Relationship Quality and Alcohol-Related Social Reinforcement during Couples Interaction

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Abstract

Individuals who are unhappy in their intimate partnerships are at risk for developing alcohol problems. But little is known about the mechanisms underlying this link. One possibility is that couples with poor relationship quality gain more reinforcement from alcohol in certain contexts—a possibility that has never previously been empirically examined. In the current study, 304 individuals (152 couples) were assigned to receive alcohol (target BAC .08%) or a non-alcoholic beverage. They then engaged in a conflict-resolution interaction with their partners. Videotaped interactions were coded by trained observers. Results revealed a significant interaction between alcohol and relationship quality across multiple measures. Alcohol decreased negative behaviors, decreased negative reciprocity, and enhanced self-reported experience to a greater extent during interactions involving individuals reporting low relationship quality and had comparatively little effect among those reporting high relationship quality. Findings point to a potential mechanism underlying problem drinking among couples with poor relationship quality.

Keywords: Alcohol, couples, relationship quality, relationship adjustment, social interaction

The past three decades have seen a surge of research exploring alcohol use within the context of intimate partnerships (Leonard & Eiden, 2007). This research has uncovered robust links between the quality of intimate relationships and drinking patterns. In particular, research suggests that individuals who have relationship problems and are dissatisfied with their intimate partnerships are at risk of developing a problem with alcohol (Epstein & McCrady, 1998; Leonard & Eiden, 2007). Studies targeting clinical samples suggest that alcoholics experiencing high levels of marital conflict are at greater risk of relapse to heavy drinking than those in less conflictual marriages (e.g., Maisto, McKay, & O'Farrell, 1995). Research examining marital quality and alcohol use in non-clinical samples have found similar results. For example, in a large-scale community sample of participants, Whisman and colleagues (2006) found that individuals who were dissatisfied with their relationships at baseline were about 4 times more likely to have developed a problem with alcohol at 1 year follow-up compared with their satisfied peers, and, in their study of newlyweds, Leonard and Homish (2008) found a similar link between poor relationship quality[1] and alcohol problems at 4 year follow-up. Indeed, novel and widely-implemented treatment approaches for alcohol use disorder (AUD) now assume a key role for relationship factors in motivating problem drinking. Behavioral couples therapy, a powerful alcohol intervention that includes components devoted to building relationship quality, has been shown to produce impressive reductions in drinking problems (McCrady & Epstein, 2009; O'Farrell & Fals-Stewart, 2006), and researchers have suggested that the success of this approach is primarily attributable to improvements in the quality of intimate relationships (e.g., Owens et al., 2013).

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[1] A variety of terms have been adopted in the literature in reference to intimate partnerships and their characteristics. In the current paper, we use "relationship quality" as an umbrella term referring to both subjective levels of relationship satisfaction as well as more "objective" relationship functioning variables (Fincham & Rogge, 2010).

Although a great deal of evidence suggests that high relationship quality might protect against heavy drinking and, conversely, that relationship problems confer risk, we still have very little conception as to why. In other words, while a substantial literature points to a link between poor relationship quality and risk for alcohol problems, the specific mechanisms supporting this link have yet to be identified. A number of explanations have been posited for links between poor relationship quality and subsequent alcohol use including dearth of alternative coping mechanisms, learned relationships between antecedent family conflict conditions and drinking, and self-regulatory failures caused by stress (see also Epstein & McCrady, 1998). Another possible explanation for this link is suggested by the alcohol-administration literature examining differences across individuals in acute alcohol reinforcement. This literature points to the possibility that dissatisfied couples might drink more because they experience more reinforcement from alcohol or, put simply, because they get more out of drinking.

Individual Differences in Alcohol Reinforcement

Researchers have long been interested in examining how individuals differ in their response to alcohol as a way to understand risk for AUD (Sher & Levenson, 1982). Alcohol can have powerful reinforcing properties—it can enhance positive mood, decrease negative mood, and help us achieve motivationally-salient goals (Levenson, Sher, Grossman, Newman, & Newlin, 1980; Sayette et al., 2012). Laboratory-based alcohol-administration studies can provide a unique window through which to observe these effects, and results of these studies reveal that the extent to which alcohol consumption is experienced as reinforcing varies dramatically across individuals (Sher & Wood, 2005). Some people experience powerful reinforcement from alcohol while others may experience little or none at all. Importantly, the extent to which an individual experiences alcohol reinforcement tends to covary with that

individual's risk profile for developing AUD (Sher & Wood, 2005). In other words, individuals who are especially likely to develop a drinking problem tend to get more reinforcement out of drinking than others, a factor that may partially explain their tendency towards excessive consumption.

Importantly, in the examination of alcohol reinforcement, a great deal of attention has been paid to the effects of alcohol in the context of stressful and otherwise negatively arousing experiences (e.g., Sher & Levenson, 1982). Alcohol consumption can disrupt cognition, and researchers have theorized that alcohol's emotionally reinforcing effects are primarily attributable to its tendency to interfere with the cognitive appraisal and processing of environmental threats (Sayette, 1999). Consistent with such a view, research suggests that alcohol's reinforcing properties may be particularly pronounced in stressful situations and among individuals sensitive to negative emotion. For example, individuals often drink more in stressful than in non-stressful settings (e.g., Higgins & Marlatt, 1975), and individuals with traits that make them vulnerable to experiencing negative emotions (neuroticism, social anxiety) experience more emotional reinforcement from alcohol than others (e.g., Hefner & Curtin, 2012). While negative emotions experienced specifically in reference to a close relationship have not previously been examined, individuals who are uncertain of and unsatisfied with their intimate partnerships may experience couples disputes as a particularly potent stressor and may therefore demonstrate sensitivity to alcohol reinforcement in these contexts (Heyman, 2001; Sher & Wood, 2005).

Laboratory researchers seeking to understand alcohol reinforcement, and individual differences therein, have faced several challenges including: 1) identifying laboratory drinking settings and negative affective cues that mirror those that participants might potentially encounter outside the laboratory and; 2) identifying measures of reinforcement that capture

alcohol's effects across key motivationally-salient domains. With respect to this first challenge, the overwhelming majority of laboratory-based alcohol-administration studies have examined alcohol's effects among individuals drinking alone (Sayette et al., 2012), whereas outside the laboratory, most drinking takes place in social contexts, such as contexts involving friends or intimate partners (Leonard & Eiden, 2007; see Fairbairn & Sayette, 2014). Laboratory paradigms involving conflicts between intimate partners have been shown to elicit negative emotions (Heyman, 2001), and so conflicts between couples, those with low and high quality relationships, could represent a fruitful context for investigating alcohol reinforcement[2]. With respect to the second of these challenges, alcohol-administration researchers have tended to focus on measures of reinforcement that examine individual experience alone (e.g., self-reports of individual mood, individual behaviors) (Sayette et al., 2012). Even when these studies have examined participants drinking in a social context, the social elements of experience have tended to be overlooked in favor of individual factors (Fairbairn & Sayette, 2014). Yet research indicates that indexes specifically targeting social constructs can be highly informative. For example, studies find that displays of negative reciprocity, or mutually reciprocated negative behaviors, among couples can predict relationship outcomes above and beyond the effects of individual behaviors (Cordova, Jacobson, Gottman, Rushe, & Cox, 1993). In the current study, we examine the effects of alcohol in the context of couples' interactions, exploring alcohol reinforcement across both individual as well as social domains of experience.

The Present Study

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[2] In the alcohol-administration literature, couples conflict paradigms have been used not only to examine alcohol reinforcement (Frankenstein, Hay, & Nathan, 1985), but also alcohol-related aggression (Leonard & Roberts, 1998). Note that these two goals are not in conflict—alcohol's mood-enhancing properties have been proposed as a primary mechanism by which it disinhibits aggression (Wilson, 1988)—and researchers have often examined alcohol reinforcement and alcohol aggression simultaneously in the same study (e.g., Smith, Parker, & Noble, 1975a, 1975b; see Fairbairn & Sayette, 2014 for a review).

The present research merges insights from two heretofore distinct fields within alcohol studies in order to explore a potential mechanism underlying vulnerability to AUD among those dissatisfied with their intimate partnerships. Building on research examining acute response to alcohol as well as research on alcohol use in couples, we examine whether individuals who report low relationship quality show sensitivity to alcohol reinforcement when interacting with their partners. Importantly, to our knowledge, only four previous alcohol-administration studies have examined the effects of a fixed dose of alcohol within couples' interaction (Frankenstein, Hay, & Nathan, 1985; Leonard & Roberts, 1998; Samp & Monahan, 2009; Smith, Parker, & Noble, 1975b), and none have explored the moderating effects of relationship quality.

The dataset we use to explore our research questions represents, to our knowledge, the largest alcohol-administration study conducted to date with couples (Testa, Crane, Quigley, Levitt, & Leonard, 2014). This dataset has several distinct advantages for examining our research question including: 1) Sufficient power to examine moderators of alcohol's effects; 2) A design in which alcohol consumption varies both within and between couples, allowing us to distinguish the effects of consuming alcohol oneself (of primary interest here) from the potentially confounding influence of interacting with a partner who consumed alcohol; 3) Evidence of some alcohol reinforcement across study participants (Testa et al., 2014); and 4) Measures that explore alcohol reinforcement experienced in not only the individual (e.g., individual behaviors, self-reported mood) but also the social (e.g., behavioral reciprocity, perceived social outcomes) domains. Initial results reported from this dataset suggested that, overall, alcohol tended to improve social interactions between couples, particularly on behavioral indexes (see Testa et al., 2014). In addition, this initial report examined several moderators of alcohol's effects, including gender, prior intimate partner aggression, trait anger, dispositional aggression, and alcohol

expectancies and found that none of these variables moderated alcohol's reinforcing effects during couples' interactions.

The present research explores, for the first time, relationship quality as a moderator of alcohol's effects within this sample of couples. Based on research suggesting that those at risk for alcohol problems are sensitive to alcohol reinforcement (Sher & Wood, 2005), as well as research indicating enhanced alcohol reinforcement in the presence of negatively-arousing cues (e.g., Higgins & Marlatt, 1975), we predicted that alcohol consumption would increase behavioral and self-report measures of mood and social outcomes to a greater extent among individuals reporting low relationship quality versus among those reporting high relationship quality.

<div align="center">Methods</div>

Participants

For a full description of study methods, see Testa et al. (2014). Heterosexual couples were recruited either via screening questionnaires mailed to 20,000 households in the Buffalo area (n=77), advertisements placed in the newspaper (n=28), or on Facebook (n=47). Both members of the couple were required to be between the ages of 21 and 45 and either married or cohabiting for at least a year. Both partners had to report drinking 4 drinks (5 for men) on an occasion at least monthly and be willing to consume up to 6 drinks in the lab. Exclusion criteria included medical conditions contraindicating alcohol consumption, pregnancy in women, and a history of treatment for substance use or psychiatric disorder. The final sample comprised 152 couples, 92.1% White with an average of 15.71 years of education and an average age of 32.33. Most were married (68.67%). Average length of marriage (or cohabitation) was 6.11 years. Men

reported drinking alcohol on 36.22% of days over the past year (M=4.56 drinks/occasion) and women on 25.65% of days (M=3.14 drinks/occasion).

Procedure

Couples who successfully completed a phone screening were sent questionnaire booklets to be completed independently by each partner. Questionnaires included indexes of relationship quality, depressive symptoms, relationship aggression, and drinking history (see also study measures). Upon arriving in the laboratory, participants independently completed baseline tasks (e.g., weight assessed and pregnancy tests for women). Couples were then reunited and instructed to generate a list of current specific disagreements in their relationship. They then independently rated each according to the amount of disagreement on a 100 point scale. The topic with the highest mean rating was discussed in the Time-2 (experimental) interaction and the next highest for the Time-1 (baseline) interaction. During each interaction, couples were instructed to try to work out a solution to the disagreement. Couples were separated immediately after each interaction to complete self-report measures of mood and social outcomes. They also rated the perceived "naturalness" of the interaction.

Beverages were administered following the completion of the baseline interaction. Couples were randomly assigned to one of four conditions: both partners received alcohol (n=40), neither received alcohol (n=36), male only (n=39), and female only (n=37). Experimenters were blind to condition until this point. Alcoholic beverages consisted of 80 proof vodka mixed with cranberry juice in a 2.39 ml/kg ratio for men (2.22 ml/kg for women), with a target BrAC of .08%. There was no deception involved in the alcohol manipulation, such that participants not receiving alcohol were correctly informed that they were drinking juice (equivalent in quantity to liquid consumed in the alcohol condition). Drinks were mixed in front

of participants and presented in 6oz glasses, each of which participants were instructed to consume in 5 minutes. Couples were reunited when the partner(s) assigned to the alcohol condition had reached a BrAC of .06% or after 15 minutes if neither had received alcohol. After the experimental (Time-2) interaction, BrAC was again assessed, and participants were led through a "happy times" discussion. If either partner had received alcohol, they were asked to remain in the laboratory until their BrACs dropped below .03%.

Measures

Reported Relationship Quality: The Dyadic Adjustment Scale (DAS) was selected as a widely-used and well-validated scale of relationship quality (Spanier, 1976). The DAS has been conceptualized as measuring a construct known as relationship "adjustment," combining questions that examine level of relationship satisfaction with questions that explore more objective relationship characteristics. The DAS consists of 32 items measuring dyadic satisfaction, consensus, cohesion, and affectional expression. Scores on individual items were summed to create an overall score (α=.91; see Spanier, 1976).

Negative and Positive Behaviors: Videotapes of couples' interactions were coded using the Rapid Marital Interaction Coding System (RMICS) under the supervision of Dr. Richard Heyman (Heyman, 2004). The RMICS categorizes behavior into a) five negative codes: psychological abuse, distress-maintaining attribution, hostility, dysphoric affect, and withdrawal; b) four positive codes: acceptance, relationship-enhancing attribution, self-disclosure, and humor; c) one neutral code: constructive problem discussion/solution: and d) one Other code (Heyman, 2004). The basic coding unit is the speaker turn or utterance. Interrater agreement was acceptable (67%, average Cohen's Kappa=.50). Consistent with our own prior work (e.g., Fairbairn & Sayette, 2013; Sayette et al., 2012; Testa et al., 2014), as well as other work in this

tradition (see Fairbairn et al., 2015 for a review), we did not explore each negative and positive behavioral code separately, but instead summed across all codes within each category to create composite negative and positive behavioral frequency indexes. Here, as elsewhere (e.g., Cranford, Tennen, & Zucker, 2015), we found that several of the negative behaviors (e.g., psychological abuse, withdrawal) did not manifest with sufficient frequency to permit independent examination of these behaviors.

Negative Reciprocity: Since behaviors were coded at the level of the event (speech turn), we used sequential analysis to explore the tendency for individuals to reciprocate their partners' negative behaviors. In particular, we used the phi coefficient—a commonly used sequential index whose distribution was not skewed by the overrepresentation of zeros in our negative behavioral data—to examine negative reciprocity (Bakeman & Gottman, 1997). The phi index can be interpreted as a z score that is corrected for sample size. Thus, like a z score, phi ranges from -1 to 1, with 0 representing no relationship between the antecedent and consequent behaviors.

Mood and Perceived Social Outcomes: Immediately after each interaction, participants provided ratings of their mood (27 items) as well as subjective ratings of their own and their partner's behaviors during the interaction (13 identical items for each). On the mood measure, participants indicated the extent to which they felt negative mood (e.g., angry, anxious, sad) or positive mood (e.g., happy, content) on a 4-point Likert scale. Individual item scores were averaged to create positive and negative subscales. Participants then rated the extent to which they and their partners had displayed positive behaviors (e.g., showed love and caring) or negative behaviors (e.g., criticized). Thus, these items produced six self-report indexes: positive mood (α=.89), negative mood (α=.90), perceived partner positive behaviors (α=.89), perceived

partner negative behaviors (α=.87), perceived self positive behaviors (α=.85), and perceived self negative behaviors (α= .82) (Testa et al., 2014).

Data Analysis

Multilevel models were used to account for the clustering of individuals within dyads (Raudenbush & Bryk, 2002). All alcohol models predicted behaviors during and self-reports following the experimental (Time-2) interaction while controlling for baseline (Time-1). Our primary hypotheses pertain to whether an individual's own alcohol consumption and that individual's own relationship quality interact ("actor" effects) to predict outcomes during marital interaction. However, in supplemental analyses, we also explore whether that individual's *partner*'s relationship quality (substituted in place of actor relationship quality) and then partner alcohol condition (substituted in place of actor alcohol condition) produce a similar pattern of findings. In order to distinguish these two sets of analyses, we use the terms "actor" and "partner" throughout the results in reference to findings of analyses examining alcohol and relationship quality. Thus, relationship quality and alcohol condition are entered at the level of the individual. Relationship quality was entered as a continuous variable and simple contrasts were probed by centering it at one standard deviation above and below the mean. After presenting primary results, we also entered a number of covariates including gender, age, and duration of marriage/cohabitation in order to explore whether our primary actor analyses are robust to these controls.

In light of moderate to strong correlations between the six self-reported measures of mood and perceived social outcomes (average Pearson correlation .55, range .39-.84), analyses examining these variables employed multivariate multilevel modeling procedures. These procedures are consistent with those used for examining self-reports of mood and perceived

social outcomes in our past research (Fairbairn et al., 2015). Self-report analyses began with multivariate hierarchical linear models in which the overall significance of effects are examined across all six self-report outcome variables (Raudenbush, Brennan, & Barnett, 1995), specifying an unstructured or "unrestricted" covariance structure among outcomes. These multivariate models involved three levels of analyses, accounting for clustering of the six self-report indexes within individuals, and the clustering of individuals within dyads. After establishing an omnibus effect within multivariate models, we followed up with models examining each outcome independently to explore where effects emerged as strongest. We then examined whether effects differed significantly across the different self-report measures. All self-reported outcomes were converted to standardized units (z-scores) for ease of interpretation.

Results

As intended, Time-2 conflict topics were rated as involving more disagreement (M=75.02, SD=22.82) than Time-1 conflict topics (M=62.44, SD=23.77), $F(1, 284)$=96.28, p<.01. Participants rated discussions as feeling natural (M=5.57 on a 7-point scale, SD=1.28) and similar to those that they have at home (M=5.46, SD=1.41). Participants consuming alcohol reached a BAC of .071% (SD=.015) immediately before interaction 2 and .076% (SD=.014) immediately following interaction 2. Average levels of relationship quality (M=114.4, SD=14.2) observed in this sample were comparable to levels observed in normative samples (e.g., Spanier, 1976; M=114.8, SD=17.8), with about 12% (N = 37) of our sample scoring in the "distressed" range on this measure (< 100) (Jacobson et al., 2000). Relationship quality was highly correlated across partners within the same couple (Pearson's r=.63), and relationship quality did not differ significantly according to individuals' current heavy episodic drinking frequency, p = .46 (note that those with current alcohol problems at the time of their study participation were excluded, so

the range of drinking was restricted). About 48% of couples reported any history of verbal or physical aggression within their relationships, but intimate partner aggression emerged as largely independent of relationship quality, $r=-.19$ (See Tables 1 and 2 for descriptive statistics and correlations).

Main Effects: There was a main effect of actor relationship quality on negative behaviors, positive behaviors, negative reciprocity, and self-reported mood and social outcomes during the experimental interaction. Individuals reporting lower relationship quality displayed more negative behaviors, $B=-0.009$, $t=-2.17$, $p<.0.03$, fewer positive behaviors, $B=0.11$, $t=2.51$, $p=.01$, marginally more negative reciprocity, $B=-0.001$, $t=-1.81$, $p=.07$, and reported lower mood and social outcomes, $B=0.017$, $t=5.68$, $p<.001$. Thus, with each 1 unit decrease in relationship quality (measured on a 151 point scale), individuals displayed .009 more negative behaviors, .11 fewer positive behaviors, a decrease of .001 in phi, and a .017 standard unit decrease in mood and perceived social outcomes. Individuals consuming alcohol displayed an average of 2.78 more positive behaviors during the Time 2 interaction than those not consuming alcohol, B=2.78, t=3.10, p=.002. There were otherwise no significant main effects of alcohol, p's > .12.

Alcohol by Relationship-Quality Interactions: Consistent with our hypothesis, we found that alcohol consumption enhanced social experience to a greater extent among individuals reporting low relationship quality (see Table 3). A significant interaction between actor alcohol consumption and actor relationship quality emerged in predicting negative behaviors, $B=0.228$, $t=2.27$, $p=0.03$. Among those reporting low relationship quality, individuals assigned to consume alcohol displayed 5.07 fewer negative behaviors during the experimental interaction, $B=-5.065$, $t=-2.37$, $p=0.02$, whereas, among those reporting high relationship quality, there was no significant effect of alcohol, $p=0.36$. [Of interest, when simple contrasts subdivided conditions

according to alcohol condition instead of relationship quality, results suggested that, among those not consuming alcohol, there was a significant negative correlation between relationship quality and negative behaviors, $B=-0.285$, $t=-2.31$, $p<0.02$, such that a 1 unit increase in reported relationship quality led to a .285 decrease in negative behaviors. In contrast, there was no significant correlation between relationship quality and negative behaviors when participants drank alcohol, $p = .42$.] Alcohol's tendency to increase positive behaviors was not significantly moderated by relationship quality, $p=.43$.

In addition, a significant interaction emerged between actor alcohol and actor relationship quality in predicting the tendency to reciprocate negative behaviors, $B=0.001$, $t=2.08$, $p=0.04$[3]. This interaction was identical in form to the behavioral frequency interaction. More specifically, among those reporting low relationship quality, alcohol consumption was associated with a .016 decrease in phi index of negative behavioral reciprocity, $B=-0.016$, $t=-1.82$, $p=0.073$, whereas, among those reporting high relationship quality, no significant effect of alcohol emerged, $p=0.39$.

Finally, actor alcohol condition significantly interacted with actor relationship quality in predicting participants' self-reports of mood and social outcomes, $B=-0.008$, $t=-2.11$, $p=0.04$. This multivariate effect did not vary significantly across the different self-report measures, $p=0.13$, suggesting that the interaction between alcohol and reported relationship quality was generally consistent across the six self-report measures of mood. Among those reporting low relationship quality, alcohol consumption was associated with a .22 standard unit increase in self-reports of mood and perceived social outcomes, $B=0.220$, $t=2.71$, $p=0.007$, whereas there was no significant effect of alcohol among those reporting high relationship quality, $p=0.42$.

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[3] This interaction was also significant when Yule's Q was examined in place of Phi, $B=0.005$, $p=0.045$, although the distribution of Yule's Q was highly skewed so we chose Phi for primary analyses.

Although the effect did not differ significantly across the 6 self-report measures of mood and social outcomes, results examining each self-report measure independently indicated that omnibus moderation effects might be partially driven by measures of perceived partner negative behaviors, $B = 0.013$, $t = 2.21$, $p = 0.03$, and perceived partner positive behaviors, $B = -0.01$, $t = -2.09$, $p = 0.04$ (other p's > .07).

Supplemental Analyses: Further analyses revealed that results were observed selectively with respect to an individual's own reported relationship quality and alcohol condition (i.e., actor effects). When partner alcohol condition and partner reported relationship quality were substituted as moderators in models predicting behaviors and self-reports, no model reached significance with respect to partners' reported relationship quality, p's > .34, or partners' alcohol condition, p's > .09. We also explored the discrepancy in reported relationship quality across partners using algebraic difference scores and did not find evidence that this discrepancy moderated the effects of alcohol, p's > .13.

Finally, we explored whether results of actor models described above remained consistent after entering a number of different factors into models as covariates. All results remained significant after controlling for participants' gender, average frequency of heavy episodic drinking, depression score, age[4] and age difference, and time married/living together.

Discussion

Over the past several decades, research has accumulated to suggest that individuals who are unhappy in their close relationships are vulnerable to developing a problem with alcohol. Yet little is currently known about the mechanisms that might explain increased AUD risk within

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[4] To better target the population most relevant to the understanding of risk for later development of AUD, we conducted supplementary analyses examining the younger half of our participants (age<31). While power was significantly reduced in this sub-sample, results of alcohol by relationship quality moderation analyses were generally consistent with those reported above (Negative behaviors: B=0.255, p=0.078; Negative reciprocity: B=0.002, p=0.009; Self-report: B=-0.008, p=0.103).

these unhappy couples. The current study used alcohol-administration methods combined with a couples' conflict paradigm in order to explore the link between relationship quality and acute alcohol response among interacting couples. Previous analyses suggested positive effects of alcohol on couples' behaviors (Testa et al., 2014); however, consistent with hypotheses, the current analyses revealed that these effects were largely specific to individuals unhappy in their intimate partnerships.

In particular, results revealed a moderating influence of relationship quality on alcohol response, an effect that emerged consistently across several behavioral and self-report indexes of social and emotional reinforcement. When sober, individuals reporting low relationship quality displayed more negative behaviors, more negative reciprocity, and further reported lower mood and less favorable social outcomes during interactions with their partners compared with individuals reporting high relationship quality. Importantly, however, when these individuals with low quality relationships consumed alcohol, their behaviors and self-reported experiences during a conflict-resolution task with their partner improved significantly, and in fact were largely indistinguishable from the behaviors and self-reports of their high relationship quality peers. These findings raise the possibility that individuals in unsatisfying intimate relationships are vulnerable to developing alcohol problems because these individuals gain more reinforcement from drinking.

One possible explanation for the pattern of results observed in this study is provided by theories of alcohol-related social enhancement (Fairbairn & Sayette, 2014; Hull, 1981). Theories suggest that alcohol may selectively enhance mood in social situations involving the threat of social rejection and/or the possibility for negative evaluation of self. Since concerns about rejection and negative evaluation can be quite salient within low quality intimate partnerships,

whereas such concerns may not even enter the minds of those who feel their relationship quality is high, rejection and evaluative concerns may partially explain the differences in alcohol reinforcement observed in this study (Clark & Lemay, 2010).

It is worth noting that the effects of relationship quality on positive behaviors did not vary depending on alcohol condition. One possibility is that our couples' interaction paradigm, involving discussion of a point of disagreement, was less well suited to examining alcohol's effects on positive behaviors. Another possibility, indicated by the literature exploring the tension-reduction hypothesis (Greeley & Oei, 1999), is that alcohol's effects and individual differences therein might emerge as especially pronounced in stressful situations and/or on measures indexing negative affect, with positive measures less sensitive to detecting these effects.

The findings of this study might have implications for couples-focused treatments for alcohol use disorder. In particular, given that couples with low relationship quality appeared to gain the most from drinking, these findings point to the possibility that couples with poor relationship quality might sometimes use alcohol as a tool by which to improve their marital interactions. Given that desire to improve couples interaction might sometimes drive drinking, findings emphasize the importance of helping these couples to develop alternative methods by which to improve the quality of their interactions. Importantly, however, this study is simply the first step towards understanding the role that alcohol might play among couples with poor marital quality, and future research should explore not only how alcohol impacts these interactions but also whether the desire to improve couples interactions does in fact lead to drinking.

Limitations of this study should be noted. First, given the design of this study, we were not able to parse expectancy effects of alcohol from pharmacological effects. Our choice to omit the placebo condition was driven by research suggesting that placebo manipulations can lead to unanticipated compensatory effects (Testa et al., 2006) and because it would have been difficult to deceive individuals about their partners alcohol condition. Second, participants in this study were somewhat older than in some studies that have examined the reinforcing effects of alcohol. Note that this study included a relatively large sample of participants, and effects observed in this study remain consistent even when only participants under the age of 31, the median age, are examined. Third, because of the ethical and practical requirements of alcohol-administration research, the sample consisted of couples in which both partners were relatively heavy drinkers but who did not have contraindications to drinking and were not seeking treatment. Thus, the sample was not intended to be representative of all drinkers nor of couples with current problem drinking. Results therefore cannot speak to factors that might currently maintain problem drinking, but instead are intended to inform an understanding of etiological factors that might ultimately lead to alcohol problems at a later point for some individuals (Levenson et al., 1980). Finally, this study examined a single moderate dose of alcohol within a conflict resolution paradigm, and future research might examine the generalizability of results obtained here to higher and lower alcohol doses and to different tasks

Conclusions

A great deal of research has explored how people differ in the reinforcement they gain from drinking alcohol. Researchers have examined a range of individual characteristics including gender, personality traits, genotypes, and psychopathology as moderators of alcohol response (Sher & Wood, 2005). Importantly, this prior research has focused exclusively on moderators

intrinsic to the individual, and none of these explorations of differences across people has explored interpersonal moderators of alcohol reinforcement. The current study is the first, to our knowledge, to use an index of *inter*personal functioning in order to explore differences in alcohol reinforcement. Results of the study combine insights across multiple fields within alcohol studies and point to acute alcohol reinforcement as one potential mechanism underlying risk for problem drinking among couples with poor relationship quality.

Authorship

C.E.F developed the study concept. M.T. developed the study design and participated in data

collection. C.E.F. performed the data analysis and interpretation. C.E.F. drafted the paper, and

M.T. provided critical revisions. Both authors approved the final version of the paper for

submission.

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Table 1. Descriptive Statistics subdivided by male and female participants

	Males		Females	
	Mean	Std Dev	Mean	Std Dev
Reported Relationship Quality (DAS)	114.14	13.33	114.72	15.07
Age (yrs)	32.97	6.70	31.68	6.57
Percent Days Drinking Alcohol	36.22	23.34	25.65	19.63
Usual # Drinks/Occasion	4.56	2.89	3.14	1.32
Depression score	12.72	6.20	11.88	6.03
Physical Aggression Score	18.97	6.20	15.34	5.02
Duration of Marriage/Cohabitation (yrs)	6.12	5.18	6.12	5.18
Total Positive Behaviors	17.51	10.73	19.32	11.77
Total Negative Behaviors	11.79	17.40	15.00	20.51
Negative Reciprocity (Phi coefficient)	0.05	0.08	0.05	0.07
Self-reported Positive Mood	2.77	0.90	2.67	0.97
Self-reported Negative Mood	1.27	0.32	1.30	0.34

Reported relationship quality measured using the Dyadic Adjustment Scale (DAS). Physical aggression was measured using the Buss-Perry aggression questionnaire (Buss & Perry, 1992). Depression was measured using the CES inventory (Radloff, 1977). Total Positive Behaviors represents the summed frequency of RMICS positive behaviors during the experimental (Time 2) couples' interaction. Total Negative Behaviors represents the summed frequency of RMICS negative behaviors during the experimental interaction. Positive mood and negative mood (2 of the 6 self-report measures taken immediately after the time-2 interaction) were measured on a 4-point Likert scale. [Note that all 6 self-report measures were highly correlated, and therefore only 2 are presented here.]

Table 2. Correlation matrix

	RelQual	Age	%DayDrk	NmbDrk	Deprss	Agrss	DurRel	PosBeh	Negbeh	NegRecip	PosMd	NegMd
RelQual	1.00											
Age	-0.16*	1.00										
%DayDrk	0.04	-0.06	1.00									
NmbDrk	-0.01	0.04	-0.07	1.00								
Deprss	-0.24*	-0.03	0.01	0.13*	1.00							
Agrss	-0.13*	-0.07	0.08	0.27*	0.26**	1.00						
DurRel	-0.16*	0.74*	-0.11	0.14*	0.02	-0.11	1.00					
PosBeh	0.18*	0.00	0.04	-0.04	-0.07	0.03	0.02	1.00				
NegBeh	-0.35*	0.10	-0.13*	0.15*	0.03	0.02	0.06	-0.18*	1.00			
NegRecip	-0.14*	-0.06	-0.09	0.03	0.04	-0.04	-0.03	-0.02	0.34*	1.00		
PosMd	0.23*	0.05	0.06	-0.09	-0.09	0.01	0.06	0.29*	-0.34*	-0.08	1.00	
NegMd	-0.27*	-0.08	-0.15*	0.11*	0.17*	0.07	-0.04	-0.33*	0.35*	0.14*	-0.71*	1.00

RelQual = Reported relationship quality was measured using the Dyadic Adjustment Scale. %DayDrk = percentage of days that participant reported drinking alcohol; NmbDrk = Usual number of drinks that participant reported drinking per drinking episode. Deprss = Depression measured using the CES inventory (Radloff, 1977). Agrss = Physical aggression measured using the Buss-Perry aggression questionnaire (Buss & Perry, 1992). DurRel = Duration of marriage or cohabitation measured in years. PosBeh = The summed frequency of RMICS positive behaviors during the experimental (Time 2) couples interaction. NegBeh = The summed frequency of RMICS negative behaviors during the experimental (Time 2) couples interaction. NegRecip = Reciprocated negative behaviors measured using the phi coefficient. PosMd = Self-reported positive mood measured immediately after the experimental interaction using a 4-point Likert scale. NegMd = Self-reported negative mood measured immediately after the experimental interaction using a 4-point Likert scale

- $p < .05$

Table 3. Relationship quality and alcohol condition as predictors of negative behaviors, negative reciprocity, and self-reported mood and social outcomes

	Negative Behaviors		
	B	*t ratio*	*p value*
Intercept	11.45	4.32	<.0001
RelatQual	-0.68	-2.31	0.02
Alcohol	-5.07	-2.37	0.02
RelatQual*Alcohol	0.23	2.27	0.03
NegBehavBsln	0.68	5.61	<.0001
	Negative Reciprocity		
	B	*t ratio*	*p value*
Intercept	0.06	7.29	<.0001
RelatQual	-0.001	-2.32	0.02
Alcohol	-0.02	-1.82	0.07
RelatQual*Alcohol	0.001	2.08	0.04
NegRecBsln	0.002	0.03	0.98
	Self-Reported Reinforcement (Higher is More Positive)		
	B	*t ratio*	*p value*
Intercept	-0.24	-3.07	0.002
RelatQual	0.014	3.60	0.0004
Alcohol	0.22	2.71	0.007
RelatQual*Alcohol	-0.009	-2.11	0.04
SlfRepBsln	0.43	22.19	<.0001

Models predict behaviors displayed during and self-reports measured immediately following the experimental (Time-2) interaction. All models control for the corresponding Time-1 "Bsln=Baseline" interaction parameter. Models reflect all covariates included in the primary ("actor") analyses, although see data analysis section for supplemental analyses exploring partner effects along with a range of other covariates. RelatQual = Reported relationship quality measured continuously using the Dyadic Adjustment Scale, centered at 1 standard deviation below the mean ("low" relationship quality). Alcohol = Actor alcohol condition, dummy coded such that 0=Control and 1=Alcohol. Models for self-report outcomes reflect multivariate models exploring effects of six correlated indexes of mood and perceived social outcomes, self-reports converted into standardized units for analysis (more positive = higher). (see data-analysis section for models that subdivide by individual self-report variable).