



This article appeared in a journal published by Elsevier. The attached copy is furnished to the author for internal non-commercial research and education use, including for instruction at the authors institution and sharing with colleagues.

Other uses, including reproduction and distribution, or selling or licensing copies, or posting to personal, institutional or third party websites are prohibited.

In most cases authors are permitted to post their version of the article (e.g. in Word or Tex form) to their personal website or institutional repository. Authors requiring further information regarding Elsevier's archiving and manuscript policies are encouraged to visit:

<http://www.elsevier.com/authorsrights>



Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Focused on fairness: Alcohol intoxication increases the costly rejection of inequitable rewards[☆]



Carey K. Morewedge^{a,*}, Tamar Krishnamurti^a, Dan Ariely^b

^a Carnegie Mellon University, USA

^b Duke University, USA

HIGHLIGHTS

- Intoxication influenced responses to inequity in a modified ultimatum game.
- Intoxicated participants did not more or less equitably divide rewards.
- Intoxicated participants were more likely to reject inequitable rewards.
- Intoxication changed attention to rather than perception of rewards' fairness.

ARTICLE INFO

Article history:

Received 20 September 2011

Revised 12 May 2013

Available online 2 September 2013

Keywords:

Alcohol intoxication
Judgment and decision making
Inequity
Negotiation
Ultimatum game

ABSTRACT

This research examined the effect of alcohol intoxication on the propensity to behave inequitably and responses to inequitable divisions of rewards. Intoxicated and sober participants played ten rounds of a modified ultimatum game in two studies. Whereas intoxicated and sober participants were similarly generous in the proposals they made to their partners, intoxicated participants more often rejected unfair offers than did sober participants. These results were consistent whether alcohol intoxication was self-determined (Study 1) or randomly assigned (Study 2). The results provide insight into the cognitive processes underlying standards of equity and responses to inequity, and elucidate how intoxication influences these processes and subsequent behavioral responses.

© 2013 Elsevier Inc. All rights reserved.

Introduction

The navigation of social life often requires strategic interaction, whether negotiating with friends, enemies, or strangers. Most interactions allow for give and take, but often people must decide whether or not to accept an inequitable division of rewards—a division that would confer substantially less benefit to themselves than to other parties. Alcohol consumption occurs in many formal, informal, and intimate negotiation contexts ranging from boardroom decisions about contracts to bedroom decisions about condom use (Leigh, 2002; Schweitzer & Kerr, 2000). While alcohol may initially act as a social lubricant (Sayette et al., 2012), it does not necessarily produce optimal negotiation outcomes.

[☆] The authors gratefully acknowledge the financial support of Duke University, the Center for Behavioral Decision Research at Carnegie Mellon University, and a National Science Foundation's Graduate Research Fellowship to Tamar Krishnamurti. We thank Jacqueline Bernard, William Castor, Sean Donegan, Christie Ibaraki, Alex Kinzler, Jonathan Lafky, Piper Lincoln, Elliot Onn, Natalie Rogers, Kate Smith, and Spencer Svetcov, for their assistance in the execution of the experiments, and Laurie Santos and Erte Xiao for their helpful comments.

* Corresponding author at: Tepper School of Business, Carnegie Mellon University, 5000 Forbes Ave, Pittsburgh, PA 15213, USA.

E-mail address: morewedge@cmu.edu (C.K. Morewedge).

We examine the influence of alcohol intoxication on decisions to offer and to accept or reject inequitable rewards across repeated social interactions.

The tension surrounding the equity of a dyadic negotiation is captured well by the proposals made and decisions to accept or reject unfair proposals¹ in the ultimatum game. In a typical ultimatum game, an anonymous proposer is given money to divide between herself and an anonymous responder. If the responder accepts the proposal, both earn the amount stipulated. If the responder rejects the proposal, neither earns any money (Güth, Schmittberger, & Schwarze, 1982). After the responder makes a decision, the game is over and they never play again. Most proposers divide the money equally, but unfair proposals are common. Logically, responders should accept any proposal in which they are offered any money, but responders usually reject proposals offering them less than 20–30% of the amount at stake, even if that absolute sum is large and they will never again interact with the proposer (Camerer, 2003). The two components of the decision to

¹ Although what may be considered “unfair” under these circumstances is debatable in line with the common parlance in this literature, we define an *unfair proposal* as one in which the proposer offers less than half of the amount at stake to the responder.

accept or reject unfair proposals are generally agreed upon—responders must tradeoff (1) the reward gained from accepting the proposal against their (2) anger and desire to punish proposers for their inequitable offer.

Rejections can be viewed as a form altruistic punishment. By rejecting an unfair proposal, responders forego their present self-interest (the monetary reward) in order to teach the proposer a lesson that may benefit their future self or other people (Fehr & Fischbacher, 2003; Nowak, Page, & Sigmund, 2000). It is also possible to view rejections as a failure of self-control, as failures to inhibit an immediate desire to punish the proposer for making an unfair offer rather than regulate that impulse to receive the more distal monetary reward. Indeed, the decision to accept unfair offers appears to be contingent on the ability to exert self-control and successfully regulate the impulse to punish proposers for making unfair offers. The propensity for ultimatum game responders to accept unfair proposals is positively related to activity in brain areas that are active when people engage in self-regulation (Tabibnia, Satpute, & Lieberman, 2008), and is inversely related to activity in brain areas active when people experience unpleasant emotions (Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003).

The predominant theory of the effect of alcohol intoxication on behavior posits that intoxication myopically focuses attention upon the most salient cue in the environment and consequently, behavioral responses are contingent on which cue is most salient (MacDonald, Fong, Zanna, & Martineau, 2000; Steele & Josephs, 1990). By manipulating the most salient cue, alcohol can produce increased cooperation or aggression (Schweitzer & Gomberg, 2001; Steele, Critchlow, & Liu, 1985; Zeichner & Pihl, 1979). It can lead people to minimize their exposure to the negative consequences of risky behavior (Fromme, Katz, & D'Amico, 1997; MacDonald et al., 2000), or to become more risk seeking (Burian, Liguori, & Robinson, 2002; MacDonald et al., 2000; Sayette, Kirchner, Moreland, Levine, & Travis, 2004). Alcohol intoxication also limits some aspects of cognitive processing, such as the ability to process peripheral information (Curtin & Fairchild, 2003; Fillmore, Carscadden, & Vogel-Sprott, 1998; Hoaken, Assaad, & Pihl, 1998; Moskowitz, Burns, & Williams, 1985; Schreiber Compo et al., 2011). Alcohol intoxication thus focuses attention on the most salient environmental cue and decreases the scope of attention, minimizing the influence of secondary cues in the environment.

There are good reasons then to predict that alcohol intoxication will affect responses to inequitable offers in negotiation contexts such as the ultimatum game. Either the fairness or the reward associated with the proposal will serve as the most salient cue to the responder. As the responses suggested by these cues are opposing responses, depending on which cue is the more salient, intoxication should increase the probability that a person behaves aggressively in response to inequity (i.e., reject inequitable proposals), or increase the probability that she behaves cooperatively in accordance with her self-interest (i.e., accept inequitable proposals).

Intoxication may also influence the proposals made to the responder. It has been proposed that alcohol intoxication increases aggressive behavior by providing a situational attribution for that behavior or by priming the general construct of aggression (for a review, see Bègue & Subra, 2008). If intoxication increases the ease of making a situational attribution for one's behavior or primes aggression, it may increase the likelihood that proposers offer less money to their partner and try to keep more money for themselves (i.e., increase the inequity of proposals).

We examined the generosity of proposals and rejection rates made by intoxicated and sober participants who played a modified ultimatum game in the field (Study 1) and in the laboratory (Study 2). This game was designed to examine how alcohol intoxication influenced the equity of initial proposals, responses to fair and unfair proposals, and behavior in response to changing cues. A repeated design allowed us to test the extent to which alcohol influenced updating when the equity of proposals changed from one round to the next.

Study 1

Our first test was a field experiment. Pedestrians outside bars were recruited to play a modified ultimatum game after their breath alcohol content (BAC) was recorded. Although alcohol myopia has been found to have similar effects on perception in the laboratory and the field (MacDonald et al., 2000), we chose this field setting in order to recruit a relatively large number of participants from a community sample unfamiliar with psychological theories and experimental economic games. It also allowed for a better approximation of the conditions under which intoxication influences negotiations, since participants regulated their own alcohol intake and therefore could be at levels of intoxication greater than typically induced in experimental settings.

Method

Participants

Two hundred and sixty-eight pedestrians (85 women) in Pittsburgh, PA were recruited outside of bars between the hours of 9 pm and 3 am to earn money in economic games played in a mobile laboratory. Seventy-seven participants had a breath alcohol content of .08 or greater ($M_{BAC} = .06$, $SD = .08$; see Fig. 1), which constitutes legal intoxication in all 50 of the United States of America.

Procedure

Upon entering the mobile laboratory, the BAC of participants was measured with an *Alcoholhawk Pro* breathalyzer and matched to a subject number. They were not told their BAC to reduce the influence of any lay beliefs about intoxication on their behavior. Participants were then seated at a computer in one of six private cubicles (six at a time). After receiving printed and orally recited instructions from the experimenter, they played a modified ultimatum game.

Participants played ten rounds of the game. Participants were proposers on five trials and responders on five trials. All participants began as proposers and alternated roles after each trial. In each trial of the game, the proposer allocated 100 points (i.e., \$1.00) between herself and the responder. Although participants were led to believe that they played all ten rounds with a single anonymous participant in their session, they actually played all ten rounds with a computer program. The computer program accepted all proposals that were ≥ 30 points and rejected proposals that were < 30 points. This cutoff point was based

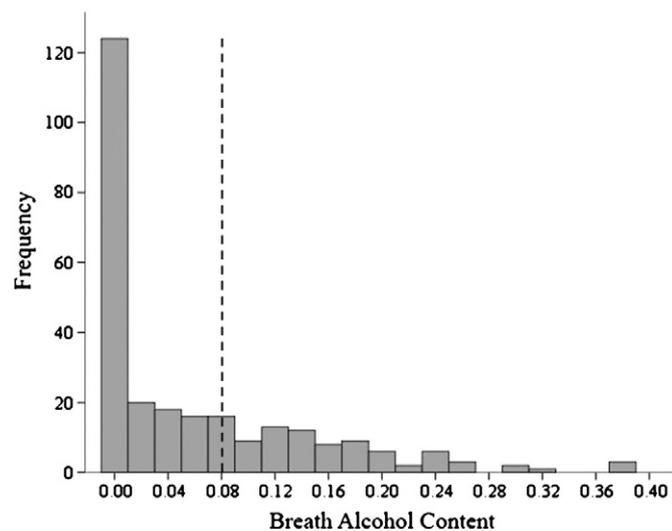


Fig. 1. Distribution of breath alcohol content across participants in Study 1. Breath alcohol content $\geq .08$ constitutes legal intoxication in all 50 states in the United States of America.

on rejection rates exhibited by participants in previous studies in Pittsburgh, PA (Camerer, 2003). The acceptance or rejection of each proposal was displayed a few seconds later.

Participants then played the role of responder and received one of six different first proposals (randomly assigned) that varied from 10 points (selfish) to 60 points (generous) in 10-point increments (see Table 1). After deciding whether to accept or reject that proposal, participants again became proposers and the game was repeated. All participants received the same proposals in subsequent rounds, which varied across rounds (see Table 1). The proposals were amounts randomly selected from the range of normal proposals made in a previous ultimatum game conducted in Pittsburgh, PA (Camerer, 2003). At the end of the experiment, participants received the sum of their earnings. If participants registered a BAC of $\geq .06$, we strongly encouraged them to not drive.

Results

No effects of gender were found. It is not discussed further.

Total earnings

We regressed total amount earned on BAC, first proposal, and their interaction to examine whether intoxication and the first proposal that participants received influenced the total amount of money that participants earned in the game, which revealed a significant linear fit, $F(3, 264) = 12.37, p < .001, R^2 = .12$. Intoxicated participants earned less in the game than did more sober participants, $\beta = -.29, t(266) = 2.97, p = .003$. Unsurprisingly, participants who received larger first proposals also earned more in the game than did participants who received smaller first proposals, $\beta = .16, t(266) = 2.40, p = .02$. This did not interact with intoxication, $t < 1$ (Table 2). Splitting the sample by whether or not participants were legally intoxicated (BAC $\geq .08$) showed that intoxicated participants received lower total earnings ($M = \$2.99, SD = 1.17$) than did sober participants ($M = \$3.64, SD = .91, t(266) = 4.98, p < .001$).

Proposals

First proposals made by participants ranged from 0–100, with the median proposal being 49 points out of the 100 points they could offer. To examine the influence of intoxication on the generosity of proposals, we regressed the first proposals made by participants on BAC. It did not significantly predict the amount initially offered by participants to their partner, $\beta = -.01, t(266) < 1$ (see Table 2). Participants who were legally intoxicated did not make more generous initial proposals to their partners ($M = 46.52, SD = 26.55$) than did participants who were sober ($M = 45.39, SD = 19.24, t < 1$).

To examine the influence of intoxication and the proposals that participants received from their partner on the average size of the proposals that they made, we regressed the average amount that participants offered to their partners ($M = 44.46, SD = .86$) on BAC, first proposal received, and their interaction, which revealed a significant linear fit, $F(2, 264) = 2.78, p = .04$. BAC did not significantly predict average proposal size, $\beta = -.02, t < 1$ (see Table 2), but the amount

Table 1

Points ($x/100$) offered by the proposer to participants in each round by condition.

Round 1	Round 2	Round 3	Round 4	Round 5
10	41	34	46	47
20	41	34	46	47
30	41	34	46	47
40	41	34	46	47
50	41	34	46	47
60	41	34	46	47

Note: Each point was worth 1¢. The proposal in Round 1 was assigned randomly.

Table 2

Total earnings, average proposals, and acceptances by BAC and first offer in Study 1.

	β	t	p
Total earnings			
Breath alcohol content	-.29*	2.97	.003
First offer	.16*	2.40	.02
Interaction	-.04	.41	.68
Average proposal			
Breath alcohol content	-.02	.15	.88
First offer	.13	1.82	.07
Interaction	.10	.95	.34
Number of offers accepted			
Breath alcohol content	-.25*	2.57	.01
First offer	.07	1.03	.30
Interaction	-.02	.17	.87
Lowest offer accepted			
Breath alcohol content	.23*	2.37	.02
First offer	.23*	3.33	.001
Interaction	-.15	1.52	.13

* $p < .05$.

that participants were initially offered did marginally predict the generosity of their average proposal, $\beta = .13, t(266) = 1.82, p = .07$. Their interaction was not significant, $t < 1$. Splitting the sample by whether participants were legally intoxicated, intoxicated participants did not make more or less generous average proposals ($M = 45.8\text{¢}, SD = 18.4$) than did sober participants ($M = 43.9\text{¢}, SD = 11.3, t < 1$).

The generosity of proposals did appear to vary as a function of size of the first proposals that participants received, but intoxication did not influence the initial or average generosity of the proposals. In other words, intoxicated participants were no more generous than sober participants with regards to their initial or average proposals.

Responses

We examined how the propensity to reject proposals would vary as a function of participant intoxication in two ways. First, we regressed the total number of proposals that participants accepted ($M = 3.82, SD = .07$) on BAC, first proposal received, and their interaction, which yielded a significant linear fit, $F(3, 264) = 7.20, p < .001$. Participants with higher BAC (i.e., more intoxicated participants) rejected more proposals than did participants with lower BAC (i.e., less intoxicated participants), $\beta = -.25, t(264) = 2.57, p = .01$ (see Table 2). No significant effect of first offer or interaction was found, $\beta_s \leq .07, t_s \leq 1.03, p_s \geq .30$. Splitting the sample by whether or not participants were legally intoxicated, intoxicated participants accepted fewer proposals ($M = 3.28, SD = 1.35$) than did sober participants ($M = 3.85, SD = 1.16, t(266) = 3.54, p < .001$).

Second, we examined how intoxication would influence the lowest proposal that participants accepted. We regressed BAC, the first proposal received, and their interaction on the lowest proposal that participants accepted ($M = 39.18, SD = 5.13$), which yielded a significant linear fit, $F(3, 253) = 4.76, p = .003$.² Critically, BAC positively predicted the size of the lowest proposal that participants accepted, $\beta = .23, t(254) = 2.37, p = .02$. In other words, intoxicated participants were more likely to reject inequitable proposals than were sober participants. Unsurprisingly, participants were also affected by the size of the first proposal to which they were randomly assigned, such that participants who received smaller first proposals were more likely to accept lower offers, $\beta = .23, t(254) = 3.33, p = .001$. Participants given the opportunity to accept lower proposals were thus more likely to accept them. The interaction was not significant, $\beta = -.15, t(254), p = .13$. Splitting the sample by whether or not participants were legally intoxicated, intoxicated participants demanded a marginally higher offer ($M =$

² Differences in degrees of freedom reflect the exclusion of participants who did not accept any offer while they played the role of responder.

39.97¢, $SD = 5.14$) than did sober participants ($M = 38.83$ ¢, $SD = 5.10$), $t(266) = 1.64$, $p = .10$.

To test whether intoxicated participants were more likely to reject all proposals irrespective of their fairness, we examined the relationship between BAC and acceptance of fair and generous first proposals (i.e., 50 or 60 out of the 100 points) with logistic regression. Overall, participants with a higher BAC were no less likely to accept fair first proposals than were participants with a lower BAC, Wald = 1.97, $p = .16$. Consistent with this finding, splitting the sample by whether or not participants were legally intoxicated showed that intoxicated participants were only marginally less likely to accept fair first offers (84.6%) than were sober participants (89.7%), $\chi^2(1, N = 85) = 2.96$, $p = .09$.

This trend appeared to be driven by the responses of intoxicated participants to generous offers. For fair offers (50/100), participants with higher BAC were no less likely to accept fair first proposals than were participants with lower BAC, Wald = .002, $p = .96$. Consistent with this finding, splitting the sample by whether or not participants were legally intoxicated showed that intoxicated participants were not less likely to accept fair first offers (84.6%) than were sober participants (89.7%), $\chi^2(1, N = 42) = 2.17$, $p = .64$.

For generous offers (60/100), however, participants with higher BAC were less likely to accept first proposals than were participants with lower BAC, Wald = 3.88, $p < .05$. Consistent with this finding, splitting the sample by whether or not participants were legally intoxicated showed that intoxicated participants were less likely to accept generous first offers (76.9%) than were sober participants (96.7%), $\chi^2(1, N = 43) = 4.19$, $p = .04$. It is not clear why intoxicated participants were both equally likely to accept fair offers and less likely to accept generous offers. Perhaps they were more likely to be confused about who was the proposer and who was the responder the first time they received an offer.

Discussion

Although intoxication did not affect the generosity of proposals that participants made, it did affect the sensitivity of responders to unfair proposals. Thus, alcohol intoxication did not appear to influence the social norms that guided the generosity of participants when making proposals, increase the acceptability of selfish behavior, or prime the tendency to act aggressively. Intoxication did, however, increase the threshold at which participants began to reject unfair proposals. Intoxicated participants were as likely as sober participants to accept proposals that were fair, but they rejected larger unfair proposals than did sober participants. Rather than increase the propensity to accept any amount of money that responders were offered, intoxication appears to have increased the focus of responders on the fairness of the proposals they were offered.

The results suggest that alcohol intoxication does not increase the propensity to behave more or less equitably in the absence of a salient cue (when making a first proposal). Intoxication does appear to influence how one responds to inequity, however, and this result has two important implications. First, as intoxication increases the influence of the most salient cue in the present context, this result suggests that the most salient cue to responders was the fairness of the proposal that they were offered and that the benefit of accepting the reward offered was a secondary concern. Second, as intoxicated participants were more likely to reject inequitable offers but similarly likely to accept fair offers, the results provide further support to the theory that alcohol increases aggressive behavior by disinhibiting aggressive responses to hostile cues, rather than by increasing aggressive behavior more generally (Giancola, Josephs, Parrott, & Duke, 2010).

Study 2

The results of our first experiment suggest that alcohol intoxication does not increase the general propensity to behave inequitably, but does increase the propensity to reject inequitable rewards. Intoxication,

however, was self-administered. It is possible that a third variable correlated with the propensity to drink, such as poor self-regulation, might have instead caused differences in decision making between intoxicated and sober participants (e.g., Baumeister, 2003; Masicampo & Baumeister, 2008; Schmeichel, Vohs, & Baumeister, 2003). To rule out this alternative interpretation of the results, intoxication was randomly assigned in Study 2. Laboratory participants assigned to a sober condition drank a placebo beverage and participants assigned to an intoxicated condition drank an alcoholic beverage to the point of intoxication. All participants then played the modified ultimatum game described in Study 1.

Method

Participants

Twenty-seven residents of Pittsburgh, PA (10 women) received \$10 per hour, plus whatever money they earned during the experiment as compensation for participating in the experiment. The experiment lasted approximately 4 h, as participants in the intoxicated condition were required to remain in the laboratory until they were sober. Female participants were not allowed to participate unless they tested negative on a pregnancy test that was administered at the beginning of the experiment.

Procedure

The height and weight of participants were measured prior to the preparation of their drinks. All participants were given two measured drinks to consume in a 15-minute period, followed by a metabolizing period of 15 min. Participants were then breathalyzed and as a manipulation check, reported their perceived level of intoxication on a 7-point scale with endpoints, *Not at all (1) and Very Much (7)*. Participants in the intoxication condition received a beverage consisting of orange juice and 40% alcohol content vodka mixed in a 6:1 juice to pure alcohol ratio calibrated to bring their BAL to .09. The appropriate volume of alcohol to bring their individual BAC to a goal level of .09 was based on each participant's height, weight, age, and sex (Curtin & Fairchild, 2003; Watson, 1989, see appendix for the formula). Participants in the sober condition were led to believe that they were being given alcohol with their orange juice, following the procedure described by MacDonald et al. (2000), MacDonald, Zanna, and Fong (1995), including rubbing the rim of their glass with alcohol. Before they began the ultimatum game, BAC was recorded. Participants were then led to a private cubical and played the modified ultimatum game described in Study 1.

Results

Manipulation checks and omission of data

Participants in the intoxicated condition reported feeling more intoxicated ($M = 2.90$, $SD = 1.30$) than did participants in the sober condition ($M = 1.13$, $SD = 1.05$), $t(24) = 5.08$, $p = .001$. One participant in the intoxicated condition, however, was not legally intoxicated (BAC = .05) and was thus excluded from subsequent analyses. Given the more limited range of BAC among intoxicated participants in Study 2 ($M = .09$, $SD = .02$) and smaller number of participants, intoxication was analyzed as a dichotomous nominal variable and the first proposal they received was used as a covariate in all subsequent analyses rather than as an independent variable.³

³ Note that we include the earnings, proposals, and response results with and without the covariate of first proposal. Its inclusion is more logically sound than its exclusion, as any proposals received after the first proposal is likely to be compared to it. Imagine, for example, that you were first offered 10 or 20 cents out of \$1 and rejected that proposal, and were offered 45 cents in a subsequent round. The latter offer would seem fairer than if you had been offered 50 or 60 cents in the first round.

Total earnings

When the earnings of intoxicated and sober participants were examined with ANCOVA, a marginally significant difference was found such that intoxicated participants earned less ($M = 356.81$, $SD = 63.89$) than did sober participants ($M = 401.73$, $SD = 63.14$), $F(1, 23) = 2.86$, $p = .05$, one-tailed; without the covariate, $t(24) = 1.78$, $p = .045$, one-tailed.

Proposals

Analysis of covariance revealed that intoxicated and sober participants did not differ significantly with respect to the size of the first proposal they offered to their partners ($M_{\text{intoxicated}} = 45.90\text{¢}$, $SD = 14.28$; $M_{\text{sober}} = 38.27\text{¢}$, $SD = 18.60$), or the average size of their five proposals ($M_{\text{intoxicated}} = 48.04\text{¢}$, $SD = 13.40$; $M_{\text{sober}} = 43.09\text{¢}$, $SD = 8.08$), $F(1, 23) = 1.29$, $p = .27$, and $F(1, 23) = 2.35$, $p = .14$, respectively. Without the covariate, $t(24) = 1.13$, $p = .27$ and $t(24) = 1.17$, $p = .25$, respectively. As in Study 1, if intoxication had any effect on proposals, it was that intoxicated participants made slightly fairer proposals than did sober participants.

Responses

Analysis of covariance revealed that intoxicated participants accepted fewer proposals than did sober participants ($M_{\text{intoxicated}} = 3.55$, $SD = .82$; $M_{\text{sober}} = 4.07$, $SD = .70$), $F(1, 23) = 3.15$, $p = .045$ one-tailed; without the covariate, $t(24) = 1.17$, $p = .13$, one-tailed. More important, as in Study 1, intoxicated participants exhibited a significantly higher threshold for the lowest proposal they would accept than did sober participants ($M_{\text{intoxicated}} = 41.55$, $SD = 4.41$; $M_{\text{sober}} = 38.53$, $SD = 4.03$), $F(1, 23) = 6.25$, $p = .01$ one-tailed; without the covariate, $t(24) = 1.81$, $p = .04$, one-tailed.⁴

Discussion

As in Study 1, alcohol intoxication did not increase the general propensity to behave inequitably, but did increase the propensity to reject inequitable rewards. Intoxication did not increase or decrease the generosity of the proposals that participants made to their partners, but intoxication did influence the propensity to reject unfair offers. Intoxicated participants were more likely to reject inequitable proposals than were sober participants. Although underpowered, the results of Study 2 replicate the results of Study 1, suggesting that alcohol intoxication changes how one responds to inequity by increasing the sensitivity to and rejection of inequitable rewards.

General discussion

Alcohol intoxication did not appear to influence the general propensity to behave equitably or inequitably, but it did influence responses to inequitable rewards. Whether intoxication was self-administered or randomly assigned, intoxicated participants made similarly equitable proposals to their ultimatum game partners as did sober participants. Moreover, intoxication increased the sensitivity of participants to the inequity of the proposals that they were offered. Whereas intoxication did not increase the propensity to reject fair proposals that divided rewards equally, intoxicated participants were more likely to reject inequitable proposals than were sober participants.

The results may help to elucidate whether the primary concern when deciding to reject an unfair proposal is the reward gained from

accepting it or the desire to punish proposers for making the unfair proposal. This distinction is important, because it defines whether rejections of unfair proposals are acts of altruism or self-regulation failures. If the reward associated with an unfair proposal is the primary concern of responders and punishing the proposer is a secondary concern, rejections are acts of altruistic punishment because responders are foregoing their present self-interest in order to benefit their future or other selves (e.g., Nowak et al., 2000). If punishing unfair proposers is the primary concern of responders and the reward associated with the unfair proposal is a secondary concern, rejections are acts of self-interest because responders are acting on an initial impulse to punish proposers for subjecting them to the negative emotions that unfair offers evoke (e.g., Blount, 1995; Kahneman, Knetsch, & Thaler, 1986, 1990; Sanfey et al., 2003).

Generally, alcohol intoxication impairs executive cognitive functions involved in controlled and effortful processing (Curtin & Fairchild, 2003; Fillmore et al., 1998; Hoaken et al., 1998; Moskowitz et al., 1985) and reduces the focus and scope of attention to the most salient cue (MacDonald et al., 2000; Steele & Josephs, 1990). As more intoxicated participants were more likely to reject unfair ultimatum game proposals than were sober participants but equally likely to accept fair offers, the most salient cue appeared to be the fairness of the offer that responders received rather than the financial reward associated with its acceptance. Indeed, if the reward were more salient, intoxication should have increased the propensity to accept unfair offers.

It is possible that intoxication affected other cognitive processes that underlie the decision to reject unfair proposals. As documented in countless laboratory and field studies, as well as by the high incidence of intoxication during the commission of violent and impulsive crimes such as marital violence (Boden, Fergusson, & Horwood, 2012; Murdoch & Ross, 1990; Pernanen, 1991), alcohol increases the likelihood that a person will behave aggressively toward other people (Bushman & Cooper, 1990). The results of Studies 1 and 2 suggest that intoxication did not appear to generally prime aggressive behavior or increase its perceived acceptability (Bartholow & Heinz, 2006; Gabor, 1994; Snyder, Higgins, & Stucky, 1983; Sykes & Matza, 1957). Intoxicated participants made similarly equitable proposals as did sober participants, and were similarly likely to accept fair proposals. If alcohol intoxication served to prime or increase the perceived acceptability of aggressive behavior, one would expect that intoxicated participants would make less equitable proposals to their partners.

Alcohol intoxication is more likely to have disinhibited aggressive responding to hostile cues (Giancola et al., 2010). The greater propensity of intoxicated participants to reject unfair offers appears to have been due to a greater propensity to respond to a hostile cue with aggression (i.e., an unfair offer with a rejection). It is also possible, however, that intoxication allowed participants to make more external attributions for responding aggressively to a hostile cue. Disentangling whether intoxication increases the rejection of unfair proposals only because fairness is the most salient cue or whether the excusing of aggressive responses to hostile cues also contributed to this increase is a question left for future research, as the design of Studies 1 and 2 is limited in its ability to answer this question.

In sum, we found that alcohol intoxication has different effects on the rewards that people offer and their decision to accept or reject the rewards that they are offered in a dyadic negotiation context. Intoxication did not influence the division of rewards that participants proposed, but did influence their decisions to accept or reject proposals to divide rewards inequitably. Whereas participants were no more likely to reject fair divisions if intoxicated or sober, participants were significantly more likely to reject unfair divisions if intoxicated than sober. Rather than increase the general propensity to behave equitably or inequitably in dyadic negotiation settings, it seems that alcohol intoxication leads to an increased focus on how fairly one is treated.

⁴ We did not compare the acceptance of fair and generous first proposals by intoxication in Study 2 due to the small number of participants who received fair and generous offers ($n = 8$).

Appendix. Formulae to determine alcohol dosage

The formulae used to determine the alcohol dosage for participants were drawn from Curtin and Fairchild (2003). These formulae are based on the premise that blood-alcohol level (BAL) is a function of an individual's height, weight, age, gender, total body water (TBW); duration of the drinking period (DDP); time to peak BAL (TPB); and alcohol metabolism rate (MR). The average metabolism rate for all participants was assumed to be 0.015 g/100 ml/h.

$$\text{Dosage (g)} = (10 \times \text{BAL} \times \text{TBW}) / 0.8 + 10 \times \text{MR} \times (\text{DDP} + \text{TPB}) \times (\text{TBW} / 0.8)$$

Total body water calculations were made separately for men and women using formulae from Watson (1989).

$$\text{TBW (males)} = 2.447 - 0.09516 \times \text{age} + 0.1074 \times \text{height (cm)} + 0.3362 \times \text{weight (kg)}$$

$$\text{TBW (females)} = -2.097 + 0.1069 \times \text{height (cm)} + 0.2466 \times \text{weight (kg)}$$

References

- Bartholow, B. D., & Heinz, A. (2006). Alcohol and Aggression Without Consumption Alcohol Cues, Aggressive Thoughts, and Hostile Perception Bias. *Psychological Science, 17*, 30–37.
- Baumeister, R. F. (2003). Ego depletion and self-regulation failure: A resource model of self-control. *Alcoholism, Clinical and Experimental Research, 27*(2), 1–4.
- Bègue, L., & Subra, B. (2008). Alcohol and aggression: Perspectives on controlled and uncontrolled social information processing. *Social and Personality Psychology Compass, 2*, 511–538.
- Blount, S. (1995). When social outcomes aren't fair: The effect of causal attributions on preferences. *Organizational Behavior and Human Decision Making Processes, 63*, 131–144.
- Boden, J. M., Fergusson, D. M., & Horwood, L. J. (2012). Alcohol misuse and violent behavior: Findings from a 30-year longitudinal study. *Drug and alcohol dependence, 122*, 135–141.
- Burian, S. E., Liguori, A., & Robinson, J. H. (2002). Effects of alcohol on risk-taking during simulated driving. *Human Psychopharmacology: Clinical and Experimental, 17*, 141–150.
- Bushman, B. J., & Cooper, H. M. (1990). Effects of alcohol on human aggression: An integrative research review. *Psychological bulletin, 107*, 341–354.
- Camerer, C. F. (2003). *Behavioral game theory: Experiments in strategic interaction*. New York: Princeton University Press.
- Curtin, J., & Fairchild, B.A. (2003). Alcohol and cognitive control: Implications for regulation of behavior during response conflict. *Journal of Abnormal Psychology, 112*(3), 424–436.
- Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature, 425*, 785–791.
- Fillmore, M., Carscadden, J., & Vogel-Sprott, M. (1998). Alcohol, cognitive impairment, and expectancies. *Journal of Studies on Alcohol, 59*, 174–179.
- Fromme, K., Katz, E., & D'Amico, E. (1997). Effects of alcohol intoxication on the perceived consequences of risk taking. *Experimental and Clinical Psychopharmacology, 5*, 14–23.
- Gabor, T. (1994). *Everybody does it!: Crime by the public*. Toronto, CA: University of Toronto Press.
- Giancola, P. R., Josephs, R. A., Parrott, D. J., & Duke, A. A. (2010). Alcohol myopia revisited clarifying aggression and other acts of disinhibition through a distorted lens. *Perspectives on Psychological Science, 5*, 265–278.
- Güth, W., Schmittberger, R., & Schwarze, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior & Organization, 3*, 367–388.
- Hoaken, P. N., Assaad, J., & Pihl, R. O. (1998). Cognitive functioning and the inhibition of alcohol-induced aggression. *Journal of Studies on Alcohol, 59*, 599–607.
- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1986). Fairness and the assumptions of economics. *Journal of Business, 59*, 285–300.
- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1990). Fairness as a constraint on profit seeking: Entitlements in the market. *The American Economic Review, 76*, 728–741.
- Leigh, B. (2002). Alcohol and condom use: A meta-analysis of event-level studies. *Sexually Transmitted Diseases, 29*, 476–482.
- MacDonald, T. K., Fong, G. T., Zanna, M. P., & Martineau, A. (2000). Alcohol myopia and condom use: Can alcohol intoxication be associated with more prudent behavior? *Journal of Personality and Social Psychology, 78*, 605–619.
- MacDonald, T. K., Zanna, M. P., & Fong, G. T. (1995). Decision making in altered states: The effects of alcohol on attitudes toward drinking and driving. *Journal of Personality and Social Psychology, 68*, 973–985.
- Masicampo, E. J., & Baumeister, R. F. (2008). Toward a physiology of dual-process reasoning and judgment: Lemonade, willpower, and expensive rule-based analysis. *Psychological Science, 19*, 255–260.
- Moskowitz, H., Burns, M. M., & Williams, A. F. (1985). Skills performance at low blood alcohol levels. *Journal of Studies on Alcohol, 46*, 482–485.
- Murdoch, D., & Ross, D. (1990). Alcohol and crimes of violence: Present issues. *Substance use & misuse, 25*, 1065–1081.
- Nowak, M.A., Page, K. M., & Sigmund, K. (2000). Fairness versus reason in the ultimatum game. *Science, 289*(5485), 1773–1776.
- Pernanen, K. (1991). *Alcohol in human violence*. New York, NY: Guilford Press.
- Sanfey, A. G., Rilling, J. K., Aronson, J. A., Nystrom, L. E., & Cohen, J.D. (2003). The neural basis of economic decision-making in the ultimatum game. *Science, 300*, 1755–1758.
- Sayette, M.A., Creswell, K. G., Dimoff, J.D., Fairbairn, C. E., Cohn, J. F., Heckman, B. W., et al. (2012). Alcohol and group formation: A multimodal investigation of the effects of alcohol on emotion and social bonding. *Psychological Science, 23*, 869–878.
- Sayette, M.A., Kirchner, T. R., Moreland, R. L., Levine, J. M., & Travis, T. (2004). Effects of alcohol on risk-seeking behavior: A group-level analysis. *Psychology of Addictive Behaviors, 18*, 190–193.
- Schmeichel, B. J., Vohs, K. D., & Baumeister, R. F. (2003). Intellectual performance and ego depletion: Role of the self in logical reasoning and other information processing. *Journal of Personality and Social Psychology, 85*, 33–46.
- Schreiber Compo, N., Evans, J. R., Carol, R. N., Kemp, D., Villalba, D., Ham, L. S., et al. (2011). Alcohol intoxication and memory for events: A snapshot of alcohol myopia in a real-world drinking scenario. *Memory, 19*, 202–210.
- Schweitzer, M. E., & Gomberg, L. (2001). The impact of alcohol on negotiator behavior: Experimental evidence. *Journal of Applied Social Psychology, 31*(10), 2095–2126.
- Schweitzer, M. E., & Kerr, J. F. (2000). The role of alcohol in negotiations. *Academy of Management, 14*, 47–57.
- Snyder, C. R., Higgins, R. L., & Stucky, R. J. (1983). *Excuses: Masquerades in search of grace*. New York: Wiley.
- Steele, C. M., Critchlow, B., & Liu, T. J. (1985). Alcohol and social behavior. 11: The helpful drunkard. *Journal of Personality and Social Psychology, 48*, 35–46.
- Steele, C. M., & Josephs, R. A. (1990). Alcohol myopia: Its prized and dangerous effects. *American Psychologist, 45*, 921–933.
- Sykes, G. M., & Matza, D. (1957). Techniques of neutralization: A theory of delinquency. *American sociological review, 22*, 664–670.
- Tabibnia, G., Satpute, A.B., & Lieberman, M.D. (2008). The sunny side of fairness: Preference for fairness activates reward circuitry (and disregarding unfairness activates self-control circuitry). *Psychological Science, 19*, 339–347.
- Watson, P. E. (1989). Total body water and blood alcohol levels: Updating the fundamentals. In K. Crow, & R. Batt (Eds.), *Human metabolism of alcohol. Pharmacokinetics, medicolegal aspects, and general interest, 1*. (pp. 41–58). Boca Raton, FL: CRC Press.
- Zeichner, A., & Pihl, R. O. (1979). Effects of alcohol and behavior contingencies on human aggression. *Journal of Abnormal Psychology, 88*(2), 153–160.