2017). IPCA was log-transformed prior to analysis due to skew and a violation of regression assumption of normally distributed residuals resulting from inflated zeroes. Participants' age, relationship length, race (dummy coded with Black/African American as the reference group), gender, gender of partner (i.e., same vs. different from participant's gender), and whether children were in the home were entered as covariates. We then assessed the prevalence of ever drinking alcohol during IPCA behaviors and compared individuals who did vs. did not report any drinking during IPCA on their IPCA perpetration frequency, general problem drinking, and relationship satisfaction, using one-way ANOVAS. Finally, we assessed the effects of problem drinking (T1), relationship satisfaction (T1), and their interaction on IPCA perpetration (yes vs. no) at T2, accounting for T1 IPCA perpetration.

Results

Descriptive Statistics

Several questions assessed participants' relationship characteristics. Almost half of participants shared one or more children with their partner (45.4%; $n = 247$), 11.0% ($n = 60$) indicated that their partner had a child from another relationship, 10.7% ($n = 58$) indicated that they had a child from another relationship, and 41.5% ($n = 226$) indicated that neither had children – and 85.5% ($n = 465$) of couples were cohabitating. Additional relationship characteristic information is provided in Table 1. At T2, three participants indicated that they were no longer in a relationship with their T1 partner (initiated by 1 participant, mutual decision for 2 participants). One of these individuals reported past 6-month IPCA perpetration at T1, and the other two did not. None of the three reported past month IPCA perpetration at T2, nor did they report that they were in a new intimate relationship.

Regarding IPCA, 41.5% of participants ($n = 226$) indicated that they had perpetrated any type of IPCA in the past 6 months. Of these 226 participants, most (61.9%, $n = 140$) reported one type of IPCA, and 38.1% ($n = 86$) reported two or more types. At T2, 32.4% ($n = 96$), regardless of T1 perpetration, reported past month IPCA perpetration (of these, 63.5% reported 1 type, 36.5% reported two or more types). Although IPCA questions referred to participants' current relationship, they could also indicate whether they engaged in any of these behaviors with another partner as well. Of the 226 participants who perpetrated IPCA, 8.6% ($n = 18$) reported IPCA perpetration with multiple partners. Those reporting IPCA with multiple partners indicated shorter relationships with the current partner (69.30 vs. 91.27 months), although this difference was not significant ($p = .060$). These groups also did not significantly differ in the frequency of overall IPCA perpetration at T1 ($p = .145$) or at T2 ($p = .433$). Although hypotheses about gender were outside the scope of this manuscript, we evaluated gender differences in the frequency of IPCA perpetration and found no significant differences at T1 ($p = .303$) or at T2 ($p = .481$). Most participants who reported IPCA at T2 (75%; $n = 72$) also reported IPCA at T1. Additional information for each type of IPCA perpetration is included in Table 1.

For past year alcohol use at T1, approximately one-quarter of the sample indicated that they do not drink alcohol (24.0%), and 63.0% indicated that they never consume six or more drinks on one occasion. At T2, 25.7% reported no alcohol consumption at all in the past month.

Prior to hypothesis testing, bivariate correlations were assessed (see Table 2). Results indicated that problem drinking and IPCA perpetration were significantly positively

Table 2 Bivariate correlations and descriptive statistics

	M (*Sd*)	1	2	3	4	5	6	7	8	9	10	11	12
1. Relationship Satisfaction (T1)	4.07 (0.82)	-											
2. Problem drinking (T1)	4.11 (4.91)	−0.14**	-										
3. IPCA Perpetration (T1)	0.15 (0.30)	−0.25**	0.36**	-									
4. IPCA – Sexual (T1)	0.05 (0.25)	−0.19**	0.38**	0.78**	-								
5. IPCA – Financial (T1)	0.25 (0.48)	−0.16**	0.25**	0.81**	0.46**	-							
6. IPCA – Control (T1)	0.07 (0.27)	−0.17**	0.42**	0.82**	0.83**	0.50**	-						
7. IPCA – Monitor (T1)	0.20 (0.42)	−0.27**	0.28**	0.83**	0.55**	0.47**	0.65**	-					
8. IPCA – Direct (T1)	0.05 (0.25)	−0.20**	0.37**	0.80**	0.93**	0.49**	0.84**	0.57**	-				
9. Alcohol use (T2)	2.47 (2.36)	−0.09	0.75**	0.13**	0.16**	0.11	0.16**	0.09	0.14*	-			
10. IPCA Perpetration (T2)	0.32 (0.47)	−0.30**	0.10	0.46**	0.14**	0.41**	0.22**	0.45**	0.19*	0.06*	-		
11. Age	35.68 (7.86)	−0.13**	−0.13**	−0.09*	−0.06	−0.02	−0.09*	−0.11*	−0.08	−0.00	0.02	-	
12. Relationship Length	92.45 (50.58)	−0.10*	−0.17**	−0.07	−0.10*	0.03	−0.12**	−0.09*	−0.10*	−0.08	0.06	0.56**	-

Note. *$p < .05$, **$p < .01$. IPCA Perpetration at T1 is log-transformed

Table 3 Moderation analysis: Problem drinking and relationship satisfaction predicting intimate partner cyber abuse perpetration

	B (*SE*)	*p*	95% CI [LL, UL]
T1 IPCA (*N* = 544)			
Constant	0.53 (0.12)	< 0.001**	[0.29, 0.78]
Problem drinking (T1)	0.06 (0.01)	< 0.001**	[0.04, 0.09]
Relationship satisfaction	− 0.04 (0.02)	0.052	[-0.08, 0.0004]
Problem drinking X relationship sat. interaction	− 0.01 (0.003)	< 0.001**	[-0.02, − 0.01]
Covariates:			
Race: White	− 0.17 (0.05)	< 0.001**	[-0.26, − 0.08]
Race: Asian	− 0.08 (0.06)	0.155	[-0.20, 0.03]
Race: Another identity or multiracial	− 0.13 (0.07)	0.046*	[-0.26, − 0.002]
Age (years)	− 0.003 (0.002)	0.129	[-0.01, 0.001]
Relationship length (months)	0.000 (0.000)	0.811	[-0.001, 0.001]
Children in home: yes (vs. no)	0.04 (0.03)	0.171	[-0.02, 0.09]
Gender: man (vs. woman)	− 0.002 (0.03)	0.938	[-0.05, 0.05]
Partner gender: different (vs. same)	− 0.07 (0.06)	0.261	[-0.19, 0.05]
T2 IPCA (*n* = 296)			
Constant	0.66 (1.57)	0.675	[-2.41, 3.73]
Problem drinking (T1)	0.03 (0.14)	0.799	[-0.23, 0.30]
Relationship satisfaction	− 0.52 (0.23)	0.027*	[-0.98, − 0.07]
Problem drinking X relationship sat. interaction	− 0.02 (0.04)	0.666	[-0.09, 0.06]
Covariates:			
Race: White	0.19 (0.60)	0.749	[-0.99, 1.37]
Race: Asian	-1.22 (0.91)	0.180	[-3.01, 0.56]
Race: Another identity or multiracial	0.25 (0.84)	0.767	[-1.40, 1.89]
Age (years)	0.000 (0.02)	0.991	[-0.05, 0.05]
Relationship length (months)	0.001 (0.004)	0.897	[-0.01, 0.01]
Children in home: yes (vs. no)	0.12 (0.34)	0.716	[-0.54, 0.78]
Gender: man (vs. woman)	-17 (0.33)	0.610	[-0.82, 0.48]
Partner gender: different (vs. same)	− 0.01 (0.85)	0.990	[-1.68, 1.66]
IPCA (T1)	6.29 (1.10)	< 0.001**	[4.15, 8.44]

Note. *$p < .05$, **$p < .01$. For race covariate, Black/African American is included as the reference group

correlated, and both were significantly negatively correlated with relationship satisfaction.

T1 IPCA Perpetration

A moderation analysis was conducted to assess the effects of problem drinking, relationship satisfaction, and their interaction on IPCA perpetration ($R^2 = 0.23$). As shown in Table 3, results indicated that the interaction between problem alcohol use and relationship satisfaction was statistically significant ($p < .001$) and therefore this relationship was probed at low, average, and high levels of relationship satisfaction. Problem alcohol use was significantly associated with more frequent IPCA perpetration when relationship satisfaction was low (3.29 [16th percentile]; $B = 0.03$, $SE = 0.003$, $p < .001$, 95% CI [0.02, 0.03]) and average (4.14 [50th percentile]; $B = 0.02$, $SE = 0.003$, $p < .001$, 95% CI [0.01, 0.02]); however, it was not associated with IPCA perpetration frequency was relationship satisfaction was high (5.00 [84th percentile]; $B = 0.01$, $SE = 0.005$, $p = .153$, 95% CI [-0.002, 0.02]). Moderation analysis results are depicted in Fig. 1. Results of a Johnson-Neyman significance region analysis indicate that the association between problem drinking and IPCA perpetration is positive and significant when relationship satisfaction is below 4.85 (78.96% of sample), and is not significant when relationship satisfaction exceeds this value (21.04% of sample). In order to investigate the potential influence of covariates, this analysis was also conducted without covariates. Results were maintained through this analysis and, therefore, only the model with covariates is presented.

Drinking During IPCA

We explored the frequency of alcohol use during IPCA incidents among individuals who endorsed any IPCA perpetration. For these analyses, 198 participants (of the $n = 226$ who reported any IPCA perpetration) had complete data: 20.2% ($n = 40$) indicated that they had ever used alcohol during IPCA, and 79.8% ($n = 158$) indicated that they had not used alcohol during IPCA. However, we are unable to determine whether drinking occurred during a specific incident if participants reported multiple. Participants who reported any alcohol use during IPCA perpetrated IPCA more frequently ($M = 0.59$, $SD = 0.48$) compared to those who did not use alcohol during IPCA ($M = 0.31$, $SD = 0.35$), $F(1,197) = 17.77$, $p < .001$. They also reported significantly more problem drinking in general ($M = 11.78$, $SD = 7.53$) compared to those who did not use alcohol during IPCA ($M = 3.87$, $SD = 4.78$), $F(1,197) = 67.53$, $p < .001$. However, there were no significant differences in relationship satisfaction between individuals who reported using alcohol during IPCA behaviors ($M = 3.78$, $SD = 0.69$) and those who did not report alcohol use during an IPCA behaviors ($M = 3.83$, $SD = 0.88$), $F(1,197) = 0.15$, $p = .700$.

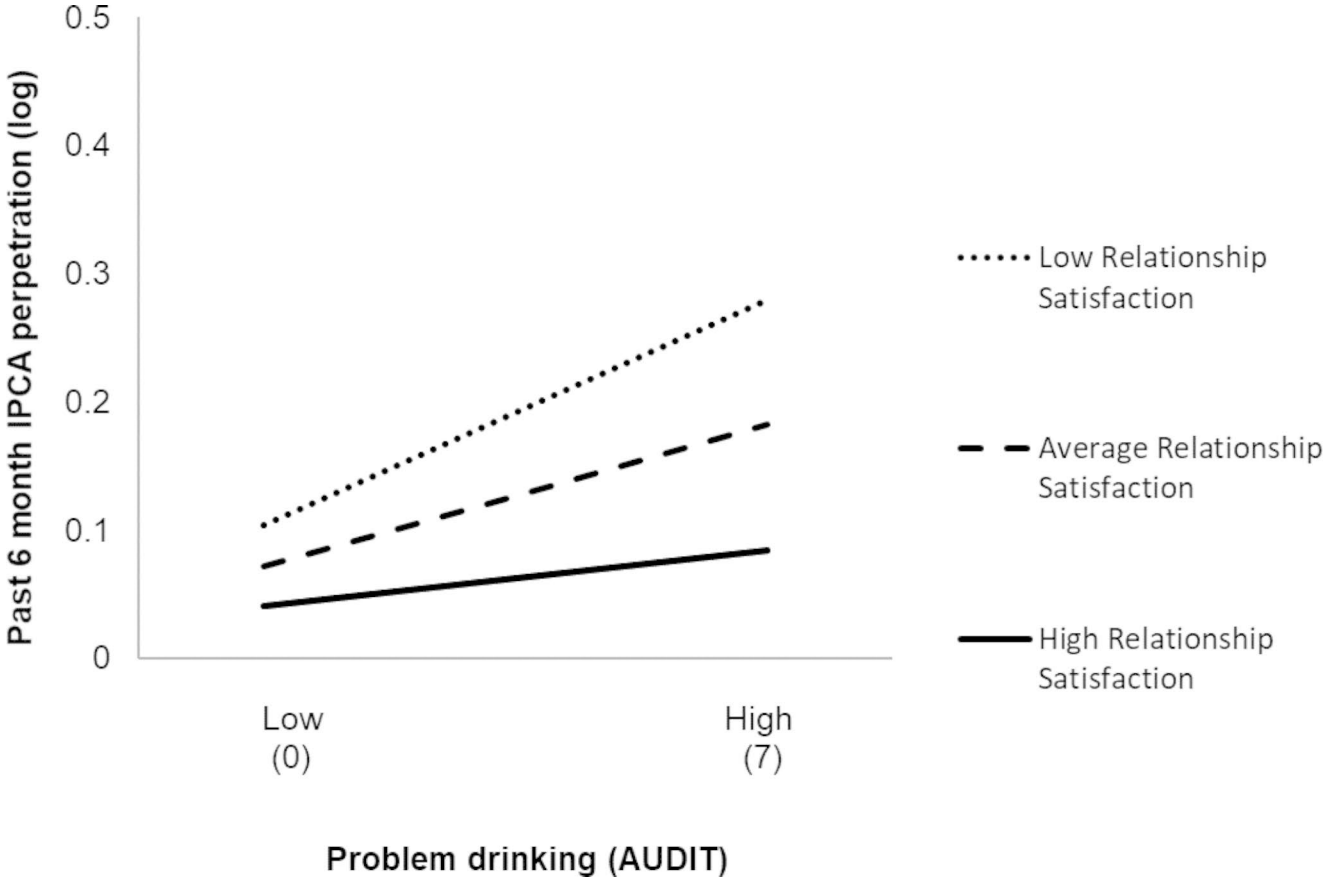

Fig. 1 Problem drinking X relationship satisfaction predicting past 6-month IPCA perpetration. Low relationship satisfaction = 16th percentile (3.29); average = 50th percentile (4.14); high = 84th percentile (5.00)

As a supplemental analysis, we sought to understand whether problem drinking was associated with IPCA perpetration even among individuals who reported that they never used alcohol during IPCA. Results indicated that, among the 158 participants who reported no alcohol use during IPCA, problem drinking remained significantly associated with IPCA perpetration, $B = 0.027$, $SE = 0.01$, $p < .001$, $R^2 = 0.135$.

T2 IPCA Perpetration

Finally, we investigated whether problem drinking, relationship satisfaction, and their interaction predicted IPCA perpetration (yes vs. no) at T2 ($R^2_{\text{McFadden}} = 0.25$; $R^2_{\text{CoxandSnell}} = 0.27$; $R^2_{\text{Nagelkerke}} = 0.38$). This analysis included all of the same covariates as the T1 model, as well as T1 IPCA perpetration (see Table 3). Results indicate a negative association between relationship satisfaction and IPCA perpetration ($p = .028$), but no effect of problem drinking ($p = .799$). Further, their interaction was not significant ($p = .666$). T1 IPCA perpetration was found to be positively associated with T2 IPCA perpetration ($p < .001$).

Discussion

The purpose of the current study was to assess the relationships between problem alcohol use, relationship satisfaction, and IPCA perpetration. We found support for the hypothesis that problem drinking is associated with IPCA perpetration (at T1 but not T2), and partial support for the hypothesis that this association would be moderated by relationship satisfaction, in that the relationship between problem drinking and IPCA was attenuated in cross-sectional (i.e., T1) but not longitudinal (i.e., T2) analyses. First, at the bivariate level, we found that problem drinking at T1 was associated with IPCA perpetration at T1 (total and each of the five subscales), but not IPCA perpetration at T2. Further alcohol use at T2 was associated with IPCA perpetration at both T1 and T2. Drinking during at least one IPCA incident was reported by 20.2% of the sample, and these individuals reported more problem drinking and more frequent IPCA perpetration compared to those who reported IPCA without drinking. Findings are consistent with a large body of research suggesting that problem drinking is associated with

a broad range of forms of violence targeting intimate partners (Foran & O'Leary, 2008; Stith et al., 2004).

Regarding the influence of relationship satisfaction, results suggest that higher satisfaction is associated with lower IPCA at both T1 and T2. Consistent with our hypothesis, relationship satisfaction moderated the association between problem drinking and IPCA perpetration at T1, indicating that when relationship satisfaction was high, there was no association between problem drinking and IPCA perpetration. However, contrary to what we expected, the interaction between problem drinking and relationship satisfaction predicting IPCA perpetration at T2 was not significant. Given limitations of the data including only surveying a subsample of T1 participants at T2 and low IPCA prevalence at T2, future studies should aim to evaluate these research questions with larger samples and across longer periods of time. It is also worth noting that relationship satisfaction was very high on average in this sample, so more nuanced approaches are needed to better understand the specific relationship processes that promote and prevent IPCA perpetration are needed. In particular, these types of investigations would provide more insight into who would most benefit from programs that bolster relationship functioning as well as the types of interventions that would have clinical utility.

Findings indicated that about 42% of respondents had engaged in any IPCA perpetration within the previous 6-months at T1, while 32% had engaged in any IPCA perpetration within the previous month at T2. This indicates that IPCA perpetration is a common behavior, which is in line with previous literature (see Taylor & Xia, 2018). This finding is also important given the known impacts of IPCA on victims' well-being (Fernet et al., 2019).

Strengths, Limitations, and Future Directions

There are several notable strengths of this study. First, existing research on the link between alcohol use and IPCA perpetration is cross-sectional, so the longitudinal design of this study is an important extension by allowing us to evaluate temporal associations. However, we were only able to follow up at T2 with approximately half of the sample due to budgetary limitations which resulted in an overreliance on the cross-sectional data and tempers our ability to make definitive conclusions regarding temporal relationships. Although participants who did vs. did not participate at T2 did not significantly differ on the key study variables, it is important to design high-powered longitudinal studies moving forward that allow researchers to assess longitudinal associations across longer periods of time. The investigation of these variables using daily diary studies or ecological momentary assessment (EMA) methods may also provide valuable insight into the temporal order of the occurrence of problem drinking, relationship satisfaction, and IPCA perpetration. These designs would also alleviate the limitations involved with retrospective accounts of events. It is also likely that relationship satisfaction at T1 was partially influenced by previous IPCA and problem drinking; accordingly, it is important to evaluate these potentially reciprocal associations in future studies.

Another strength of this study was the consideration of participants' alcohol use in multiple ways. First, we evaluated associations between problem drinking and IPCA perpetration both at baseline and one month later. Second, we explored the extent to which participants reported drinking alcohol *during* IPCA incidents. We also considered a broad range of IPCA types (e.g., sexual, financial, monitoring abuse), demonstrating that problem drinking was associated with all forms of IPCA perpetration. A large proportion of studies on alcohol-involved violence focuses more narrowly on sexual assault and offline IPV (Lorenz & Ullman, 2016), so it is important to show that these associations extend to other forms of IPCA as well.

Given the broad assessment of IPCA in the current study, we are unable to determine during which types of IPCA behaviors individuals are more likely to use alcohol in the moment. Future IPCA studies that have a more nuanced assessment of drinking in the moment is an important research direction. In particular, given that a minority of participants who reported IPCA perpetration indicated alcohol use in the moment, it is possible that the proximal influence of alcohol is more limited for IPCA compared to other forms of IPV. A related limitation was the use of a modified IPCA measure, which was initially validated to assess victimization but was adapted to assess perpetration. Given that IPCA prevalence rates vary so greatly across studies in part due to different measures used (Caridade et al., 2019; Taylor & Xia, 2018), it is important that researchers think intentionally about the assessment of IPCA to ensure appropriate comparisons can be made across studies. In addition, the effects of problem drinking patterns on IPCA may reflect several other processes such as externalizing behavioral tendencies or stress reactions, such that more research that considers both the proximal and distal effects of alcohol use on IPCA perpetration is needed (Chan et al., 2008; Egerton et al., 2020; Keyes et al., 2012).

It is also important to acknowledge that data were collected during the COVID-19 pandemic (October through December 2020). Studies have shown that both alcohol use (Barbosa et al., 2021; Pollard et al., 2020) and IPV (Kaukinen, 2020) have increased since COVID-19 began in the United States. Given the implementation of social distancing guidelines as well as the shift in-person interactions and

events to virtual environments, acts of violence that occur in cyberspace are of particular importance to investigate.

The sample recruited for this study was diverse in terms of age, relationship type, gender, sexual orientation, and geographic location. Although many studies focused on IPCA sample young adults, particularly college students, we evaluated IPCA and its predictors among adults between the ages of 18–50 years, demonstrating that these behaviors are also prevalent in middle adulthood. We included participants in any type of intimate relationship, which builds upon existing IPCA research which largely focuses on dating relationships. It should be noted that relationship satisfaction was also high, on average, in this sample. Although relationship satisfaction seems to serve as a protective factor in the current study, more research is still needed to how this translates to specific relationship behaviors. We further had a more inclusive sample by not restricting on the bases of gender identity or sexual orientation; however, by not specifically oversampling gender and sexual minorities, we are unable to make meaningful comparisons across groups or draw conclusions specific to these groups. We did not find gender differences in IPCA perpetration in this study, consistent with some other studies on IPCA (e.g., Borrajo, Gámez-Guadix, Pereda, et al., 2015a; Caridade et al., 2019; Taylor & Xia, 2018). However, some studies on both IPCA (Deans & Bhogal, 2019) and other forms of IPV more broadly (e.g., Foran & O'Leary) have identified significant gender differences; therefore, more research specifically aimed at understanding the role of gender are needed. Finally, the majority of the sample was white which limits generalizability of conclusions. Future studies are needed that purposefully recruit minoritized groups to the unique risk and protective factors for different demographic identities.

Implications and Conclusions

This study provides an important preliminary step to understanding the unique associations between problem drinking, relationship satisfaction, and IPCA perpetration. Results of this study suggest that both problem alcohol use and relationship satisfaction should be included as potential predictive variables of IPCA, and merit attention in future studies. Since our findings indicate that high relationship satisfaction buffers the interaction between alcohol use and IPCA, web-based relationship satisfaction programs may be appropriate to reduce the occurrence of IPCA and could be integrated into existing IPV prevention strategies (Roddy et al., 2018) to promote healthier, safer, and more satisfying intimate relationships. Given our finding that individuals who reported more problem alcohol use also reported more frequent IPCA, alcohol interventions that target reductions in alcohol quantity and frequency could help to reduce the occurrence of IPCA, as the concurrent treatment of IPV and problem alcohol use has demonstrated promise (Tarzia et al., 2020).

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

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