

Drinking Motives and Drinking Behaviors in Romantic Couples: A Longitudinal Actor-Partner Interdependence Model

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Excessive alcohol consumption is related to adverse physical and social consequences. Research shows an individual's own drinking motives (reasons for drinking alcohol) are linked to his or her specific drinking outcomes in a theoretically expected manner. Romantic couples often engage in a "drinking partnership," where partners reciprocally influence each other's drinking. Though alcohol consumption partner effects have been studied, partner effects of drinking motives on an individual's alcohol consumption have not been investigated in romantic couples. We investigated this topic. Romantic couples ($N = 203$) were assessed once weekly for four weeks using self-report questionnaires. Participants were on average 22.7 years old ($SD = 5.5$) and were in their relationship an average of 2.3 years ($SD = 2.4$). Actor-partner interdependence models using multilevel path-analysis with indistinguishable dyads were conducted, with each motive predicting drinking quantity and frequency. There were significant actor effects for social and enhancement motives; moreover, changes in a partner's enhancement and social motives predicted change in the individual's drinking quantity during any given week, but only averaged partners' enhancement motives predicted the individual's drinking frequency. Coping-with-anxiety motives had significant actor effects when predicting averaged quantity and frequency; moreover, changes in partners' coping-with-anxiety motives predicted changes in drinking quantity. Enhancement and social motives of the partner influenced the drinking quantity and frequency of the actor by way of influencing the actor's enhancement and social motives. Intervention efforts targeting both members of a romantic dyad on their reasons for drinking should be tested for preventing escalations in either member's drinking behavior.

Keywords: alcohol use, romantic couples, drinking motives, social learning theory, longitudinal

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Risky alcohol use is common among emerging adults, with 35% of Canadian university students reporting that they binge drink (i.e., consume five or more alcoholic drinks in a 2-hr period; American College Health Association, 2016). Emerging adults also report high levels of alcohol-related problems, such as mem-

ory loss (25.4%) and drinking and driving (3.8%; Adlaf, Demers, & Gliksman, 2005). Both individual and social factors, such as drinking motivations (Cooper, 1994) and partner influences in romantic relationships (Roberts & Leonard, 1998), contribute to heavy drinking. Drinking motives theory suggests individuals

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drink to achieve desired outcomes, and that each motive predicts a different pattern of alcohol use and alcohol-related problems (Cooper, 1994). Though much research has linked individuals' drinking motives to their own alcohol use (Cooper, Kuntsche, Levitt, Barber, & Wolf, 2015), few studies have examined drinking motives and alcohol use within a social context (cf., Homish & Leonard, 2007). In the present study, we examined the impact of romantic partners' drinking motives on an individual's alcohol use. Specifically, do romantic partners influence each other's drinking behaviors via their drinking motivations?

Partner Influence in Romantic Couples

Individuals are constantly observing the behaviors of others around them, and often witness behaviors in others that are rewarded or punished (Bandura, 1971). Consequently, people do not need to directly experience the consequences of a behavior to learn that it is reinforcing, we simply need to witness it being reinforced in others. In this way, observational learning can extinguish potentially punishing behavior, and promote internalization of potentially rewarding behavior (Bandura, 1977). Social learning theory suggests that behavior is regulated not only by personally experienced consequences but also through vicarious reinforcement; when we observe the motivations and behaviors of others being reinforced, we adopt those same motivations and behaviors into our own repertoire (Akers, 1985; Bandura, 1977). While we do not directly observe the motivations of others, we observe the antecedents and consequences of certain behaviors and infer the individual's motivation through these observable events. Such socialization processes operate within many different dyadic relationships, including romantic partnerships.

Socialization of a variety of behaviors occurs within romantic relationships (Bove, Sobal, & Rauschenbach, 2003; Gonzaga, Campos, & Bradbury, 2007). For example, couples influence each other's emotional responses over time (Anderson, Keltner, & John, 2003). Further, some research shows couples become similar in their personality traits (Gonzaga et al., 2007) and food preferences (Bove et al., 2003) over time. There is also strong correspondence between romantic partners' health behaviors, including physical activity, smoking, and drinking (Wilson, 2002). Moreover, changes in one partner's health behavior (such as diet or smoking) appear to influence the other partner's health behavior (Lewis et al., 2006; Sexton et al., 1987). From this body of research, it appears that couples influence each other's behavior in a variety of ways, and the more time members of a couple spend with each other, the more likely they are to adopt their partner's reinforced behaviors (Gonzaga et al., 2007).

Social conformity pressures are also robust predictors of behavior in young adults. Social impact theory suggests the more important an individual is to us, the more likely we will conform to their normative social influence (i.e., conforming to be liked and accepted by the other person; Latané, 1981). The importance of interpersonal relationships, especially romantic relationships, during emerging adulthood has been noted in many developmental studies (e.g., Steinberg & Monahan, 2007). Further, compatibility theorists argue that dissimilar partners are at risk for marital/relationship problems (Kurdek, 1991). In fact, considerable evidence suggests similarity is associated with relationship satisfaction. For example, Gaunt (2006) found greater similarity in

personality and value domains among couples was associated with greater marital satisfaction and lower negative affect. Further, Weisfeld, Russell, Weisfeld, and Wells (1992) found that couples who were more similar across a variety of domains (e.g., education, health, attractiveness) reported significantly higher levels of marital satisfaction. Thus, partners may change their behavior to maintain and improve their relationship with their partner.

Drinking Motives Theory

Motivational models of drinking (e.g., Cox & Klinger, 1988) posit individuals drink to achieve desired outcomes, and these valued outcomes motivate them to drink. These motivations can be described in terms of their valence (i.e., positively vs. negatively reinforcing), and their source (i.e., internal vs. external rewards). Crossing these two dimensions (valence and source) led to Cooper's (1994) four-factor model of drinking motives which includes: social (positive and external; drinking to increase social affiliation), conformity (negative and external; drinking to reduce/avoid social rejection), enhancement (positive and internal; drinking to increase pleasurable emotions), and coping (negative and internal; drinking to reduce/avoid negative affect; see also Cooper et al., 2015). Cooper's (1994) four-factor model of drinking motives was later modified to split the generic coping motive into distinct coping-with-depression and coping-with-anxiety factors (Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007). Research has shown these two coping motives are factorially distinct and have distinct drinking outcome correlates (Grant et al., 2007; Grant, Stewart, & Mohr, 2009).

Some drinking motives are riskier than others in terms of their associations with alcohol outcomes. For example, enhancement motives are the most stable predictors of heavy alcohol consumption (Cooper et al., 2015; Cooper, 1994). Further, coping-with-depression and coping-with-anxiety motives are significant predictors of alcohol-related problems, but only coping-with anxiety motives directly predict alcohol-related problems after accounting for alcohol consumption levels (Grant et al., 2007). In contrast, when controlling other motives, social motives are modestly associated with drinking quantity and frequency but are unrelated to binge drinking and alcohol-related problems (Kuntsche, Knibbe, Gmel, & Engels, 2005). Conformity motives are often negatively associated with drinking quantity and frequency yet positively related to alcohol-related problems (Cooper et al., 2015).

People are likely influenced by their romantic partners' drinking motives through a socialization process. Specifically, individuals may witness their partner being reinforced by drinking for a certain motivation, leading them to drink themselves to achieve that same rewarding outcome. For example, influence may result from partners teaching each other to drink to manage negative emotions (promoting coping motives), to affiliate with others (promoting social motives), or to enjoy the euphoric effects of alcohol (promoting enhancement motives). While it is likely that one's drinking motives can influence another's drinking motives and behavior through social learning, social influences on drinking motives are rarely studied. Given that drinking motives are hypothesized to be a proximal influence on drinking behavior, and the avenue through which other more distal factors (such as personality or social influences) predict alcohol consumption (Cooper, 1994; Kuntsche,

von Fischer, & Gmel, 2008), it is important to test whether one person's motives can influence other's risky drinking behaviors.

Partner Influence and Alcohol Consumption

Social conformity pressures are robust predictors of alcohol use and misuse (Fairlie, Wood, & Laird, 2012). For instance, interpersonal influence from peers is a strong predictor of alcohol consumption in university students (Wood, Read, Palfai, & Stevenson, 2001). The partner influence hypothesis suggests partners in romantic relationships influence one another's alcohol consumption (Mushquash et al., 2013). This can create a "drinking partnership," where partners influence each other's drinking in a reciprocal manner (Roberts & Leonard, 1998). Supporting this notion, Leonard and Das Eiden (1999) found husbands' drinking influenced their wives' drinking over the first year of marriage. Husbands and wives also reciprocally influenced each other's drinking over a 5-year period (Windle & Windle, 2014). Mushquash et al. (2013) found partner heavy episodic drinking significantly predicted future individual heavy episodic drinking over a 30-day period in dating couples. This finding has since been replicated over a 3-year period, with dating couples positively influencing each other's drinking over time (Bartel et al., 2017). Congruence of drinking patterns between partners is associated with relationship satisfaction (Homish & Leonard, 2007). Thus, drinking partnerships may sometimes be beneficial to relationship functioning (e.g., Linden-Carmichael, Lau-Barraco, & Kelley, 2016).

While romantic partners seem to influence each other's drinking behaviors, it is unknown if a partner's drinking motives influence an individual's drinking behaviors. One study that examined drinking motives within heterosexual couples showed that coping-depression motives mediate the relationship between dyadic conflict and alcohol-related problems, but only for women (Lambe, Mackinnon, & Stewart, 2015). Kuntsche and Stewart (2009) found that individual drinking motives (enhancement, conformity, coping, and social) were positively predicted by classmate motives in a sample of 12- to 18-year-olds students, demonstrating drinking motives can be transmitted via peer social influence. Further work suggests that drinking motives of one's own peer-group can influence an adolescent's own drinking levels by way of impacting the adolescent's own drinking motives (Stewart, Castellanos-Ryan, Vitaro, & Conrod, 2014). Kuntsche and Stewart (2009) similarly demonstrated that the drinking motives of classroom peers could influence the drinking behavior of an individual adolescent via influence on the individual adolescent's own drinking motives. Furthermore, a study by Hussong (2003) used a 28-day daily diary methodology in college student friendship dyads to show college students' own alcohol use levels were influenced by their own drinking motives and by the drinking motives of their best friends. While the evidence is limited, it appears a valued other person's drinking motives can influence an individual to drink through a socialization process. However, no one has yet investigated this process in romantic couples.

Rationale and Hypotheses

We investigated if romantic couples can influence each other's drinking behaviors via their drinking motivations. Given how influential romantic relationships are in young adulthood (Stein-

berg & Monahan, 2007), it is important to test if the motivations of one partner can cause changes in the drinking behavior of another partner. There has been no study to our knowledge that has investigated this important process. Investigating drinking motives within a social context also represents a significant advance to drinking motives theory; prior tests have tended to focus exclusively on the individual, ignoring the role of close relationships. If romantic couples can influence each other's drinking behavior via influencing drinking motivations, drinking motives in couples could be an important target for intervention to prevent escalations in drinking over time in either member of the couple. Moreover, if a romantic partner influences an individual's drinking behaviors via partner drinking motives, we wanted to investigate whether said influence occurs indirectly via changes in the individual's drinking motives given similar findings in adolescent peer groups (Kuntsche & Stewart, 2009). Such a result would provide a mechanism through which partners effect change in individual drinking behaviors.

We utilized a four-wave, 4-week longitudinal design and the actor-partner interdependence model (APIM; Cook & Kenny, 2005). Our study involved weekly measurement intervals in order to minimize recall bias and maximize reliability through repeatedly assessing events. Data collected over shorter intervals may also better capture short-term transactions between participants and their social environments. The APIM accounts for interdependence in dyadic relationships and assesses both actor effects and partner effects. Actor effects refer to the influence one's own characteristics have on one's own behavior; partner effects refer to the influence the partner's characteristics have on the behavior of the other individual in the relationship. By controlling for individual stability, a longitudinal APIM provides a stringent test of whether partners influence each other over time. The drinking behaviors of interest in the present study were the total number of drinks consumed per week divided by the number of drinking occasions (quantity) and number of days spent drinking per week (frequency). Given that enhancement and social motives are the strongest predictors of drinking behavior in nonclinical samples (Cooper et al., 2015), we hypothesized these two motives would predict drinking behavior in romantic partners. The specific hypotheses for our study were as follows:

H1: An individual's enhancement and social drinking motivations would positively predict their own alcohol consumption quantity and frequency (i.e., actor effects).

H2: A partner's enhancement and social drinking motivations would positively predict the alcohol consumption quantity and frequency of the individual (i.e., partner effects).

H3: Partner enhancement and social drinking motivations would have an indirect effect on the individual's alcohol consumption quantity and frequency by way of influencing the individual's enhancement and social drinking motivations, respectively.

H4: The predictions proposed in H1, H2 and H3 would hold at the within-subjects level (i.e., change within any given week) and the between-subjects level (averaged across all our weeks).

Cooper et al.'s (2015) meta-analysis also suggests coping and conformity motives positively predict alcohol quantity and frequency. However, the effect sizes tend to be small relative to enhancement and social motives. Thus, our predictions for these motives were more tentative, and are framed as a general exploratory research question:

RQ1: Do coping-anxiety, coping-depression, and/or conformity motives have positive actor and/or partner effects when predicting alcohol consumption quantity and frequency?

Method

Participants

Our study received research ethics board approval. Romantic couples were recruited in two separate samples ($N_1 = 101$; $N_2 = 102$ couples) from the community and via the psychology research pool.¹ Data were combined from both samples for analyses. The combined sample consisted of 203 couples (187 [92%] heterosexual, 14 [7%] same-sex female and 2 [1%] same-sex male). Participants' mean age at baseline was 22.6 ($SD = 5.5$) years, and most were students (59.2%) and Caucasian (83.5%). Further, 51.7% were cohabiting and 8.4% were married. Couples were in their relationship for an average of 2.3 years ($SD = 2.4$) and couple members had frequent face-to-face contact with their partner ($M = 6.2$, $SD = 1.4$ days per week).

Measures

Modified Drinking Motives Questionnaire-Revised (Modified DMQ-R). Drinking motives were measured using the Modified DMQ-R, 7-day version (Lambe et al., 2015), a 28-item, self-report measure that assesses participants' scores on five subscales, each related to a specific drinking motive: coping-with-anxiety ("To reduce my anxiety"), coping-with-depression ("To numb my pain"), enhancement ("To get a high"), conformity ("To be liked") and social ("To be sociable"). Participants rated how much the specific item related to their reasons for drinking over the past 7 days on a relative frequency scale ranging from 1 (*almost never/never*) to 5 (*almost always/always*). The Modified DMQ-R, 7-day version, has shown adequate to excellent internal consistency across subscales ($\alpha = .72$ to $.91$; Lambe et al., 2015) and correlates strongly with the original Modified DMQ-R (r s from $.69$ to $.77$; Lambe et al., 2015).

Self-Administered Timeline Follow-Back (STLFB). Drinking quantity and frequency were measured using the STLFB (Collins, Kashdan, Koutsky, Morsheimer, & Vetter, 2008), a self-report measure, in calendar form, used to track alcohol intake over the past 7 days. Participants were asked to indicate on a calendar the days they drank and how many standard alcoholic beverages they had that day. Self-report accuracy is typically improved by utilizing a calendar as a memory anchor (Collins et al., 2008). STLFB data was used to calculate quantity of drinks consumed (i.e., the sum of drinks consumed per week divided by the number of drinking days) and frequency of drinking days (i.e., the number of drinking days per week). A single drink was defined as 5-ounces of wine, 12-ounces of beer or cooler, or a drink containing one shot of liquor or spirits for the STLFB. Visual

aids representing standard drinks were also provided as well as descriptions of the number of standard drinks found within various bottles of alcohol (Kerr & Stockwell, 2012). The STLFB converges with other measures of alcohol use (Collins et al., 2008).

Procedure

Sample 1 was recruited from the community via posters, online ads, and the psychology research participant pool. Couples were only recruited if they were (a) in a current romantic relationship and (b) each partner drank at least 12 alcoholic drinks in the past year. These criteria were used to ensure all couples were engaging in drinking behavior and were actively in a relationship. Couples completed baseline pen-and-paper questionnaires in the lab on the same day. All alcohol questionnaires asked about the past seven days. Participants were scheduled to return to the lab to complete the same questionnaires once a week for an additional three weeks. Each appointment was scheduled seven days apart. If couples missed their appointment, researchers attempted to schedule a make-up survey as close as possible to the original appointment date. Participants were given six days to complete a make-up survey at any given wave. Thus, all surveys were completed at minimum 7 days apart and at maximum 13 days apart. Follow-up appointments were then rescheduled to seven days after the make-up survey was completed. Each participant was compensated either \$5.00 or one credit point in an eligible psychology class for each wave completed and was debriefed following the final session.

Sample 2 was recruited in a similar manner as Sample 1. Couples were recruited with the same inclusion criteria as Sample 1, with the addition that each couple had to have Internet access at home. Questionnaires were completed online using Opinio 7.1.2 (ObjectPlanet, Inc., 1998) software and couples only came into the lab to complete the baseline questionnaire. All further follow-ups were completed at home using participants' personal computers. Participants were sent a secure link to their survey in an e-mail that contained their individual identification code. The link to the survey only remained open for a 24-hr period. If the participant missed the survey, a make-up survey was sent via a link that also expired 24-hr later. These make-up surveys were sent out every day for up to six days after the original survey was sent. After six days passed, that wave was considered missed. If a participant filled-out a make-up survey, the instructions were modified so that the measures referred to the originally scheduled 7-day reporting period to ensure both couple members were always reporting on the same 7-day period. To encourage retention, participants in Sample 2 were also provided with an extra \$5.00 each if both members of the couple completed their surveys on the same scheduled day. All participants in Sample 2 were debriefed via e-mail and compensated with money or a gift certificate.

¹ Four research papers have been published utilizing this dataset. The first examined dyadic conflict, coping-with-depression drinking motives, and alcohol-related problems (Lambe et al., 2015). The second examined conflict, well-being, and perfectionism in couples (Mackinnon, Kehayes, Leonard, Fraser, & Stewart, 2017). The third examined similarity in couples' drinking motives and behavior (Kehayes, Mackinnon, Sherry, Leonard, & Stewart, 2017). The fourth utilized partner informant reports to examine alcohol-related problems and dyadic conflict in couples (Farrelly, Sherry, Kehayes, & Stewart, 2019).

Data Analytic Strategy

Compliance rates were assessed by analyzing the proportion of make-up surveys completed and by examining proportions of missing data. Intraclass correlations (ICCs) were also computed for each variable to determine whether multilevel modeling was warranted. ICCs indicate the percentage of variance available to be explained at the between-subjects level. ICCs larger than .05 are considered suitable for multilevel analysis (Preacher, Zyphur, & Zhang, 2010). Descriptive statistics and multilevel bivariate correlations were also calculated, including means, standard deviations, and internal consistencies. Within- and between-subjects internal consistencies were calculated using Cronbach's alpha (Geldhof, Preacher, & Zyphur, 2014).

Hypotheses were tested using APIMs (Kenny & Ledermann, 2010) in a multilevel path-analysis framework. APIMs are a dyadic data analytic approach used to test interdependence within interpersonal relationships. APIMs are comprised of both actor and partner effects. Actor effects measure how well one's own drinking motives predict one's own alcohol outcomes, whereas partner effects measure the extent to which a partner's drinking motives predict the actor's alcohol outcomes. Ten APIMs were modeled to test the effects of all five drinking motives on both alcohol outcomes (quantity, frequency). To account for the longitudinal aspect of the data, multilevel path-analysis with fixed slopes was used (Preacher et al., 2010). This method partitions variance into between-subjects and within-subject components. In the current study, the between-subjects level represents the portion of variance that did not change across four weeks (e.g., when averaged across four weeks, were drinking motives and alcohol outcomes related?). The within-subjects level represents change within any given week (e.g., did drinking motives and alcohol outcomes change in the same direction within any given week?). Models appear in Figure 1. A standardized root-mean-square residual (SRMR) < .08, a root-mean-square error of approximation (RMSEA) < .06, and a CFI and TLI > .95 indicate excellent model fit (Kline, 2011). To account for violations of the normality assumption, a robust estimator of fit indices and standard errors was used (MLR estimation). Missing data were handled using a full information maximum likelihood approach (Enders & Bandalos, 2001), which uses all available data to adjust parameters and standard errors to account for missing data. The 95% confidence intervals for indirect effects were assessed using the delta method in Mplus using the MODEL CONSTRAINT command (Muthén & Muthén, 2017).

Results

Missing Data and Compliance

Compliance rates were high across both samples; couples completed, on average, 3.70 ($SD = 0.76$) of a possible four waves, with 81.8% of participants completing all four waves. At wave 2, 76.6% completed their survey on the scheduled date, 12.6% completed a make-up survey, and 10.8% failed to complete their survey. At wave 3, 66.7% completed their survey on the scheduled date, 16.1% completed a make-up survey, and 17.2% failed to complete their survey. At wave 4, 69.0% completed their survey on the

scheduled date, 13.0% completed a make-up survey, and 18.0% failed to complete their survey. There were 7.45 days ($SD = 1.00$) on average between completed surveys. Missing data varied by wave. Skip logic was used such that participants did not complete the DMQ-R if they consumed zero drinks in a given week. Thus, drinking motives were always missing when participants abstained from alcohol in a given week. Because of this, data analysis incorporated only data from weeks where alcohol was consumed by at least one partner.² At wave 1, 17.5% of participants did not drink alcohol the previous week and thus did not have drinking motives to report. All participants completed wave 1 so there was no other missing data. At wave 2, 20.3% of participants did not drink alcohol the previous week and thus had no motives to report. Another 8.3% of data was lost due to noncompliance. At wave 3, 23.6% of participants did not drink alcohol the previous week and thus had no motives to report. Another 6.6% of data was lost due to noncompliance. At wave 4, 25.5% of participants did not drink alcohol the previous week and thus had no motives to report. Another 7.1% of data was lost due to noncompliance. Out of a potential 1,624 weeks of data (406 participants \times 4 weeks), 1,183 weeks had available data (i.e., participants responded to the survey and drank during the past week). A significant Little's MCAR test, $\chi^2(402) = 523.46, p < .001$, revealed the data were not missing completely at random. Closer examination of separate variance t tests revealed that missing data could be significantly predicted by age on all variables (i.e., older participants had more missing data). As a result, age was added as a covariate in all analyses. Thus, data were assumed to be missing at random (i.e., missing data could be predicted by variables within our models). Results did not change when controlling for lab versus online sample.³

Descriptives, Intraclass Correlations, and Bivariate Correlations

Means and standard deviations on all study measures were calculated from the combined sample and appear in Table 1. Drinking quantity ranged from 1 to 25 drinks and drinking frequency ranged from 1 to 7 drinking occasions per week. Within-subjects and between-subjects bivariate correlations⁴ appear in Table 2. Overall, most variables were correlated as expected. All

² Drinking outcomes for abstainers on any given week were coded as missing data, rather than zeros. Thus, when only one partner drank in a given week, their data was used to calculate actor effects (but not partner effects). When both partners drank in a given week, their data was used to calculate both actor and partner effects. When neither partner drank in a given week, they were excluded from the model. This maximized the use of all available data.

³ Analyses available upon request from the first author.

⁴ In Supplementary Table 3, we examined the bivariate correlations between residualized drinking motive scores and our outcome variables contrasted with our initial analysis. Residualizing the drinking motives created scores where the unique shared variance between all four motives was removed. We also created residualized variables excluding social motives as a predictor of enhancement motives and vice versa (e.g., residuals of a regression analysis with coping-anxiety, coping-depression, and conformity motives predicting social motives). The purpose of this analysis was to demonstrate that controlling for all other motives in this model is liable to create misleading results because the predictor variables themselves overlap considerably. Thus, we decided to use each drinking motive as an individual predictor without removing the shared variance of all other motives.

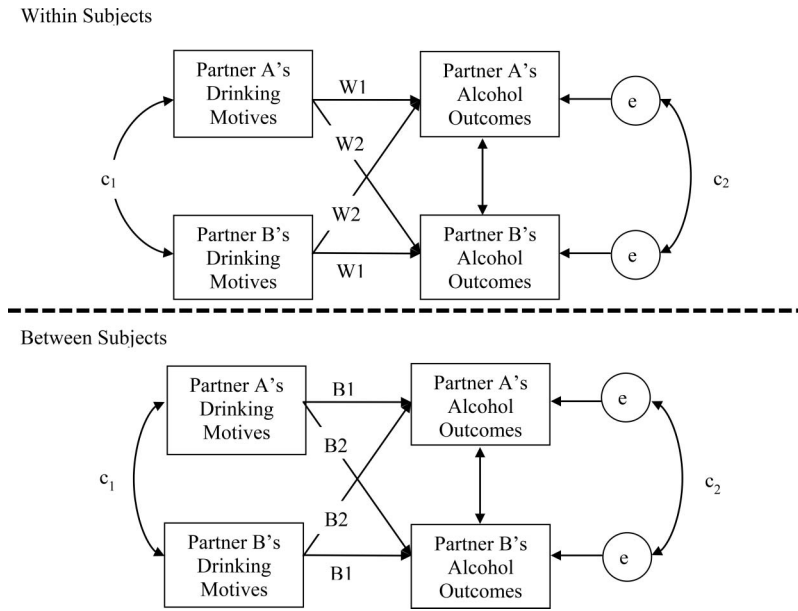


Figure 1. Multilevel APIM path diagram. Squares indicate observed variables, ovals indicate residual error. Single-headed arrows indicate paths, double-headed arrows indicate covariances. In multilevel path-analysis, the variance is partitioned into within-subjects and between-subjects components. Indistinguishable dyads were specified so paths were constrained to equality across partners; paths that share the same label (e.g., W2) were constrained to be equal. Actor effects are paths W1 and B1 whereas partner effects are paths W2 and B2. Ten models were tested in our study by using five separate drinking motive predictors (i.e., conformity, enhancement, coping-with-depression, coping-with-anxiety, and social) and two separate alcohol outcomes (i.e., total number of drinks consumed per week divided by the number of drinking days [quantity], and drinking occasions per week [frequency]).

five drinking motives were correlated with each other at the within- and between-subject levels. Drinking quantity was correlated with coping-anxiety motives at the between-subjects level and with enhancement and social motives at both levels. Drinking frequency was correlated with enhancement, coping-anxiety, and coping-depression motives at the between-subjects level and with social motives at the within-subjects level. Relationships tended to be larger at the between-subjects level. Internal consistencies at the between-subjects and within-subjects levels revealed alphas that ranged from .96 to 1.00 (between) and from .90 to .99 (within) suggesting excellent reliability. ICCs suggested that around 21% (drinking quantity) to 67% (enhancement motives) of the variance

was at the between-subjects level, supporting our decision to utilize multilevel modeling.

Multilevel Path-Analysis

Ten separate models were specified, with each of the five drinking motives individually predicting our two outcomes (i.e., drinking quantity and frequency; see Supplemental Figures 1 through 10 for a visual display of each analysis). These models are shown in Figure 1 and were analyzed using indistinguishable dyads which included both same-sex and heterosexual couples in the same analysis (see Supplemental Table 2 for distinguishable

Table 1
Descriptive Statistics

Variable	Wave 1 (N = 335)		Wave 2 (N = 291)		Wave 3 (N = 283)		Wave 4 (N = 274)	
	M	SD	M	SD	M	SD	M	SD
Coping with depression motives	1.34	.64	1.25	.57	1.22	.51	1.20	.54
Coping with anxiety motives	1.82	.82	1.70	.72	1.63	.69	1.67	.69
Enhancement motives	2.35	1.05	2.24	1.03	2.12	.99	2.08	1.02
Conformity motives	1.16	.40	1.14	.44	1.14	.41	1.11	.31
Social motives	2.54	1.00	2.38	1.01	2.30	1.02	2.16	1.03
Drinking quantity	4.04	2.82	4.35	3.14	4.02	2.98	4.07	3.00
Drinking frequency	2.57	1.40	2.51	1.60	2.57	1.53	2.43	1.57

Note. N = number of participants; M = mean; SD = standard deviation; Drinking quantity = total number of drinks consumed per week divided by the number of drinking days; Drinking frequency = drinking occasions per week.

Table 2
Bivariate Correlations, Intra-class Correlations, and Reliability at Between- and Within-Subject Levels

Variable	1	2	3	4	5	6	7
1. Coping with depression motives	—	.38***	.29***	.27***	.11*	-.03	.06
2. Coping with anxiety motives	.67***	—	.41***	.19**	.23***	.00	.05
3. Enhancement motives	.38***	.63***	—	.17**	.39***	.12***	.06
4. Conformity motives	.36**	.39***	.25***	—	.20***	.02	.04
5. Social motives	.32***	.57***	.69***	.43***	—	.14*	.10**
6. Drinking quantity	.16	.23**	.45***	.11	.49***	—	-.08***
7. Drinking frequency	.21*	.24**	.27***	-.03	.12	.07	—
ICC	.60	.62	.67	.50	.50	.21	.47
Alpha reliability (within-subjects)	.987	.899	.921	.987	.895	—	—
Alpha reliability (between-subjects)	.997	.959	.957	.996	.957	—	—

Note. Between-subject correlations are below the diagonal, and within-subjects correlations are above the diagonal. ICC = intraclass correlation; Drinking quantity = total number of drinks consumed per week divided by the number of drinking days; Drinking frequency = drinking occasions per week. * $p < .05$. ** $p < .01$. *** $p < .001$.

dyad model results with same-sex couples removed). All fit indices, with the exception of the chi-squared (χ^2) goodness of fit test, suggested the models fit the data well (see Table 4 for fit statistics). Unstandardized path coefficients and covariances for all models can be found in Table 3. Only statistically significant findings for actor and partner effects at $p < .05$ are noted below.

Enhancement motives were associated with significantly greater drinking frequency among actors at the within- and between-subjects levels (i.e., an increase in 1.0 on the enhancement motives scale predicted a 0.12 unit increase in drinking frequency among actors at the within-subjects level and a 0.30 unit increase in actors at the between-subjects level), but were only associated with

Table 3
Multilevel Actor-Partner Interdependence Model Coefficients

	Actor effects		Partner effects		Covariance: Predictor		Covariance: Outcome	
	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p
Outcome: Frequency								
Within subjects								
CAM	.09 (.08)	.233	.06 (.09)	.491	.03 (.02)	.064	.56 (.09)	<.001
CDM	.16 (.09)	.065	.09 (.11)	.387	.02 (.01)	.054	.56 (.09)	<.001
Enhancement	.12 (.06)	.048	.02 (.06)	.805	.05 (.02)	.031	.56 (.09)	<.001
Social	.14 (.05)	.003	.00 (.05)	.958	.10 (.03)	.001	.56 (.09)	<.001
Conformity	.13 (.14)	.334	.27 (.15)	.071	.01 (.01)	.253	.55 (.09)	<.001
Between subjects								
CAM	.31 (.12)	.009	.07 (.11)	.524	.08 (.04)	.079	.57 (.11)	<.001
CDM	.46 (.17)	.007	.07 (.16)	.665	.04 (.03)	.091	.57 (.10)	<.001
Enhancement	.30 (.07)	<.001	.14 (.07)	.041	.24 (.07)	.001	.51 (.10)	<.001
Social	.20 (.10)	.054	.09 (.10)	.373	.30 (.06)	<.001	.57 (.11)	<.001
Conformity	.09 (.23)	.714	.06 (.22)	.771	.03 (.02)	.076	.59 (.12)	<.001
Outcome: Quantity								
Within subjects								
CAM	-.03 (.21)	.895	.03 (.18)	.873	.03 (.02)	.063	1.33 (.61)	.030
CDM	-.13 (.31)	.663	.22 (.29)	.456	.02 (.01)	.053	1.35 (.58)	.019
Enhancement	.70 (.15)	<.001	.60 (.16)	<.001	.05 (.02)	.031	1.12 (.54)	.037
Social	.72 (.14)	<.001	.29 (.11)	.007	.10 (.03)	.001	1.26 (.44)	.004
Conformity	.48 (.33)	.143	.42 (.24)	.083	.01 (.01)	.267	1.30 (.61)	.034
Between subjects								
CAM	.66 (.24)	.006	.64 (.30)	.036	.08 (.04)	.077	2.62 (.54)	<.001
CDM	.65 (.47)	.174	.62 (.33)	.057	.04 (.03)	.107	2.83 (.51)	<.001
Enhancement	.83 (.16)	<.001	.63 (.21)	.002	.24 (.07)	.001	2.00 (.53)	<.001
Social	1.02 (.27)	<.001	.55 (.22)	.011	.29 (.06)	<.001	2.01 (.50)	<.001
Conformity	.16 (.65)	.811	1.10 (.69)	.107	.03 (.02)	.083	2.89 (.58)	<.001

Note. Models were specified as in Figure 1 in two separate runs, where the dependent variable was specified as either drinking occasions per week (frequency) or total number of drinks consumed per week divided by the number of drinking days (quantity). Age was specified as a covariate at the between-subjects level in all models. Unstandardized path coefficients are reported as they are more comparable across samples than standardized estimates. CAM = coping-anxiety motives; CDM = coping-depression motives; Enhancement = enhancement motives; Social = social motives; Conformity = conformity motives. Bolded coefficients are significant at $p < .05$.

Table 4
Multilevel Actor-Partner Interdependence Model Fit Statistics

Variable	χ^2	CFI	TLI	SRMR _{within}	SRMR _{between}	RMSEA
Outcome: Frequency						
CAM	618.97	1.00	1.00	.01	.02	.04
CDM	612.36	.99	.98	.01	.03	.03
Enhancement	710.57	1.00	.99	.01	.03	.02
Social	762.65	1.00	1.00	.01	.02	.00
Conformity	581.44	1.00	1.00	.01	.02	.00
Outcome: Quantity						
CAM	240.63	.97	.90	.01	.08	.04
CDM	226.44	.97	.91	.02	.08	.03
Enhancement	268.26	.96	.87	.02	.08	.04
Social	278.00	.96	.84	.02	.08	.05
Conformity	232.08	.97	.91	.01	.09	.03

Note. Chi-squared (χ^2) goodness of fit $df = 21$ across models. Bolded χ^2 goodness of fit tests are significant at $p < .001$.

partner drinking frequency at the between-subjects level (i.e., an increase in 1.0 on the enhancement motives scale predicted a 0.14 unit increase in drinking frequency among partners at the between-subjects level). Enhancement motives were also associated with significantly greater drinking quantity among both actors and partners at the within- and between-subjects levels. Overall, effects for drinking quantity were stronger than effects for drinking frequency at both within- and between-subjects levels.

Social motives were associated with significantly greater drinking frequency in the actor at the within-subjects level. Consistent with hypotheses, social motives were also associated with significantly greater drinking quantity among both actors and partners at the within- and between-subject levels. Coping-anxiety motives were associated with significantly greater drinking frequency in the actor at the between-subjects level only. Coping-anxiety motives were also associated with significantly greater drinking quantity among both actors and partners at the between-subjects level. Coping-depression motives were only associated with greater drinking frequency in the actor at the between-subjects level. Finally, conformity motives were not associated with drinking in the actor or partner at either the between- or within-subjects levels.

Effect sizes. Estimates of standardized effect sizes for outcome variables (i.e., drinking frequency and quantity) were calculated using R^2 values at the between-subjects and within-subject levels. Because variances can differ across partners, R^2 values can vary slightly across partners despite the equality constraints placed on the model for indistinguishable dyads (Kline, 2011). As a result, a range of values is reported here for R^2 values. The within-subjects R^2 values ranged from $< .01$ (coping-anxiety motives predicting frequency) to .07 (social motives predicting quantity). The between-subjects R^2 values ranged from .04 (conformity motives predicting quantity) to .45 (social motives predicting quantity). However, readers should note that standardized effect sizes in multilevel models may not generalize well to other samples.

Indirect Effects

Indirect effects testing mediation are displayed in Supplemental Table 1. Overall, only positive reinforcement drinking motives (i.e., social and enhancement) showed evidence of mediation. Partner social motives predicted actor alcohol quantity through

actor social motives at the between- and within-subject levels. Partner social motives predicted actor drinking frequency through actor social motives at the within-subjects level only. Partner enhancement motives predicted actor drinking frequency and alcohol quantity through actor enhancement motives at the between-subjects level. At the within-subjects level, partner enhancement motives did not predict actor drinking frequency ($p = .152$) or actor alcohol quantity ($p = .063$). As noted in Table 4, partner effects for conformity, coping-depression, and coping-anxiety motives were less consistent; indirect effects including these pathways were nonsignificant.

Discussion

The purpose of our study was to integrate drinking motives theory (Cooper, 1994) and drinking partnership theory (Roberts & Leonard, 1998) to test if individual drinking motives are associated with increased drinking behavior in romantic partners. Previous studies had investigated drinking partnerships in terms of alcohol consumption (Bartel et al., 2017; Leonard & Das Eiden, 1999), but no one had investigated whether the drinking motives of one partner were associated with drinking behaviors in the other partner. We advanced this area by testing hypotheses using longitudinal data and multilevel APIMs. This allowed us to partition the variance into between- and within-subjects components where stable, trait-like variance was represented by the between-subjects models (i.e., the proportion of the variance that remained the same over 4 weeks) and where state-like variance was represented by the within-subjects models (e.g., the portion of the variance that varied across 4 weeks). The between-subjects model is most consistent with cross-sectional research; however, it improves on cross-sectional studies by reducing measurement error by partialing out within-subjects variation. The within-subjects models represented the more substantial advancement to the literature as they allowed for tests of co-occurring change over time (Little, Bovaird, & Card, 2007). Overall, novel results from our study suggest drinking motives are not only associated with drinking behavior in the individual but are also associated with drinking behavior in the individual's romantic partner.

Consistent with hypotheses and prior research (e.g., Grant et al., 2007), enhancement motives in the actor predicted drinking quan-

tivity and frequency in the actor at both the within- and between-subjects level. That is, individuals who endorsed greater drinking for enhancement reasons tended to drink in higher quantities and more frequently when averaged across the four weeks of the study. Moreover, state-like fluctuations in enhancement motives were associated with state-like fluctuations in both alcohol outcomes over the four weeks. Enhancement motives are a risky drinking motive given their link with heavy alcohol consumption and frequency of use (Cooper et al., 2015). Research also suggests drinking alcohol to achieve its mood-enhancing, positively reinforcing effects leads to escalations in drinking quantity and frequency over time (Grant et al., 2007; Mackinnon, Kehayes, Clark, Sherry, & Stewart, 2014). Our study supplements these results in a sample of young adult drinkers followed weekly over four weeks.

A similar pattern emerged when examining partner effects, where the partner's enhancement motives significantly predicted the individual's drinking quantity at both the within- and between-subject levels, as well as the individual's drinking frequency at the between-subjects level only. That is, drinking for enhancement reasons in one partner was associated with increased alcohol consumption and drinking frequency in the other partner when averaged across time, and with co-occurring changes in the other partner's alcohol quantity within a given week. Consistent with hypotheses, when averaged across time, this relationship was mediated by the actor's own enhancement motives. That is, if the partner was motivated to drink for enhancement reasons, the individual also tended to drink for enhancement reasons which in turn was associated with increased drinking frequency and quantity in the individual. These findings extend Kuntsche and Stewart's (2009) findings with adolescent peers to romantic couples and provide a mechanism through which a partner's drinking motives effect change in an individual's drinking behavior.

Consistent with hypotheses, social motives in the actor and partner also predicted actor drinking quantity at both the within- and between-subjects level. This association was mediated by effects on the actor's own social motives at both the within- and between-subjects level. Moreover, social motives of the partner were associated with the drinking frequency of the actor through effects on the actor's social motives at the within-subjects level only. Social motives are regarded as a less risky motive as they are typically associated with moderate alcohol use when the influences of other riskier motives are controlled for (Kuntsche et al., 2005). The current study adds support to research where social motives are related to alcohol consumption in young adults when other motives are not controlled for (Grant et al., 2007). Overall, partner effects appeared to be stronger for enhancement motives than for social motives. This is consistent with literature at the individual level where enhancement motives are more strongly related with alcohol consumption than social motives (Grant et al., 2007; Mackinnon et al., 2014). Taken together, it appears that positive reinforcement motives (i.e., enhancement and social) are the strongest predictors of drinking behavior in one's partner.

Results for coping motives were inconsistent across our two alcohol outcomes. Both coping motives predicted actor drinking frequency at the between-subjects level only. Coping-anxiety motives also predicted actor drinking quantity at the between-subjects level, but coping-depression motives did not predict actor drinking quantity at either level of analysis. When coping-motivated drinking is measured as a single construct it is related to alcohol

quantity and frequency of use, although findings are mixed (Kassel, Jackson, & Unrod, 2000; Read, Wood, Kahler, Maddock, & Palfai, 2003). When measured more specifically, coping-depression motives are associated with drinking quantity whereas coping-anxiety motives are directly associated with alcohol-related problems (Grant et al., 2007). Our discrepant results may be attributable to our weekly assessment of motives where Grant et al. (2007) utilized a yearly measure of motives. Further, our results may be more accurate given participants responded to questions about their reasons for drinking closer in time to instances of drinking events. Our results suggest that those who drink to cope with low mood are drinking frequently, while those who drink to cope with anxiety are drinking both frequently and in higher quantities. A single partner effect emerged where coping-anxiety motives in the partner predicted drinking quantity in the individual at the between-subjects level. Thus, drinking to cope with anxiety in one partner was related to increased drinking quantity in the other partner when averaged across time.

Our results partially replicate Hussong (2003) who found drinking motives of close friends predicted increased individual alcohol consumption over a 28-day period in college students. While Hussong (2003) demonstrated nonspecific partner effects attributable to all drinking motives, we found partner effects for enhancement, social, and coping-anxiety motives only. Hussong (2003) hypothesized her lack of specificity may suggest that any motive that increases the likelihood of drinking in the social context of a close friend results in increased alcohol consumption by an individual young adult. Our results suggest only specific motives are associated with alcohol consumption in a romantic relationship. However, all our reported effects are positive in the expected direction, similar to Hussong's (2003) findings. Thus, it is likely some drinking motives are more strongly associated with drinking behavior within couples than others (such as enhancement and social motives) and we lacked statistical power to detect smaller effects. Hussong (2003) also utilized a daily diary approach so methodological differences as well as differences across friendships and romantic relationships may explain our somewhat discrepant results. Further, conformity motives are related to drinking within a peer context and not a romantic context (Cooper, Russell, Skinner, & Windle, 1992) which likely impacted our null conformity motive results.

It may at first seem counterintuitive that a partner's internal drinking motives (enhancement and coping-with-anxiety) would be associated with an individual's drinking as the internal motives of one's partner would presumably be unobservable to the individual. However, both enhancement and coping motives have been shown to be transferred between peers in adolescence (Stewart et al., 2014), suggesting internal motives are likely perceivable by others (e.g., seeing a partner drink to cope with observable anxiety). It is possible that given the observability of drinking for enhancement, coping-anxiety, and social reasons, individuals were more likely to be affected by those motives in their partner. As mentioned, conformity motives lie on the external dimension of Cooper's (1994) model and are more closely related to peer drinking than to romantic partner drinking. Thus, conformity motives may not have been influential in a romantic context (Cooper et al., 2015). Given the general dearth of research on drinking motives within romantic relationships, studies should clarify whether conformity motives operate in a similar fashion within

romantic relationships as they do with individuals. To do so, conformity items on the Modified DMQ-R (e.g., “To fit in with a group you like”) could be modified to increase their applicability to drinking in a romantic relationship context.

Our study is the first to show partner effects on drinking via drinking motives in romantic partners. Moreover, we are the first to show in romantic couples that positive reinforcement motives in the partner are associated with increased positive reinforcement motives in the actor, which in turn are associated with increased drinking behaviors in the actor. These results provide a significant contribution to the drinking motives literature by focusing on the social contributions (i.e., romantic partner effects) of motives as opposed to their contributions at the level of the individual (e.g., drinking motives’ mediational relationship between personality and substance use; Mackinnon et al., 2014). From this, it appears people’s drinking is affected not only by the explicit drinking behaviors of their romantic partners (Bartel et al., 2017; Homish & Leonard, 2007; Mushquash et al., 2013), but also by their partners’ reasons for drinking. And by witnessing their partner’s reasons for drinking, individuals may come to drink themselves for those same reasons and may escalate their drinking as a result (Kuntsche & Stewart, 2009). However, given the direct partner effects of motives on drinking remained significant after controlling for actor effects, there are likely other important mediational factors (such as drinking together; Levitt & Leonard, 2013) that may also help explain the association between a partner’s drinking motives and an individual’s drinking behaviors.

Studies support the importance of romantic partners in emerging adult drinking (Steinberg & Monahan, 2007). Among other things, romantic partners are similar in their drinking behaviors (Ask, Rogmo, Torvik, Røysamb, & Tambs, 2012). Our results suggest part of the similarity found in drinking behaviors in couples may be due to the motivations behind drinking behaviors. Partners may teach each other (via social learning; Bandura, 1971) to drink to increase positive affect and social affiliation. In this way, partners may teach each other not only *how* to drink, but *why* to drink, resulting in escalations of each other’s drinking behavior.

Intervention efforts may wish to explore motivations for drinking in romantic partners of people with problematic drinking habits given that social influence could result in escalations in risky drinking behaviors in both members of a couple. Individually tailored interventions targeted to underlying motivational processes have been shown to reduce risky drinking behavior, risky internal drinking motives, and alcohol-related problems when administered to individuals (Conrod, Castellanos-Ryan, & Mackie, 2011). This type of intervention might be usefully adapted for helping couples to understand and address factors which may serve to reinforce and maintain their risky drinking patterns. Further, our results suggest the focus in treatment should be on reducing positive reinforcement motives as these motives appear to have the largest effect sizes when predicting drinking quantity over time in partners. This is consistent with other studies that have specifically linked positive reinforcement motives to risky drinking (e.g., White, Anderson, Ray, & Mun, 2016). Couples may benefit from developing alternative activities that they could do together instead of drinking, particularly if those activities have the added benefit of addressing their underlying positive reinforcement motives. For example, taking up a stimulating hobby together, such as running or biking, may address a couple’s shared need for enhancement, or

attending a community event or volunteering may address their shared need for social engagement. Moreover, educating individuals on the impact their partner may be having on their reasons for drinking may also be an important step in preventing escalations in drinking over time. Positive reinforcement motives were found to most consistently predict increased alcohol consumption in couples, but this may be different for partners who engage in more hazardous drinking, or for those who become dependent on alcohol. Withdrawal from alcohol causes negative symptoms such as irritability, increased anxiety and depression as well as loss of motivation and dysphoria (Koob & Volkow, 2016). There may therefore be a shift from seeking positive reinforcement from alcohol to seeking negative reinforcement in order to reduce negative emotional states triggered by withdrawal.

Limitations and Future Directions

It is important to recognize the limitations of this study. First, we were unable to tease apart socialization versus selection effects on drinking behavior. While we did find longitudinal changes in drinking behavior via drinking motives, couples may also have selected one another based on similarity in drinking behavior and/or drinking motives when their relationship began. Future research could recruit couples who have just begun their relationship to see whether couples initially select partners due to their reasons for drinking, and/or whether drinking motive influence occurs as their relationships progresses. Second, we may have lacked statistical power to detect small effects due to our sample size; this is particularly true when coping and conformity motives are predictors, as a meta-analysis suggests these are weaker predictors of alcohol use than enhancement and social motives (Cooper et al., 2015). Third, significant chi-squared tests suggested poor model fit, although this test is often significant with larger samples (Kenny & McCoach, 2003). Finally, replicability of our results may be related to excluding nondrinking weeks from our models. This was done because we could not measure an individual’s drinking motives in the absence of drinking behavior. In order to obtain relevant data regardless of drinking behavior, future dyadic research could measure different types of urges to drink (e.g., reward vs. relief urges; Glöckner-Rist, Lémenager, & Mann, 2013) or include motives for abstaining (Anderson, Grunwald, Bekman, Brown, & Grant, 2011) which could be used to examine actor and partner effects on alcohol abstinence and motives for abstaining.

Models presented were also analyzed using indistinguishable dyads to increase generalizability to same-sex couples. While we included a distinguishable dyads analysis in our [online supplemental materials](#), this required us to exclude 8% of our sample who identified as homosexual. Moreover, the distinguishable dyad approach doubled the number of *p* values calculated causing our Type I error rate to increase. Our distinguishable dyad analyses resulted in multiple significant actor effects of motives predicting drinking frequency for female partners only, whereas motive actor and partner effects were similar across both sexes when predicting drinking quantity. Research could build upon our work by testing a similar model using a larger sample with distinguishable heterosexual-only dyads to investigate sex differences more thoroughly. Additionally, given our sample contained only 8% same-

sex couples, future studies should oversample same-sex couples to better understand partner influences in same-sex couples.

We also combined data from two samples that used two slightly different methods. While these methodological differences may have some impact on results, conclusions did not change when controlling for sample. Shorter or longer time lags may produce different results. For example, a longer time frame might allow researchers to examine if the association between drinking motives and drinking behaviors within partners changes over long-term relationships, either in magnitude of effect and/or in the specific motive(s) that is/are associated with drinking behavior within the couple. Finally, our sample mainly consisted of young, dating, student couples so the results may not generalize to other dyads (e.g., older married couples or peer dyads).

Conclusions

Our study integrated drinking motives theory (Cooper, 1994) and drinking partnership theory (Roberts & Leonard, 1998) in romantic relationships to test if the drinking motives of one partner were associated with the drinking behaviors of the other partner. Results showed partner positive reinforcement motives (enhancement and social motives) were most predictive of drinking behavior in the actor and this was mediated through partner effects on the actor's positive reinforcement motives. Moreover, partner positive reinforcement motives were associated with actor drinking behavior in both a trait-like and state-like way over time. Results suggest positive reinforcement motives may be important targets in couples' therapy to prevent escalations in either member's drinking over time. Our results also show the relationship between drinking motives and drinking behavior goes beyond the individual and extends to intimate relationships as well.

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