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Effects of Urgency and Decision-Making on Alcohol Consumption

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Abstract

College alcohol consumption is a serious concern socially and financially. The federal government spends between \$900 million and \$1 billion on alcohol prevention services annually. Car accidents, violent crime, drowning, suicide attempts, and fetal alcohol syndrome are a few costly problems associated with underage drinking (U.S. Department of Justice, 1999). Recent advances in personality theory and factors that influence risk-taking have led to a number of questions examining the relationship between different personality variables and engagement in risky behaviors, including alcohol use. However, the relationship between urgency (the tendency to take rash, risky actions in order to gain or retain a good mood), decision-making, and alcohol consumption has not been examined extensively. The current study examined the relationships between urgency, decision-making, alcohol expectancies, and actual alcohol consumption among college-aged students. Students completed measures of these elements, and tracked their expected and actual alcohol consumption over the course of three weeks. Results did not support the hypothesis that high risk-taking as measured by the Iowa Gambling Task and high urgency levels would predict increased alcohol consumption. However, there was an effect of gender on alcohol consumption. Findings of the current study suggest that specific study factors related to urgency and risk-taking impact results and need further investigation.

Effect of Urgency and Decision-Making on Alcohol Consumption

Recent advances in personality theory and risk-taking have led to a number of research questions examining the relationship between different personality variables and engagement in risky behaviors including illegal drug use, risky sexual behavior, eating disorders, drinking, and problematic gambling. In particular, alcohol use is a risky behavior which is problematic on many levels. College drinking is a serious concern socially and financially. The federal government spends between \$900 million and \$1 billion on alcohol prevention services annually. The total cost of alcohol use by youth in 1996 was \$52.8 billion (U.S. Department of Justice, 1999). Alcohol-related car accidents are a well-known serious consequence of underage drinking. Nearly 20 percent of traffic crashes involving a driver under 21 years of age are alcohol-related. Other costly problems associated with underage drinking include violent crime, drowning, suicide attempts, burns, alcohol poisoning, and fetal alcohol syndrome (U.S. Department of Justice, 1999).

A large body of evidence has led to the accumulation of a variety of risk factors related to drinking and alcohol use. These include behavioral, psychological, and neurocognitive functioning such as drinking behavior in early life, impulsivity, and poor executive functions (Brown et al., 2008; Nigg et al., 2006). Findings suggest that a variety of personality factors are predictors of alcohol consumption in college students (Zuckerman & Kuhlman, 2000). Further research has led to the question of whether drinking behavior is associated with emotions (Cyders & Smith, 2008). The current study will examine the effect of the trait of urgency and behavioral risk-taking on alcohol consumption.

Research on the relationship between personality variables and risk-taking behavior has been examined broadly. Findings suggest that certain personality dispositions such as impulsivity and poor decision-making processes can in turn lead to risky behaviors including alcohol use, drug use, risky sexual behavior, problematic gambling, and binge eating (Cyders & Smith, 2008; Cyders & Smith, 2010; Xiao et al., 2008; Skeel, Pilarski, Pytlak, & Neudecker, 2008; Zapolski, Cyders, & Smith, 2009). Xiao et al. (2009) conducted a longitudinal study of Chinese adolescents and tested their decision-making abilities using the Iowa Gambling Task (IGT). Findings suggest that deficits in affective decision-making are important predictors of compulsive drinking and possibly other addictive behavior in adolescents. Results further indicate that adolescents who were shown to be consistent binge drinkers performed poorly on the IGT and scored higher in urgency when compared to those who rarely drank (Xiao et al., 2009). Personality measures have been shown to contribute to the prediction of alcohol consumption as well. Skeel et al. (2008) found results consistent with other findings, which suggest a complex relationship between behavioral measures of risk-taking, personality measures, and alcohol consumption.

Further, several studies have examined emotion-based decision-making and risk-taking using a more narrow focus. Cyders & Smith (2008) proposed a personality trait, urgency, which refers to emotion-based dispositions to engage in risky behaviors or rash actions. Urgency has two facets that are referred to as positive urgency and negative urgency. Positive urgency is the tendency to engage in rash action as a response to very positive affect. Negative urgency is the tendency to engage in rash action as a response to very negative affect. The urgency traits have been linked to the impulsiveness facet of neuroticism. These personality traits have further been correlated with problematic levels of risky behaviors including gambling and alcohol

consumption (Cyders & Smith, 2008). It is thought that for individuals who are high in positive urgency, intensely positive emotions may lead to reduced impulse control, which in turn leads to more impulsive decisions (Cyders & Smith, 2008). The experience of extremely positive or negative emotion can lower one's ability to control certain behaviors (Muraven & Baumeister, 2000).

In addition to increased gambling behaviors and alcohol consumption, positive and negative urgency have been shown to play a role in other problematic behaviors such as binge eating, risky sexual behavior, and drug use (Cyders & Smith, 2008; Zapolski, Cyders, & Smith, 2009). Zapolski et al. (2009) conducted a longitudinal study hypothesizing that positive urgency would predict increases in illegal drug use and risky sexual behavior in first-year college students. Results confirmed the hypothesis, and point to the importance of positive mood-based rash action as a factor in the risk-taking process for the group studied (Zapolski et al., 2009).

Some research suggests that there are differences in behavior in relation to positive and negative urgency. Negative urgency is the best predictor of the severity of certain psychiatric problems in individuals with substance dependence (Verdejo-Garcia, Bechara, Recknor, & Perez-Garcia, 2007). Positive urgency uniquely predicts increases in drinking quantity in first-year college students (Cyders & Smith, 2008). Negative urgency relates to binge eating behavior, while positive urgency does not (Cyders & Smith, 2008). However, they are substantially related with correlations ranging from .37 to .62 (Cyders & Smith, 2007). Overall, the two urgency facets are seemingly major predictors of negative consequences from risky behavior. The UPPS-P (Lynam, Smith, Cyders, Fischer, & Whiteside, 2007) is a commonly used scale designed to assess lack of planning, lack of perseverance, negative urgency, positive urgency, and sensation-

seeking. The five scales have good convergent and discriminant validity (Cyders & Smith, 2007).

Little research has examined the relationship between urgency and behavioral measures of risk-taking. However, some very important findings have been made, and further research needs to be done for closer examination. The Iowa Gambling Task (IGT; Bechara, Damasio, Damasio, & Anderson, 1994) has been used in several studies to examine the performance of substance users on behavioral measures of risk-taking. In the IGT, participants are presented with four decks of cards and are instructed to select from any of the four decks, with the goal of gaining as much game money as possible. When a card is chosen, the computer indicates whether the participant has lost or won some money. Some cards are riskier than others. Performance on the IGT is reported as the number of cards selected from the risky decks (Bechara et al., 1994). The IGT has successfully demonstrated impairments in the decision-making processes of alcohol or stimulant abusers (Bechara, Dolan, Denburg, Hindes, Anderson & Nathan, 2001) and long-term abstinent alcoholics (Fein, Klein, & Finn, 2004). Studies show that the learning processes involved in the IGT are greatly influenced by affective systems (Stocco & Fum, 2008; Wagar & Dixon, 2006).

Other behavioral measures of risk-taking include the Angling Task (Pleskac, 2008) and the Balloon Analogue Risk Task (BART; Lejuez, Read, Kahler, Richards, Ramsey, Stuart et al., 2002). The Angling Task is a computer-based task that measures the frequency at which an individual will risk losing points earned by “catching” certain kinds of fish from a pond. Participants gain points by catching blue fish (which there are many of) and lose points for catching a red fish (which there is one of). The BART is a computer-based measure of risk taking in which participants must “pump up” an on-screen balloon in which the goal is to make

the balloon as large as possible without it exploding. Participants are often given points for each pump if they “cash out” before the balloon pops, and explosion results in the loss of all accumulated points. Individuals are classified as showing higher levels of risky behavior if they demonstrate more pumps for each balloon and more balloon explosions (Lejuez et al., 2002). Findings suggest that patients with a prior history of alcohol use disorder exhibited high risk-taking behavior as measured by the BART (Holmes, Bearden, Barquil, Fonseca, Monkul, Nery, Soares, Mintz, Glahn, 2009).

There is widespread evidence demonstrating a significant relationship between certain risky behaviors and personality variables. However, the relationship between positive and negative urgency, behavioral measures of risk-taking, and alcohol consumption has not yet been examined extensively. The current study examined the question of whether the combination of high risk-taking behavior and high urgency predicts increased ETOH consumption. The participants completed the IGT to measure risk-taking and the UPPS-P to measure positive and negative urgency. In this study, it was hypothesized that high risk-taking, as evidenced by the IGT, and high urgency will predict increased alcohol consumption. It was predicted that high risk-taking and low urgency levels will predict moderate alcohol consumption. Low risk-taking and high urgency would predict moderate levels of alcohol consumption as well. Low risk-taking and low urgency would predict lower levels of alcohol consumption. A combination of urgency and behavioral risk-taking measures would predict alcohol consumption more successfully than individual factors.

Method

Participants

The sample consisted of 33 undergraduate students aged 18 or older who were recruited via the Psychology Subject Pool from Central Michigan University. The makeup of the sample is consistent with the demographics of the Undergraduate Psychology Subject Pool, with the exception that no minors were allowed to participate. Participants aged 18-20 were informed of the potential legal risks of admitting to underage drinking, and of the steps that will be taken to protect their confidentiality should they choose to participate in the study. The following statement was included in the Informed Consent document that was provided to the participants:

“In the current study, you will be asked questions that address potentially illegal behavior. The admission of such behaviors would pose a legal risk if your confidentiality was violated. We have taken a number of steps to preserve your confidentiality. These include entering data in our database in a non-identifying manner.”

Researchers assigned extra credit for participation in the initial 60-minute session to subjects participating in the study regardless of their performance on the tasks. However, their participation was entirely voluntary. If subjects decided to discontinue participation, or not to participate at all, they were provided with an opportunity to gain the extra credit by writing a one-page summary of a related journal article.

Participants were informed that the money earned on the computerized task is a hypothetical amount, and that at the end of the study one participant will win an actual \$50 reward from a lottery into which all of the participants have been entered. They were informed

that better performance on the computerized tasks equated to more entries into the drawing to enhance motivation and to increase likelihood of consistent effort on the Iowa Gambling Task.

The nature of the paradigm (a gambling task), as well as the mechanisms under study, require consequences to choice in order to achieve affective feedback associated with risky decision-making. Participants earned one to four “entries” into the lottery. Students in the upper quartile earned four, second quartile earned three, third quartile earned two, and in the fourth quartile earned one. Thus, each participant had an opportunity to win the lottery.

Participants read and signed informed consent forms prior to filling out questionnaires, and they were informed that their participation is voluntary. The informed consent included contact information for counseling if participants feel they need it.

Materials/Instruments

Background Information Form. Participants completed a form that provides basic demographic information in order to be contacted about the results of the study as well as in order to provide descriptive statistics for the data including age, estimated weekly alcohol consumption, gender, and education.

The UPPS-P. The UPPS-P (Lynam et al., 2007) is a 59-item scale designed to assess lack of planning, lack of perseverance, negative urgency, positive urgency, and sensation-seeking. Items are assessed on a scale of 1 (*agree strongly*) to 4 (*disagree strongly*). Three-month test reliability was .68 (Cyders & Smith, 2008).

IGT (Bechara et al., 1994). Risk-taking behavior was measured using the Iowa Gambling Task. The IGT is a computer-based measure. Headphones were used while the participants

completed the task. Casino-like sounds were produced by the program in response to wins and losses. The IGT measured the frequency at which an individual will risk monetary loss by choosing certain cards which bear greater monetary gain yet often result in even greater monetary loss as opposed to cards that render low, immediate monetary gain, yet even lower monetary punishment. In the IGT, participants were presented with four decks of cards (labeled A, B, C, and D) on a computer screen. Each deck contained 80 cards.

The decks differ in the amount of immediate gain versus the possibility of a penalty. Decks A and B result in an average loss of \$250 per 10 cards, while Decks C and D yield an average gain of \$250 per 10 cards. The rewards and losses are individually larger in Decks A and B compared to Decks C and D. The greatest performance was achieved when participants selected from Decks C and D and avoid decks A and B. Performance was based on cards selected from risky decks (Bechara et al., 1994).

Self-report daily alcohol diary. Participants tracked their alcohol consumption daily through an online survey for a period of two weeks after completing the personality and behavioral measures of risk-taking. The online survey asked students about recent alcohol consumption and alcohol limits. Participants received a daily e-mail reminder to complete the survey that day.

Procedure

All questionnaires and behavioral tasks were administered during the initial phase of the experiment. During the initial phase, participants filled out surveys and completed behavioral tasks in one 60-minute session. The second phase of the study occurred over two weeks. Participants completed an online survey daily, which asked students about recent alcohol

consumption and alcohol limits. Researchers assigned individual identification numbers to each participant. Information from the surveys was coded according to subject identification numbers, and the key was kept in a location separate from the data.

Participants were tested in groups of up to four. Subsequent daily surveys were completed over a span of 14 days via the internet during the second phase of the study. The materials were passed out to each student, and the directions were read aloud to the participants. The informed consent was first passed out to each participant. Prior exposure to the IGT was checked by the experimenter. If they had been in a previous study involving gambling tasks and monitoring behaviors, then they were dismissed and received full credit for one hour of participation.

Participants were then asked to complete a brief background information and debriefing questionnaire. They were asked to write down their e-mail that they check most often. Once the debriefing questionnaire was collected, the experimenter then explained the reinforcement system of the risk-taking games as follows:

“You will now play two games in which the object of each is to make as much money as you can. Your performance on each of the measures will affect your likelihood of winning the \$50 for participation in the study. Students who perform better on the measures will get more entries in the drawing, and in that way will increase their likelihood of winning the money. Students who perform worse will get fewer entries, though everyone will be entered in the drawing.”

The IGT was then administered and the instructions were read aloud to the participants. The experimenter then briefly reviewed the instructions for the UPPS-P questionnaire and answered any questions that the participants had. Next, the experimenter reviewed the printout of

the daily survey with each participant after they finished the UPPS-P. The experimenter showed the survey and explained that in order to get the maximum number of entries into the drawing, participants must complete the survey on the day they are received. Participants were then told that they will get credit for all diaries returned, however.

Results

Descriptive Statistics

The initial sample consisted of 45 undergraduate students. Participants that responded to less than 75% of the self-report daily alcohol diaries were not accounted for in the analyses. This resulted in 12 participants being removed from the sample. The final sample had a mean age of 20 ($SD = 2.18$, range = 18-29). Fifty-five percent of the participants were male ($N = 18$) and 45 percent were female ($N = 15$). Ninety-one percent of the participants were Caucasian ($N = 30$) and nine percent were African American ($N = 3$). The mean number of days responded to the diary was 13.36 ($SD = 1.25$). The mean number of days reportedly drinking in three weeks was 2.42 ($SD = 2.51$). Drinks per day only included returned dairies. Sixty-three percent of the participants consumed alcohol over the course of the study. Table 1 shows full descriptive statistics.

Table 1

Descriptive Statistics

Variables	<i>M</i>	<i>SD</i>	Range
IGT Total	45.42	13.2	18-72
Total Units Consumed	13.3	19.79	0-82
Drinks Per Day	1.13	1.58	0-5.86

Negative Urgency	22.61	5.29	13-35
Positive Urgency	21.36	7.46	13-48

Note. IGT = Iowa Gambling Task.

Analysis of Gender Differences

T-tests were used to analyze gender differences. Results showed a significant difference in total alcohol units consumed between males and females; $t(31) = 2.185, p = 0.037$. There was also a significant difference in number of alcohol units per day between males ($M = 1.66, SD = 1.96$) and females ($M = 0.49, SD = 0.48$); $t(31) = 2.26, p = 0.031$. A significant difference was also found in positive urgency between males and females, $t(31) = 2.21, p = 0.035$. See table 2 for full gender means and t-tests.

Table 2

Gender Means and T-tests

Variable	Males		Females		T-tests	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	sig. (<i>p</i>)
IGT total	42.28	14.89	49.2	49.2	1.527	0.137
Total units consumed	22.06	26.55	6.67	6.55	2.185	0.037*
Drinks per Day	1.66	1.96	0.49	0.48	2.26	0.031*
Negative Urgency	23.56	4.55	21.47	6.01	1.14	0.265
Positive Urgency	23.83	8.43	18.4	4.87	2.21	0.035*

* $p < .05$, ** $p < .01$

Correlations

Correlations showed results that did not support hypotheses. Total units consumed was not significantly correlated with negative urgency ($r = .132, p = .153$) or with IGT total bad deck selections ($r = .129, p = .474$). Positive urgency was not significantly correlated with drinks per day ($r = .258, p = .148$) or with total units consumed ($r = .254, p = .153$). There was a positive correlation between positive urgency and negative urgency ($r = .438, p = .011$), a finding consistent with previous research (Zapolski, Cyders, & Smith, 2009). Correlations of primary study variables are shown in Table 3.

Table 3

Correlations of Major Study Variables

	Variables	<i>N</i>	1	2	3	4	5
1	IGT Total	33	1	0.129	0.116	-0.144	0.124
2	Total Units Consumed	33	0.129	1	.995**	0.132	0.254
3	Drinks Per Day	33	0.116	.995**	1	0.129	0.258
4	Negative Urgency	33	-0.144	0.132	0.129	1	.438*
5	Positive Urgency	33	0.124	0.254	0.258	.438*	1

* $p < .05$, ** $p < .01$

Analysis of Variance

A three-way between subjects analysis of covariance controlling for gender was conducted to test the effects of gender, IGT total bad deck selections, and negative urgency on drinks of alcohol per day. Median splits were performed on IGT total, negative urgency, and positive urgency scores in order to explore possible interactions of the variables. There was a significant main effect of gender on drinks of alcohol per day [$F(1, 28) = 4.639, p = .04$]. There was not a significant main effect of IGT total bad deck selections [$F(1,28) = 0.495, p = 0.487$], or on the main effect of negative urgency [$F(1,28) = 1.709, p = 0.202$]. The interaction between IGT total bad deck selections and negative urgency was not significant [$F(1,28) = 0.172, p = 0.682$]. Results were similar using positive urgency instead of negative urgency. Full results of the three-way between subjects analysis of covariance are displayed in Table 4

Three-way Between-Subjects Analysis of Covariance

Sources	SS	df	MS	F	Sig. (<i>p</i>)
Gender	10.36	1	10.36	4.639	.04*
IGT total Med Split	1.11	1	1.11	0.495	0.487
Negative Urgency Med Split	3.82	1	3.82	1.709	0.202
IGT total Med Split X Negative Urgency Med Split	0.384	1	0.384	0.172	0.682

* $p < .05$, ** $p < .01$

Regression Analyses

Hierarchical regression analyses were performed in order to analyze how personality and behavioral measures predict alcohol consumption. Units of alcohol consumed per day was the dependent measure. Analyses using total units consumed were also conducted and results were similar. In each analysis, gender was considered part of the equation. In the first model, gender was accounted for 14.2 % ($p = .03$) of the variance. Model 2, using urgency and gender predictors, was not significant. Model 3, using urgency, gender, and behavioral risk predictors, was also not significant. A summary of the regression analyses is presented in Table 5.

Table 5

Summary of Regression Analyses for Variables Predicting Units of Alcohol Consumed

Variable	<i>B</i>	<i>SE B</i>	β	$R^2/\Delta R^2$
Step 1				
Gender	0.377	1.485	0.114	.142/0.142*
Step 2				
Gender X Urgency	0.398	1.52	0.071	.158/0.016
Step 3				
Gender X Urgency X Behavioral Risk	0.447	1.508	0.086	.200/0.042

* $p < 0.05$

Discussion

In this study, it was hypothesized that high risk-taking as evidenced by the Iowa Gambling Task and high urgency would predict increased alcohol consumption. It was predicted that high risk-taking and low urgency levels would predict moderate levels of alcohol consumption; low risk-taking and high urgency would predict moderate levels of alcohol consumption as well; and low risk-taking and low urgency would predict lower levels of alcohol consumption. It was also predicted that a combination of urgency and behavioral risk-taking measures would predict alcohol consumption more successfully than individual factors.

Results of the current study were not consistent with previous research suggesting a relationship between urgency and alcohol consumption or behavioral measures of risk-taking and alcohol consumption. We did find results showing that gender had an effect on number of alcoholic drinks consumed per day. Males were more likely to consume more alcohol than females.

Results also showed that positive urgency and negative urgency are very closely related. Previous studies have provided evidence suggesting the two facets are distinct (Cyders & Smith, 2008). Based on a high level of correlation, closer examination of the true uniqueness of the two facets of urgency seems necessary. The relationship between positive urgency and drinks per day suggest a mechanism such that when in an extremely positive mood state, as in a time of celebration, people are more likely to consume more units of alcohol on that day. While results were not significant, identified correlations between positive urgency and alcohol consumption were in the predicted direction, and were similar to the size of correlations seen in previous research.

Limitations and implications of the current study were examined by comparing recent studies to the current study. Cyders & Smith (2008) proposed the two facets of the urgency trait: positive urgency (the tendency to engage in rash actions when experiencing extreme positive affect) and negative urgency (the tendency to engage in rash actions when experiencing extreme negative affect). In a later study conducted by Cyders & Smith (2009), they studied individuals across their first year of college to test whether urgency traits predicted increases in risky sex and illegal drug use. Romer et al. (2009) conducted a multi-cohort one-year longitudinal study. Each of those studies had extended time frames for data collection. Testing individuals over a prolonged period of time for risky behaviors versus the two-week time frame used in the current study may have possibly made a substantial difference in our results.

A second limitation concerns sample size. Cyders & Smith (2008) enrolled 418 college students in their study, and Cyders & Smith (2010) studied 292 first-year college students. Their results showed a significant, positive correlation between positive urgency and rash action undertaken while in a positive mood ($r = .27, p < .02$). There was also significant correlation between positive urgency and rash action undertaken while in a negative mood ($r = .24, p = <.01$). Thus, while current results were not significant, the correlations were comparable. Other studies related to urgency and risk-taking behaviors have also had larger sample sizes (Zapolski, Cyders & Smith, 2009; Xiao et al., 2009). Thus, a larger sample would add significantly more power to the current study.

The measures used in this study were the UPPS-P to measure urgency, the IGT to measure behavioral risk-taking, and the self-report daily alcohol survey to measure recent alcohol consumption and alcohol limits. The UPPS-P is a commonly used personality measure (Cyders & Smith, 2009; Cyders & Smith, 2008; Zapolski, Cyders & Smith, 2009; Xiao et al.,

2009). However, other measures have been used to measure urgency such as the Mood-Based Questionnaire (MBQ; Cyders & Smith, 2007) and the Positive Urgency Measure (Cyders et al., 2007), and it is possible specific differences between the questionnaires may have affected results. Future research may want to explore the comparability of related measures of urgency.

Other measures of risk-taking should be utilized or investigated in future studies as well. Behavioral measures of risk-taking such as the BART should be explored in relation with urgency. Real-life measures of risk-taking, such as the Risky Behaviors Scale, have been used to measure risky behavior such as risky sexual behavior, binge eating, drug use, and alcohol consumption (Cyders & Smith, 2008), and so, real-life measures may provide a more comprehensive review of risk-taking behaviors. Further, a recent study has implemented new behavioral measures of risk taking such as betting on a horse race, betting at a casino, and betting on sports (Cyders & Smith, 2008). Since measures of risk-taking behavior and personality have been shown to be idiosyncratic, other measures of risk-taking behavior should be explored further in relation to other personality measures and behavioral measures of risk taking.

There are several limitations to the current study. The nature of the sample is homogeneous, and the sample size is small. The time for data collection (two weeks) is short and time-constrained. A larger, more diverse sample and longer period for data collection would add more power to the study. While 73 percent of participants returned over 75 percent of their self-report surveys, new ways to further increase response rates to alcohol consumption should be examined.

In summary, urgency and behavioral measures of risk-taking did not predict alcohol consumption in the current study. Our results were not consistent with those of previous studies.

Current findings suggest that specific study factors related to urgency and risk-taking impact results and need further investigation.

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