

Pissed Drunk: The Effects of Anger on Binge Drinking Behavior

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ABSTRACT

Researchers have studied everything from rock climbing to financial decision making with the goal of understanding what factors influence the phenomena of risk taking. While researchers have identified specific emotional states – namely anger – that have an immediate effect on risk evaluations, little research has attempted to generalize these findings to real world examples of risk-taking behavior. We conducted research that focused on identifying personality features (such as a tendency to act impulsively when angered) that predict binge drinking behavior (a real world example of risk taking). One-hundred-eighteen participants were randomly assigned to a neutral or an angry emotional state. After the emotional states were induced through a nature video (neutral emotional state) or a frustrating mock jury scenario involving two confederates who resist consensus (angry emotional state), participants completed the State-Trait Anger Expression Inventory (STAXI-2), the Balloon Analogue Risk Task (BART), the Barrett Impulsiveness Scale (BIS-11), and a questionnaire on their alcohol consumption. Correlational and regression analyses supported previous research demonstrating the influence of impulsivity on binge drinking behavior beyond the effects of gender.

INTRODUCTION

Risk-taking behaviors are all around us. Researchers have studied everything from rock climbing to financial decision making with the goal of understanding what factors influence the phenomena of risk taking (e.g., Grable & Roszkowski, 2008; Howard, Yan, Ling, & Min, 2002). Although definitions of risk-taking behavior vary considerably, we will define it as an individual engaging in a behavior that could result in undesired outcomes in order to achieve a desired goal (Byrnes, Miller, & Schafer, 1999). Traditionally, researchers have looked at risk-taking through the lens of cognition, but recently some researchers have proposed explanations that involve a strong influence of affect (Forgas, 1995; Loewenstein, Weber, Hsee, & Welch, 2001). Whereas cognitive researchers focus on rational evaluations of risk and reward, explanations involving affect often deal with the immediate effect of affective states on decision making (Loewenstein et al., 2001). This study explored the relationship between affective states and a specific risky behavior – binge drinking.

Binge Drinking

Binge drinking is recognized as a problem in the United States, especially among college students. Binge drinking has been linked to negative outcomes such as unplanned sexual acts, drinking and driving, and aggressive behaviors (Jennison, 2004; Wechsler, Davenport, Dowdall, & Moeykens, 1994). The definition of “binge drinking” remains a controversial issue. An influential study by Wechsler, Dowdall, Davenport, and Rimm (1995) defined problematic binge drinking as five drinks in one sitting for males and four for females. Courtney and Polich (2009) added intervals to the definition: men drinking five drinks in two hours or women drinking four drinks in two hours; the drinking must occur on more than one occasion within the past six months. Still, others have questioned the value of the traditional binge/non-binge dichotomy and offered more complex systems that account for differential behavior patterns among heavy drinkers (Read, Beattie, Chamberlain, & Merrill, 2008). In the current study we attempted to negotiate between traditional definitions (i.e. Wechsler et al., 1994), more recent definitions incorporating intervals (Courtney & Polich, 2009; Cranford, McCabe, & Boyd, 2006), and non-dichotomous definitions (Read et al., 2008) by obtaining multiple indices of drinking behavior and analyzing each as a continuous variable.

Anger and Risk Taking

Although affective states have been linked to outcome behaviors, research involving affect reflects a large variation in effects due to the high variance in types of mood and the level of physiological arousal apparent in individuals across affective states. In particular, angered individuals appear to act in ways less indicative of other

high intensity affective states. For example, Leith and Baumeister (1996) found that when testing anger (negative affect with arousal), participants' risk taking increased significantly. These results were not reproduced when neutral arousal and negative affect were tested separately, indicating that anger has a unique effect on risk-taking behavior.

Other Factors That Influence Risk Taking

Personality factors related to impulsivity have also been shown to have a significant effect on risk taking (Stanford, Greve, Boudreaux, & Mathias, 1996). Impulsivity is broadly defined as "the tendency to think, control, or plan insufficiently" (Guerrieri et al., 2007, p. 66). Recently, several researchers have explained the connection between impulsivity and affect through the concept of urgency, which is the tendency to act more impulsively and take more risks while in a state of intense (positive or negative) affect (Cyders & Smith, 2008; Phillips, Hine, & Marks, 2009). Individuals with high trait urgency are more likely to consume more alcohol when drinking and to engage in more episodes of heavy drinking (Cyders, Flory, Rainer, & Smith, 2009; Fischer, Anderson, & Smith, 2004; Smith et al., 2007).

Studies on gender and drinking behavior have resulted in similar findings. Grucza, Norberg, and Bierut (2009) analyzed three decades of data from the National Survey on Drug Use and Health (NSDUH) and found increased binge drinking levels in female college students and no change in the high rates of male college students. Despite these parallel findings with respect to binge drinking specifically, the relationship between gender, risk taking, and impulsivity is complex and inconclusive. In a comprehensive review of the literature on impulsivity, Cross, Copping, and Campbell (2011) observed that sex-based differences are greater in low-level motivational processes, such as risk taking and sensation seeking. They also stressed the cognitive distinctions between sensation seeking and risk taking – individuals are likely to carefully plan a skydiving trip as opposed to a night of promiscuous sex, for example – and suggested that "risky impulsivity" may underlie more destructive behaviors. A related meta-analysis found that men are indeed more likely to engage in various risk-taking behaviors, including drinking/drug use (grouped), but these effects are age, situation, and task dependent (Byrnes et al., 1999).

Objectives

Despite the rich and complex literature examining variables related to a real life risk taking behavior, binge drinking, and the distinct literature exploring the relationship between state anger and risk taking behavior in the lab, to the best of our knowledge no study has attempted to merge the two schools of thought. This study explored the relationship between state anger and binge drinking behavior by using an empirical risk-taking measure as a substitute for actually observing binge drinking behavior. We predicted that participants in the angry mood condition would take significantly more risks than participants in the neutral mood condition. We also predicted that risk-taking behavior in the lab would have a significant positive relationship with real-world binge drinking behavior. Finally, we planned to monitor the effects of gender and trait impulsivity, positing that these variables would have a relationship with binge drinking behavior.

METHOD

Participants

Our participants were 118 undergraduates at the University of Wisconsin-La Crosse who received course credit points for participating. Participants were enrolled either in an introductory psychology course or a higher level abnormal psychology course. We intentionally recruited from a higher level course to offset the effect of the legal drinking age on alcohol consumption and to increase the probability of obtaining a well-distributed sample of drinking behaviors. Participant age was well-distributed ($M = 20.13$, $SD = 1.50$) and the sample included comparable grade level ratios (22 freshmen, 30 sophomores, 31 juniors, 35 seniors). 78.8% of the sample identified as female, 21.2% male. The sample was 89.8% White/Caucasian.

Materials

State-Trait Anger Expression Inventory (STAXI-2). The STAXI-2 is a self-report instrument that includes three separate scales. Ten questions measure state (momentary) anger, 15 questions measure trait (dispositional) anger, and 30 questions measure anger expression (Kassinove, Roth, Owens, & Fuller, 2002). Each scale consists of Likert scale questions with response ranges from 1 to 4. On the State Anger Scale and the Anger Expression Scale, these scores indicate a range from "Almost never" (1) to "Almost always" (4); on the Trait Anger Scale, these scores indicate a range from "Not at all" (1) to "Very much so" (4). The STAXI-2 has demonstrated good to excellent test-retest reliability, with Cronbach's alphas ranging from .75 to .94 for the inventory and its subscales (Spielberger, 1999).

Balloon Analog Risk Task (BART). The BART is a computer-based risk assessment instrument that allows participants to blow up a balloon by clicking a button (White, Lejuez, & de Wit, 2008). As the balloon grows, so does the participant's score. However, the balloon could possibly explode after each click, in which case the participant would gain nothing. The participant always has the choice to cash out their current accrued reward and move on to the next balloon (White et al., 2008). The BART was beneficial for the current research because, compared to other measures of risk taking, it assesses performance under *varying* risk levels (Figner, Mackinlay, Wilkening, & Weber, 2009; White et al., 2008). The BART has been tested for test-retest reliability with acceptable results (Cronbach's alpha of .77; White et al., 2008). Scores on the BART have been shown to account for more variation in real-world risk behaviors (including alcohol abuse), than either demographic information or personality constructs such as impulsivity (Lejuez et al., 2002). The standard protocol for scoring the BART is the mean number of total clicks on non-exploding balloons (Lejuez et al., 2002; Upton, Bishara, Ahn, & Stout, 2011).

Barratt-Impulsiveness Scale (BIS-11). The BIS-11 is a self-report instrument that consists of 30 Likert scale questions with response ranges from "Rarely/Never" (1) to "Almost Always/Always" (4). Statements include "I plan trips well ahead of time," and "I act on the spur of the moment." The BIS has demonstrated good test-retest reliability (Cronbach's alpha of .82; Spinella, 2007) and is widely used in clinical work and research related to substance abuse (Carlson, Johnson, & Jacobs, 2010; Fox, Bergquist, Gu, & Sinha, 2010).

Procedures

Participants signed up in maximum groups of ten for each session, and each session was pre-assigned as a neutral or angry affect condition. At the beginning of each session, the researchers obtained written informed consent. Replicating Leith and Baumeister's (1996) protocol for inducing neutral affect, which involved an innocuous nature documentary, participants in the neutral affect condition watched 15 minutes of a PBS program entitled "Hummingbirds: Magic in the Air". Participants in the anger condition completed a mock jury scenario designed to be frustrating.

The participants in the mock jury sat around a table and the experimenter distributed a short summary of a court case in which the evidence exclusively favored a guilty verdict. The experimenter informed the participants that, although they signed up for an hour-long study, if they could reach a unanimous verdict in 15 minutes, they would be released early and would still receive full participation credit. The participants were joined by two confederates. Both confederates originally disagreed with the verdict that was reached by the rest of the group. After approximately seven minutes of deliberations, the first confederate changed his view and acquiesced to the majority. However, the second confederate remained in opposition to the views of the group until the deadline expired. Participants in both conditions then completed the State Anger Scale portion of the STAXI-2.

After participants completed the anger assessment, they were directed to an adjacent computer lab to complete 15 trials of the Balloon Analogue Risk Task (BART) on individual computers. Finally, all participants completed the Trait Anger Scale (STAXI-2), the Anger Expression Scale (STAXI-2), the Barratt Impulsiveness Scale (BIS-11), and a masked survey of drinking behavior. The survey contained questions about basic demographics and questions about drinking behavior (the frequency and duration of drinking episodes and the quantity of alcohol consumed) intermixed with unrelated questions about general dining habits (i.e., "How often do you eat out?"). After completing the survey, participants were debriefed. The experimenters took special care to ensure that participants who were placed in the angry affect condition had regained a safe affect before leaving the lab.

RESULTS

To ensure normality, we conducted outlier analyses before proceeding. An initial frequency distribution revealed univariate outliers in two data sets for the age variable. Logarithmic, square root, and reciprocal transformations did not adequately correct for positive skewness, and the data sets were removed. Four data sets presented with irregular Mahalanobis distance, indicating multivariate outliers, and they were subsequently removed. The final sample included data from 112 participants (49 neutral affect, 63 angry affect).

Table 1 presents the results of a correlation analysis between the primary variables of interest. There was a significant relationship between affect condition and scores on the State Anger Scale ($r = .65, p < .01$), indicating that the mock jury protocol successfully induced feelings of anger. No relationship was found between our measure of binge drinking behavior (self-reported number of drinks consumed in a typical two hour period of drinking) and BART scores or scores on the State Anger Scale. Two independent variables shared a significant relationship with binge drinking behavior: gender ($r = -.25, p < .01$) and impulsivity ($r = .24, p < .01$). Male participants and participants who reported higher trait impulsivity were more likely to consume more drinks in a typical two hours of drinking.

Table 1. Correlations between variables related to risk taking behavior

Scale	1	2	3	4	5	6	7	8	9	10	11	12
1. CON	-											
2. GEN	-.00	-										
3. AGE	-.16	-.14	-									
4. YR-SC	-	-.01	.77**	-								
5. D/6M	.28**	-.01	.13	.23*	-							
6. D/1W	-.13	.03	.15	.24*	.69**	-						
7. D/2H	-.06	-	.03	-.01	.48**	.30**	-					
8. S-ANG	.65**	.07	-.16	-.17	-.13	-.05	.07	-				
9. T-ANG	.07	-.06	-.18	-.23*	-.03	-.05	.16	.27**	-			
10. ANG-X	.11	-.09	-.17	-.22*	-.08	.03	.12	.22*	.62**	-		
11. BIS	.27**	-.18	-.12	-.21*	.06	.12	.24**	.19*	.25**	.26**	-	
12. BART	.07	.02	-.11	-.18	-.14	-.08	.12	.10	.05	-.00	.09	-

Note. CON = Mood Condition; GEN = Gender; AGE = Age; YR-SC = Years in school; D/6M = Drinking episodes in typical 6 months; D/1W = Drinking episodes in typical week; D2H = Drinks consumed in a typical 2 hours of drinking; S-ANG = State Anger Inventory; T-ANG = Trait Anger Inventory; ANG-X = Anger Expression Inventory; BIS = Barratt Impulsiveness Score; BART = Balloon Analogue Risk Task.
*p < .05. **p < .01. N = 112.

A linear regression analysis was performed to assess the respective contributions of participant gender and self-reported impulsivity with respect to binge drinking behavior. Because gender had a significant relationship with the dependent variable ($r = -.25, p < .01$), it was entered as a covariate in the first step of the regression model. Scores on the BIS-11 were entered as an explanatory variable in the second step of the model in order to evaluate the contribution of trait impulsivity to binge drinking behavior. Table 2 provides the final results of the model. The variation in binge drinking behavior that can uniquely be accounted for by each explanatory variable (R^{Δ}) and standardized regression coefficients (β) are included. The model incorporating both gender and trait impulsivity accounted for 10% of the variance in self-reported binge drinking behavior and was significant. Independently, gender accounted for 6% of the variance and was significant; impulsivity accounted for 4% and the model remained significant. In other words, impulsivity traits accounted for a significant portion of the variance in participants' binge drinking behavior, beyond the significant variance associated with gender.

Table 2. Summary of linear regression analysis for variables related to drinking episodes in a typical two-hour period

Variable	B	B SE	β
Gender	-0.40	0.18	-0.21*
Impulsivity (BIS)	0.02	0.01	.021*

Note. $R^{\Delta} = .06$ for Gender; $R^{\Delta} = .04$ for Impulsivity; *p < .05. N = 112.

DISCUSSION

Our linear regression results supported previous studies that demonstrated independent effects of trait impulsivity (Cyders et al., 2009; Fischer et al., 2004; Smith et al., 2007) and gender (Byrnes et al., 1999) on binge drinking behavior. Although we did not observe a significant relationship between state anger and drinking behavior in this study, the significant positive relationship between state anger and trait impulsivity ($r = .19, p < .05$) lends some support to the concept of negative urgency (Cyders & Smith, 2008; Phillips et al., 2009). In the context of the current study, this result suggests that participants with higher trait impulsivity were more likely to experience higher state anger levels in response to the mock-jury procedure.

Our initial hypotheses, that participants in the angry mood condition would take significantly more risks than participants in the neutral mood condition and that risk-taking behavior in the lab would have a significant positive relationship with real-world binge drinking behavior, were not supported. This was particularly surprising in the

case of our first hypothesis because it represented a theoretical replication of the results of Leith and Baumeister (1996). When this relationship did not emerge (BART performance was not significantly related to emotional state), we were unable to accurately proceed with the more ambitious half of our hypotheses (i.e. risk taking behavior in the lab under differing emotional states predicting self-reported drinking behavior). In the aforementioned study participants were either angered individually or induced into a neutral emotional state by viewing a nature documentary (Leith & Baumeister, 1996). They were subsequently given a single choice between two lotteries with different potential rewards and explicit chances of success. Although it is difficult to interpret our divergent results because of a lack of studies examining state anger and risk taking using a comparable methodology, studies examining risk taking in relation to other emotional states have more commonly used multi-trial tasks, such as the BART and the Iowa Gambling Task (IGT), to assess risk taking behavior (Heilman, Crişan, Houser, Miclea, & Miu, 2010; Upton et al., 2011). Leith and Baumeister's (1996) use of a single-trial task may explain our inability to replicate their results. We did modify the BART from its typical 30-trial format to a 15-trial format in order to reduce the total time requirement of the study, but this is unlikely to have resulted in the disparity between our results and those of Leith and Baumeister (1996). However, we also modified typical BART procedure by not offering a monetary reward for performance. It is common practice to offer a reward for performance on a risk assessment task because this provides external motivation that increases external validity, and Bornovalova and colleagues (2009) demonstrated that scores on the BART are indeed impacted by the amount of rewards provided (Lejuez et al., 2002; Upton et al., 2011). Leith and Baumeister (1996) provided financial rewards to participants in their fictional lottery task ranging from \$1.40 to \$25, and this may explain our inability to replicate their results.

Another factor that may explain our divergent results is our novel method for inducing anger in a group. Previous researchers, including Leith and Baumeister (1996), have primarily relied on individually angering participants. State anger has previously been dichotomized into interpersonal/non-interpersonal anger, labels that respectively apply when anger is aimed at others or felt internally (Why & Johnston, 2008). The STAXI-2 contains subscales that can potentially be used to assess these aspects of anger feelings, but our sample size is not large enough to accurately interpret these results. It should be noted that the inducement of interpersonal state anger does not necessarily invalidate the results of any study related to binge drinking or risk-taking behavior. Because binge drinking is likely to occur in both social and isolated contexts, this aspect of state anger should be addressed in future research. It should also be noted that, although our mock-jury procedure was designed to anger each member of the group, previous studies have not necessarily refrained from inducing similar interpersonal anger. In fact, Leith and Baumeister (1996) induced both remembered anger (internal) and anger at the experimenter (interpersonal), which decreases the likelihood that the interpersonal/non-interpersonal dichotomy can account for our divergent results.

A promising direction for future studies on the relationship between state anger and drinking behavior is to focus on clinical populations. Although binge drinking in the general and college populations is associated with many predictive variables (discussed in "Limitations"), it is possible that state anger plays a more central role in individuals with a history of alcohol dependence. Chiang, Schuetz, and Soyka (2002) found that irritability increased cravings in alcoholics undergoing abstinence treatment. Another study found that stress-induced alcohol cravings were associated with increases in state anger, but the relationship between state anger and alcohol cravings was not examined directly (Fox, Bergquist, Hong, & Sinha, 2007). This relationship is already documented in individuals undergoing smoking-cessation, and it represents an avenue for continued research on state anger and binge drinking with important clinical implications (Patterson, Kerrin, Wileyto, & Lerman, 2008).

LIMITATIONS

A major limitation of this study was our inability, due to practical and ethical constraints, to directly test the effect of state anger on binge drinking behavior. Binge drinking behavior has documented associations with a large variety of predictive variables (gender role perception, Peralta, Steele, Nofziger, & Rickles, 2010; college climate, Seo & Li, 2009; drinking beliefs, Turrise, Wiersma, & Hughes, 2000; etc.), and in this context participants' behavior in an artificial lab environment is not an ideal predictor of behavior in the real world. Due to this limitation, support of our hypotheses would have primarily indicated the value of pursuing a more direct methodology. A second major limitation was the moderate drinking behavior that our sample exhibited. Sample means were generally below expected means for the college population (Carlson et al., 2010; Grucza et al., 2009; Seo & Li, 2009). Previous studies have found relationships between anger, gender, and risk taking behavior, and based on the significant relationship between gender and binge drinking behavior seen in this study, it is possible that our original hypotheses may hold true only for men (Byrnes et al., 1999; Cross et al., 2011; Grucza et al., 2009). However, the low percentage of males in our sample limited our ability to explore this possibility.

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REFERENCES

- Bornoalova, M. A., Cashman-Rolls, A., O'Donnell, J. M., Ettinger, K., Richards, J. B., deWit, H. H., & Lejuez, C. W. (2009). Risk taking differences on a behavioral task as a function of potential reward/loss magnitude and individual differences in impulsivity and sensation seeking. *Pharmacology, Biochemistry and Behavior*, *93*(3), 258-262. doi:10.1016/j.pbb.2008.10.023
- Byrnes, J., Miller, D., & Schafer, W. (1999). Gender differences in risk taking: A meta-analysis. *Psychological Bulletin*, *125*(3), 367-383. doi:10.1037/0033-2909.125.3.367
- Carlson, S. R., Johnson, S. C., & Jacobs, P. C. (2010). Disinhibited characteristics and binge drinking among university student drinkers. *Addictive Behaviors*, *35*(3), 242-251. doi:10.1016/j.addbeh.2009.10.020
- Chiang, S. W., Schuetz, C. G., & Soyka, M. (2002). Effects of irritability on craving before and after cue exposure in abstinent alcoholic inpatients: Experimental data on subjective response and heart rate. *Neuropsychobiology*, *46*(3), 150-160. doi:10.1159/000066392
- Courtney, K., & Polich, J. (2009). Binge drinking in young adults: Data, definitions, and determinants. *Psychological Bulletin*, *135*(1), 142-156. doi:10.1037/a0014414
- Cranford, J. A., McCabe, S., & Boyd, C. J. (2006). A new measure of binge drinking: Prevalence and correlates in a probability sample of undergraduates. *Alcoholism: Clinical and Experimental Research*, *30*(11), 1896-1905. doi:10.1111/j.1530-0277.2006.00234.x
- Cross, C. P., Copping, L. T., & Campbell, A. (2011). Sex differences in impulsivity: A meta-analysis. *Psychological Bulletin*, *137*(1), 97-130. doi:10.1037/a0021591
- Cyders, M. A., Flory, K., Rainer, S., & Smith, G. T. (2009). The role of personality dispositions to risky behavior in predicting first-year college drinking. *Addiction*, *104*(2), 193-202. doi:10.1111/j.1360-0443.2008.02434.x
- Cyders, M., & Smith, G. (2008). Emotion-based dispositions to rash action: Positive and negative urgency. *Psychological Bulletin*, *134*(6), 807-828. doi:10.1037/a0013341
- Figner, B., Mackinlay, R., Wilkening, F., & Weber, E. (2009). Affective and deliberative processes in risky choice: Age differences in risk taking in the Columbia Card Task. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *35*(3), 709-730. doi:10.1037/a0014983
- Fischer, S., Anderson, K. G., & Smith, G. T. (2004). Coping with distress by eating or drinking: Role of trait urgency and expectancies. *Psychology of Addictive Behaviors*, *18*(3), 269-274. doi:10.1037/0893-164X.18.3.269
- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin*, *117*(1), 39-66. Retrieved from PsycINFO database.
- Fox, H. C., Bergquist, K. L., Gu, P., & Sinha, R. (2010). Interactive effects of cumulative stress and impulsivity on alcohol consumption. *Alcoholism: Clinical and Experimental Research*, *34*(8), 1376-1385. Retrieved from EBSCOhost.
- Fox, H. C., Bergquist, K. L., Hong, K., & Sinha, R. (2007). Stress-induced and alcohol cue-induced craving in recently abstinent alcohol-dependent individuals. *Alcoholism: Clinical and Experimental Research*, *31*(3), 395-403. doi:10.1111/j.1530-0277.2006.00320.x
- Grable, J., & Roszkowski, M. (2008). The influence of mood on the willingness to take financial risks. *Journal of Risk Research*, *11*(7), 905-923. doi:10.1080/13669870802090390
- Gruza, R., Norberg, K., & Bierut, L. (2009). Binge drinking among youths and young adults in the United States: 1979-2006. *Journal of the American Academy of Child & Adolescent Psychiatry*, *48*(7), 692-702. doi:10.1097/CHI.0b013e3181a2b32f
- Guerrieri, R., Nederkoorn, C., Stankiewicz, K., Alberts, H., Geschwind, N., Martijn, C., et al. (2007). The influence of trait and induced state impulsivity on food intake in normal-weight healthy women. *Appetite*, *49*(1), 66-73. doi:10.1016/j.appet.2006.11.008
- Heilman, R. M., Crişan, L. G., Houser, D., Miclea, M., & Miu, A. C. (2010). Emotion regulation and decision making under risk and uncertainty. *Emotion*, *10*(2), 257-265. doi:10.1037/a0018489

- Howard, R., Yan, T., Ling, L., & Min, T. (2002). Risk taking and metamotivational state. *Personality and Individual Differences*, 32(1), 155-165. doi:10.1016/S0191-8869(01)00014-9
- Jennison, K. M. (2004). The short-term effects and unintended long-term consequences of binge drinking in college: A 10-year follow-up study. *The American Journal of Drug and Alcohol Abuse*, 30(3), 659-684. doi:10.1081/ADA-200032331
- Kassinove, H., Roth, D., Owens, S., & Fuller, J. (2002). Effects of trait anger and anger expression style on competitive attack responses in a wartime prisoner's dilemma game. *Aggressive Behavior*, 28(2), 117-125. doi:10.1002/ab.90013
- Leith, K., & Baumeister, R. (1996). Why do bad moods increase self-defeating behavior? Emotion, risk taking, and self-regulation. *Journal of Personality and Social Psychology*, 71(6), 1250-1267. doi:10.1037/0022-3514.71.6.1250
- Lejuez, C., Read, J., Kahler, C., Richards, J., Ramsey, S., Stuart, G., et al. (2002). Evaluation of a behavioral measure of risk taking: The Balloon Analogue Risk Task (BART). *Journal of Experimental Psychology: Applied*, 8(2), 75-84. doi:10.1037/1076-898X.8.2.75
- Loewenstein, G., Weber, E., Hsee, C., & Welch, N. (2001). Risk as feelings. *Psychological Bulletin*, 127(2), 267-286. doi:10.1037/0033-2909.127.2.267
- Patterson, F., Kerrin, K., Wileyto, P., & Lerman, C. (2008). Increase in anger symptoms after smoking cessation predicts relapse. *Drug and Alcohol Dependence*, 95(1-2), 173-176. doi:10.1016/j.drugalcdep.2008.01.013
- Peralta, R. L., Steele, J. L., Nofziger, S., & Rickles, M. (2010). The impact of gender on binge drinking behavior among U.S. college students attending a Midwestern university: An analysis of two gender measures. *Feminist Criminology*, 5(4), 355-379. doi:10.1177/1557085110386363
- Phillips, W., Hine, D., & Marks, A. (2009). Individual differences in trait urgency moderate the role of the affect heuristic in adolescent binge drinking. *Personality and Individual Differences*, 47(8), 829-834. doi:10.1016/j.paid.2009.06.028
- Read, J. P., Beattie, M., Chamberlain, R., & Merrill, J. E. (2008). Beyond the 'binge' threshold: Heavy drinking patterns and their association with alcohol involvement indices in college students. *Addictive Behaviors*, 33(2), 225-234. doi:10.1016/j.addbeh.2007.09.001
- Seo, D., & Li, K. (2009). Effects of college climate on students' binge drinking: Hierarchical generalized linear model. *Annals of Behavioral Medicine*, 38(3), 262-268. doi:10.1007/s12160-009-9150-3
- Smith, G. T., Fischer, S., Cyders, M. A., Annus, A. M., Spillane, N. S., & McCarthy, D. M. (2007). On the validity and utility of discriminating among impulsivity-like traits. *Assessment*, 14(2), 155-170. doi:10.1177/1073191106295527
- Spielberger, C. (1999). STAXI-2 state-trait anger expression inventory-2: Professional manual. Odessa, FL: Psychological Assessment Resources.
- Spinella, M. (2007). Normative data and a short form of the Barratt Impulsiveness Scale. *International Journal of Neuroscience*, 117(3), 359-368. doi:10.1080/00207450600588881
- Stanford, M., Greve, K., Boudreaux, J., & Mathias, C. (1996). Impulsiveness and risk-taking behavior: Comparison of high-school and college students using the Barratt Impulsiveness Scale. *Personality and Individual Differences*, 21(6), 1073-1075. doi:10.1016/S0191-8869(96)00151-1
- Turrisi, R., Wiersma, K. A., & Hughes, K. K. (2000). Binge-drinking-related consequences in college students: Role of drinking beliefs and mother-teen communications. *Psychology of Addictive Behaviors*, 14(4), 342-355. doi:10.1037/0893-164X.14.4.342
- Upton, D. J., Bishara, A. J., Ahn, W., & Stout, J. C. (2011). Propensity for risk taking and trait impulsivity in the Iowa gambling task. *Personality and Individual Differences*, 50(4), 492-495. doi:10.1016/j.paid.2010.11.013
- Wechsler, H., Davenport, A., Dowdall, G., & Moeykens, B. (1994). Health and behavioral consequences of binge drinking in college: A national survey of students at 140 campuses. *JAMA: Journal of the American Medical Association*, 272(21), 1672-1677. doi:10.1001/jama.272.21.1672
- Wechsler, H., Dowdall, G., Davenport, A., & Rimm, E. (1995). A gender-specific measure of binge drinking among college students. *American Journal of Public Health*, 85(7), 982-985. doi:10.2105/AJPH.85.7.982
- White, T., Lejuez, C., & de Wit, H. (2008). Test-retest characteristics of the Balloon Analogue Risk Task (BART). *Experimental and Clinical Psychopharmacology*, 16(6), 565-570. doi:10.1037/a0014083
- Why, Y., & Johnston, D. W. (2008). Cynicism, anger and cardiovascular reactivity during anger recall and human-computer interaction. *International Journal of Psychophysiology*, 68(3), 219-227. doi:10.1016/j.ijpsycho.2008.02.001