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Experimental effect of positive urgency on negative outcomes from risk taking and on increased alcohol consumption

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Abstract

The current pair of experimental studies sought to further validate the role of positive urgency (acting rashly when in an extreme positive emotional state) as a risk factor for impulsive and maladaptive behavior. Previous research has supported the use of emotion-based dispositions to rash action in predicting a wide range of maladaptive acts. However, that research was conducted in the field and relied on self-reported behavior, thus lacking tight experimental controls and direct observation of risky behaviors. In the two experimental studies described here, we found that, among college students, (1) positive urgency significantly predicted negative outcomes on a risk-taking task following a positive mood manipulation (n = 94), and (2) positive urgency significantly predicted increases in beer consumption following positive mood induction (n = 33). Positive urgency's role was above and beyond previously identified risk factors; these findings, combined with prior cross-sectional and longitudinal field studies, provide support for the role of positive urgency in rash action.

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Recent research has shown that impulsive behavior can be predicted by several different personality traits, including sensation seeking, lack of premeditation, lack of perseverance, negative urgency (impulsive action when in an extreme negative mood), and positive urgency (impulsive action when in an extreme positive mood: Cyders & Smith, 2007;

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Cyders & Smith, 2008a; Cyders, Smith, Spillane, Fischer, Annus, & Peterson, 2007; Smith, et al., 2007; Whiteside & Lynam, 2001). One novel finding in this research has been that positive urgency is cross-sectionally and prospectively predictive of negative consequences from a wide range of rash acts, as described further below (Cyders & Smith, 2007; Cyders & Smith, 2008a; Cyders & Smith, 2008b; Cyders & Smith, 2010; Cyders et al., 2007; Cyders, Flory, Rainer, & Smith, 2009; Settles, Cyders, & Smith, in press; Zapolski, Cyders, & Smith, 2009). It appears that even though trait-like positive affectivity contributes to reduced risk (Wills, Sandy, Yaeger, 2000), there are individual differences in the tendency to respond to extremely positive affective states with rash, ill-advised behavior. However, past research has relied on self-reports of rash acts obtained in field studies and retrospective reports of mood states. The aim of the current pair of studies was to test whether additional evidence for the role of positive urgency would be present when observing rash behavior directly, under laboratory controls.

Rash Action While in Extreme Positive Emotional States: Positive Urgency

Positive urgency is a personality trait that reflects individual differences in an individual's tendency to act in ill-advised ways while experiencing extreme positive emotions (Cyders et al., 2007). In a multitrait multimethod analysis, positive urgency was distinct from other impulsive behavior-related traits (Cyders & Smith, 2007). Cyders et al. (2007) showed it was associated with unique variance in a wide range of risky behaviors, especially those behaviors likely to occur while in a positive emotional state. Two such behaviors important for the current studies are alcohol use and gambling. Positive urgency concurrently differentiated control, eating disordered, and alcoholic individuals, with alcoholic individuals endorsing significantly higher levels of the trait; and it interacted with drinking motives to predict problematic levels of alcohol use: Positive urgency related to problem drinking specifically for individuals high in the motive to drink to enhance an already positive mood (Cyders et al., 2007). With respect to gambling behaviors, positive urgency has been found to predict pathological gambler status (Cyders et al., 2007).

Recent longitudinal findings are consistent with these cross-sectional results. Positive urgency predicted increases in problematic and risky behaviors prospectively during the first year of college, including increased gambling behaviors, increased negative outcomes experienced from alcohol consumption, risky sexual practices, and increased drug use (Cyders & Smith, 2008b; Cyders et al., 2009; Zapolski et al., 2009). One interesting feature of these findings concerns the different roles of positive urgency and sensation seeking: Positive urgency prospectively predicted increased quantity of alcohol consumption per episode and increased problems from drinking and gambling, but sensation seeking did not. In contrast, sensation seeking predicted more frequent alcohol consumption and more frequent gambling behaviors, but did not predict quantity of consumption, alcohol problems, or problematic gambling behavior (Cyders & Smith, 2008b; Cyders et al., 2009).

The Current Study

As promising as these findings have been, they have relied on self-reports of one's behavior and recall of one's mood state. They have neither manipulated mood state nor observed behavior directly. To strengthen the validity of the inference that positive urgency influences impulsive behavior while in a positive emotional state, it is necessary to experimentally manipulate affective state and show increases in impulsive behavior as a function of positive urgency status. We explored the role of positive urgency using an experimental manipulation of emotional states and two behavioral indicators of impulsivity: a computer-based risk taking task and alcohol consumption.

We conducted two experimental studies. The first study used a computer-based risk-taking task, and we hypothesized that positive urgency would predict increased negative outcomes from risk-taking following positive mood induction. The second study used a laboratory paradigm for alcohol consumption: We hypothesized that positive urgency would predict increased quantity of alcohol consumption following positive mood induction. In addition, as a second part of study one, we also conducted a correlational test of the hypothesis that sensation seeking would relate to frequency of self-reported gambling behaviors and positive urgency would relate to a marker of problem gambling (replicating previous findings; Cyders & Smith, 2008b).

Study One

The computer-based risk-taking task we used was the Balloon Analog Risk Task (BART: Lejuez, et al., 2002). The task asks participants to inflate virtual balloons in exchange for monetary rewards; participants are told that with each pump they will earn 1 cent. However, each balloon has a different and unknown explosion point; once the balloon reaches this point, it explodes and the subject loses all earned money for this balloon. Balloon explosion points range from explosion on the first pump to explosion on the 128th pump. This task is thought to replicate aspects of real-life risky behavior, in that risky behavior is often rewarded up to a point, but then additional risky behavior results in poorer outcomes.

There are a number of possible task performance measures available for the BART. Typically, researchers use the average number of pumps for unexploded balloons: scores on this criterion represent a good marker of the frequency of engaging in the risky behavior, and they have the advantage of not being constrained by the explosion point of the balloon (Lejuez, Aklin, Zcolensky, & Pedulla, 2003). But because our interest was in measuring negative outcomes from the risky behavior, we report number of exploded balloons as our key task performance criterion. Number of exploded balloons represents a negative outcome from the pumping, because one loses all the money one has earned on that trial when the balloon explodes. In practice, the two dependent variables may not differ meaningfully: Hunt, Hopko, Bare, Lejuez, and Robinson (2005) found that they correlated $r = .93$. Because number of exploded balloons is a function of both the participant's behavior and characteristics of the task (balloons explode at various points, ranging from the 1st pump to the 128th pump), we relied on a repeated measures assessment. To test whether positive urgency predicted this negative outcome variable when in a positive mood, we predicted number of exploded balloons following a positive mood induction. We controlled for number of exploded balloons while in a neutral mood, so that we were predicting an increase in explosions when in a positive mood.

Method

Participants—Participants for study one consisted of 104 undergraduate students at the University of Kentucky who were enrolled in an Introduction to Psychology course. All participants underwent informed consent procedures before participating and received course credit and money for their participation. Participants were debriefed following their participation.

Measures

The UPPS-P: (Lynam, Smith, Cyders, Fischer, & Whiteside, 2007). The UPPS-P is a 59 item scale designed to assess lack of planning, lack of perseverance, negative urgency, positive urgency, and sensation seeking. Items are assessed from 1 (*agree strongly*) to 4 (*disagree strongly*). The five scales have good convergent validity across assessment method, good discriminant validity within assessment method, and different external

correlates (Cyders & Smith, 2007; Smith et al., 2007). Estimates of internal consistency reliability for each scale are greater than .80.

The Self Assessment Manikin Rating Scale (SAM): We adapted the SAM (Lang, Bradley, & Cuthbert, 1999), in order to measure current mood state. The SAM was initially developed to judge the affective quality of visual stimuli. Originally derived from Osgood's semantic differential (Osgood, Suci, & Tannenbaum, 1957), the SAM rating scale consists of a graphic figure representing three dimensions depicting the major elements involved in emotion: valence (i.e., degree of pleasure), arousal, and dominance. Participants are instructed to place an "X" over any of the 5 figures on each scale, or in between each figure, to designate their experience of the stimulus, resulting in a 9-pt scale. In our adaptation, participants only completed the valence portion of this task.

The Balloon Analog Risk Task (BART): The BART (Lejuez et al., 2002) is a computer-based task designed to measure risk-taking and behavioral disinhibition. Each participant underwent 30 trials (balloons) of the task during each administration, as suggested by Lejuez and colleagues (2003). BART performance is significantly correlated with scores on self-report measures of risk-related constructs, with the self-reported occurrence of real-world risk behaviors, and it accounts for variance in these criteria beyond that provided by self-report measures (Lejuez et al., 2002).

Positive and Negative Affect Scale (PANAS): The PANAS (Watson, Clark, & Tellegen, 1988) is a twenty item scale devised to measure one's positive and negative affect. The current measure asked participants to rate their current mood on a scale of 1 (not at all) to 5 (extremely). The PANAS has been shown to have high internal validity, convergent validity and discriminant validity (Watson et al., 1988). Two internally consistent scales were used from this measure: an overall positive affect scale (PAS, average α pre and post mood manipulation = .83) and a two item composite scale which measures elation, consisting of the items "elated" and "overjoyed" (ELA, average α pre and post mood manipulation = .83). These items were summed and average to determine each composite scale, with higher scores indicating higher levels of the self-reported emotion.

Self-Reported Gambling Behavior: Items were taken from an 83-item scale that assesses the frequency with which individuals participate in a wide range of risk-taking behaviors (Fischer & Smith, 2004). Items were coded on a 1–5 Likert-type scale, with 1 indicating *never* participating in the behavior and 5 indicating *often* participating in the activity. Six gambling items were chosen for the current study: betting on a sports event, betting on a horse race, betting in a casino, investing money in the stock market, trading or buying stocks on the Internet, and betting money one was unsure how one would pay back. We created a composite of these six items to reflect a sum of self-reported gambling behavior. We do not view these items as alternate expressions of a common, underlying construct. Instead, we view each item as a cause of overall gambling behavior. For that reason, internal consistency does not represent an appropriate means of assessing reliability.

Procedure—Each participant was contacted for participation in the current study and subsequently completed one session, which involved collection of baseline measures, mood measurement, completion of 30 trials of the BART, a positive mood induction procedure, and completion of another 30 trials of the BART. The details are explained more fully below.

Individuals were recruited from a pool of 1,200 undergraduate students enrolled in an Introduction to Psychology course. Participants were telephoned to schedule their session

and were told that they would receive course credit and compensation equal to the amount of money they earned while completing the computerized task.

Each participant was scheduled for an individual session. Upon arrival for the study, participants first completed informed consent procedures, a demographic questionnaire, the UPPS-P, and the self-reported gambling behavior items; they then completed the SAM and PANAS scales. They were then reminded that they would receive compensation equal to the amount of money they earned while completing the BART, and then each participant completed 30 trials of the BART. Following the task, participants were paid immediately.

Participants (n = 94) then underwent a combined method positive mood induction procedure. The first stage was a story mood induction procedure in which each participant was given headphones and asked to listen to an audiotaped story that aimed to induce a positive mood state. The audiotaped recording consisted of an individual describing a series of very good things that happened during a day. The positive events were wide-ranging, in order to increase the likelihood of tapping events of potential significance to each participant. They included experiencing a sports win, earning a high mark on an exam, finding money, getting a free lunch, and having a romantic encounter. The script was recited in second-person and the individual was asked to explicitly imagine and get involved in the situation described and in the feelings suggested. The story induction procedure plus instruction has been shown to have a mean weighted effect size of .73 to induce a positive mood in a meta-analysis performed by Westerman, Spies, Stahl, and Hesse (1996).

Following the story mood induction procedure, the experimenter re-entered the room and the participant completed an imagination mood induction procedure. The instructions were as follows: “Imagine vividly a situation from your life that has put you in an extreme positive mood. Try to re-experience the original perceptions, sensation, and feelings that you experienced during this elated mood. Please write down on this piece of paper the feelings, emotions, and thoughts you experienced while in this positive mood and why. Also explain what you did in response to this positive mood. Please begin writing when I leave the room and continue to do so until I return. Remember; continue to really experience this good mood while writing.” Participants were then given 10 minutes to write about their experience. The imagination mood induction procedure has been shown to have a mean weighted effect size of .36 to induce a positive mood (Westerman et al., 1996). The experimenter then re-administered the SAM and PANAS scales.

At this time, the participant was told that they would complete 30 more trials of the BART and that they would be compensated as before. Each participant completed the 30 trials and was then debriefed, compensated, and awarded credit for participating in the experiment.

An additional 10 participants were assigned to a neutral mood condition, in order to validate the effect of the positive mood induction procedures chosen in the current study. These participants were administered the same protocol as explained above, except for the audiotaped recording and writing exercise. For this group, the audiotaped recording involved listening to an individual describe the events of a typical day (i.e., nothing particularly good or bad occurred); the writing exercise asked each participant to write about a typical day for him or her. The test of the effectiveness of the mood induction involved an interaction between group (neutral mood versus induced positive mood) and time.

Results

Sample Demographics—The final study sample consisted of a total of 104 participants (94 in the experimental group plus 10 in the control group). The mean age was 19.22 years (SD = 3.25) and the sample was equally divided between males and females. Eighty-four

percent of the sample indicated their race as European-American, 9% African-American, 5% Asian-American, and 2% Other. The majority of the sample was first-year college students (69.2%). Positive urgency was unrelated to all demographic variables.

Impulsivity-Related Traits and Self-reported Gambling—We first sought to replicate the finding that sensation seeking and positive urgency differentially predicted different aspects of gambling behavior. We created a composite six-item scale which included indicators of both common, frequent betting (e.g., betting on a sports event) and problem gambling (betting money you didn't know how you would pay back). We expected both sensation seeking and positive urgency to predict this composite scale. Within that composite, we viewed betting money on a sports event as a marker of relatively common gambling behavior for college students, and we viewed betting money you don't know how you would pay back as a marker of problem gambling behavior. We expected sensation seeking to predict the common gambling behavior (betting money on a sports event), and positive urgency to predict the problem gambling behavior (betting money you don't know how you would pay back).

These hypotheses were confirmed. In a multiple regression analysis in which we entered all five impulsivity-related traits simultaneously as prospective predictors of the gambling composite so that the impact of each predictor was tested above and beyond prediction by the other predictors, sensation seeking ($\beta = 0.26$, $p < .05$) and positive urgency ($\beta = 0.30$, $p < .05$) both predicted significantly. In an analogous multiple regression to predict betting on a sports event, only sensation seeking predicted the criterion significantly ($\beta = 0.32$, $p < .05$). Because the base rate of betting money you didn't know how you would pay back was quite low (10 individuals out of 104 did so), we collapsed that outcome to a dichotomous score of ever having done so versus never having done so. We then predicted that outcome using binary logistic regression, again entering all five impulsivity-related traits simultaneously. Only positive urgency predicted the presence/absence of having engaged in this behavior significantly (using the Wald test, $p < .05$). The odds ratio was 3.96: With each one unit increase in positive urgency score, one was 3.96 times as likely to report having engaged in that behavior.

Overall results from the BART—On the first trial of the BART, participants earned, on average, $7.60 (range $5.24 – 10.07, *SD* 1.19); on the second trial of the BART, participants earned, on average, $7.84 (range $3.39 – 10.49, *SD* 1.30). For the first trial, participants exploded, on average, 11.62 balloons (*SD* 3.22) and pumped 43.24 times on unexploded balloons (*SD* 12.25). For the second trial, participants exploded, on average, 10.34 balloons (*SD* 3.49) and pumped 41.89 on unexploded balloons (*SD* 12.49). Paired sample t-tests revealed that participants, on average, earned more money ($t = -2.21$, $p < .05$) and exploded fewer balloons ($t = 6.42$, $p < .01$) in the first trial than in the second trial ($t = -2.21$, $p < .05$).

Analyses Preliminary to the Experimental Procedure—In order to examine the role of positive urgency experimentally, we first tested whether individual differences in positive urgency were related to individual differences in baseline mood, prior to exposure to the laboratory manipulation. Because positive urgency does not load on positive affect dimensions in factor analysis (rather, it loads on dimensions related to dyscontrol: Cyders & Smith, 2008a), we did not expect it to relate to baseline mood. It did not. Positive urgency was not correlated with SAM rating, the PANAS overall positive affect scale (PAS), and a composite scale that indicated elation (ELA) prior to the mood manipulation. Also as expected, positive urgency was unrelated to post-manipulation SAM, PANAS, and ELA scores and it was also unrelated to changes in the pre- to post-manipulation SAM, PANAS, and ELA scores. And, positive urgency was unrelated to the number of balloons exploded on the BART prior to the mood induction.

In order to validate the mood induction procedure, we compared the positive mood induction group (n = 94) with a comparison neutral mood induction group (n = 10). The groups did not differ on any of the self-reported mood variables before the administration of the mood induction procedure (SAM t = 0.14, p = *0.89*; PAS t = 0.74, p = *0.46*, ELA t = 1.29, p = *0.20*. For each mood variable, the interaction test was significant (SAM: F (1, 95) = 21.84, p < .01; PANAS elation: F (1, 95) = 10.84, p < .01; PANAS Positive Mood: 7.83, p < .05). The means for these comparisons are presented in Table 1. In each case, positive mood increased following the positive mood induction and did not following the neutral mood induction.

Effect of Experimental Positive Mood Induction on BART as Predicted by Personality—The central hypothesis of study one was that, analogous to field study findings in the prediction of gambling behavior, positive urgency would predict negative outcomes from risky behavior while in a positive mood, and sensation seeking would not. To test this hypothesis, we used hierarchical multiple regression, with the dependent variable of number of balloons exploded from the BART task following positive mood induction. At step one, we entered number of balloons exploded pre-mood induction. At step two, we entered positive urgency and sensation seeking, thus enabling us to test each trait's incremental validity over balloons exploded prior to the mood induction and over each other. The theory was supported. Individual differences in pre-mood induction balloon explosions strongly predicted individual differences in balloon explosions while in a positive mood (β = 0.89, p < .001). Even though participants, across the sample, tended to explode fewer balloons in the second trial of the BART, positive urgency predicted additional variance in exploded balloons post mood induction (β = 0.12, p < .05), but sensation seeking did not (see Table 2). In addition, prediction by positive urgency was significantly greater than prediction by sensation seeking (p < .05). Results were unchanged when controlling for age and sex.[1]

Study One Discussion

The current self-report findings concerning gambling behavior replicated the differential roles of positive urgency and sensation seeking in relation to that set of behaviors. Only positive urgency predicted betting money one doesn't know how one would pay back, a marker of problem gambling. With each one unit increase in positive urgency score, one was almost four times as likely to have engaged in this problematic gambling behavior. As hypothesized, sensation seeking had a different role: It covaried with a common gambling behavior, betting on sports events, but not with the marker of problem gambling. These findings provide additional support for the contention that sensation seeking prompts individuals to engage in risky actions with greater frequency, but positive urgency results in problem levels of involvement in risky behaviors.

In the current laboratory manipulation, our positive mood induction was generally effective in generating positive moods in our participants. Moreover, our expectation that positive urgency would predict increases in negative outcomes from risk-taking was supported: Positive urgency predicted increased number of balloons exploded following positive mood induction; that is, continued pumping on a single balloon until it exploded, thus costing one all the money one had earned on that balloon up until that point. It is important to note that participants, as a whole, tended to explode fewer balloons and earn more money during the second trial of the BART as compared to the first, suggesting some practice effects; despite

[1]We compared positive urgency and sensation seeking because we understood the BART task as most analogous to gambling behavior. We ran the same set of analyses including all five UPPS-P impulsivity-related traits, and, again, positive urgency was the only significant predictor of number of balloons exploded. We also ran the same set of analyses using, as the dependent variable, number of pumps on unexploded balloons, and the results were the same.

this fact, however, positive urgency predicted increases in the number of balloons exploded in the current study. This finding replicates prediction by positive urgency observed in cross-sectional and longitudinal research (Cyders & Smith, 2008b; Cyders et al., 2009) and is consistent with the premise that, for some individuals, intensely positive affect can lead to biased, overly optimistic and dyscontrolled decision making, resulting in negative outcomes. Also consistent with past longitudinal work, sensation seeking did not predict the balloon explosions marker of negative outcomes from risky behavior involvement, above and beyond prediction from positive urgency. In these ways, the results of this analogue, laboratory study converge with previous longitudinal findings.

Study Two

Study two examined the role of positive urgency and positive emotional experiences in alcohol consumption. We made the following hypothesis for this study: Positive urgency would be unrelated to the quantity of alcohol consumption during a neutral mood induction, but it would predict quantity consumed following positive mood induction, even controlling for quantity consumed when in a neutral mood.

Method

Participants—Participants for study two consisted of 33 undergraduate students at the University of Kentucky who were enrolled in an Introduction to Psychology course. All participants were at least 21 years of age and underwent informed consent procedures before participating. They received course credit and money for their participation. Participants also underwent experimental debriefing following their participation in the study. None of these participants were involved in study one.

Measures

The UPPS-P: (Lynam et al., 2007); *The SAM* (Lang et al., 1999); and the *PANAS* (Watson et al., 1988) were used in study two as well.

Procedure—Participants were recruited via a telephone screening and completed two counter-balanced experimental sessions: one positive mood induction session and one neutral mood induction session. At their first session, participants completed the UPPS-P, the SAM, and the PANAS. During each session, participants first completed a drug test, pregnancy screen, field sobriety test, and blood alcohol breath analyzer test (BAC). Following this, at each session, each participant completed the BART, the mood induction, and a 90 minute beer taste-test. Each session ended with a BAC test, a field sobriety test, and compensation. The main dependent variable of interest was the amount of beer consumed during each 90 minute beer taste-test. Details of these procedures are outlined below.

Forty-five participants were initially recruited and were contacted by phone screening. During the phone screening, participants were asked to participate in an experiment examining the alcohol preferences of undergraduates. Only participants who endorsed (1) being at least 21 years old, (2) being at least a social drinker (3 or more drinks per week), and (3) enjoying drinking beer were asked to participate. Participants were asked to not drink alcohol the day of the study and females were asked to not participate if they are pregnant (and were told that they would need to complete a pregnancy test the day of the experiment). Participants were informed that they would be asked to participate in two sessions, during which they would complete questionnaires, participate in some writing and computer exercises, and participate in a beer taste test. Participants were informed that they would be provided with snacks, magazines, and movies to watch while their blood alcohol

level returns to a legal level and that they should save a total of 3 hours per session. Participants were asked to schedule their sessions on days in which they do not have any important obligations (e.g., tests, etc), were asked to not schedule their sessions on days before major obligations as well, and were required to have at least 48 hours between the two sessions. Sessions were held in a drinking lounge (e.g., couch, TV, videos, music) at the University of Kentucky. Test sessions were held between 2pm and 9pm; all participants were tested individually and received $10 and research credit for their participation in each session.

When individuals arrived for the study, they were required to show photo identification to verify their age. They completed informed consent procedures and a field sobriety test, in order to ensure that they were not under the influence of alcohol at the beginning of the study and also to familiarize them with the device. Females also completed a urine pregnancy test at this time. All participants underwent an initial BAC level assessment using a breath analyzer test and a urinalysis drug screen. Individuals who were pregnant, who tested positive for illicit drug use, or who did not have a BAC of 0 at the beginning of the study were dismissed. Each participant then completed a demographic questionnaire and the above mentioned scales.

Participants were randomly counterbalanced as to order of the positive and neutral mood induction sessions. Prior to completion of the BART task, participants were told that a random drawing would determine whether or not they would be compensated for their performance on the task. Participants then completed the 30 trials of the BART task; compensation, for the positive mood group, was provided in the same way as in study one. Participants assigned to the neutral mood condition received no compensation for their BART performance. We did this to increase the effect of the mood induction procedure. Each participant then underwent either the neutral or positive mood induction procedure, as described in study one. Participants once again completed the SAM and PANAS to assess mood change.

Following this, all participants, regardless of mood condition, were told that we would like to study beer preferences of undergraduate students in order to determine which type of beer to use in a future study. Thus, they were asked to consume four different beers and rate them on different aspects, such as flavor, aroma, and color. They were told that we were also interested in the effects the beer consumption would have. Participants were placed in a room with four 12 ounce beer choices. Two different types of non-alcoholic beer and two types of alcoholic beers were used as options to minimize the level of drunkenness and, therefore, risk for participants. Each beer was served in a cold beer glass and was color coded so the participant did not know which beers they were sampling, and participants were provided with snacks and entertainment (e.g., movies, magazines, music). Participants spent 90 minutes drinking as much beer or as little beer as they would like. The 90 minute taste test was used because previous studies have supported its effectiveness (see Weafer & Fillmore, 2008). Participants were asked to rate the beers on several dimensions (e.g., overall taste, would you buy this drink).

At the end of the 90 minutes, participants underwent a field sobriety test and a BAC reading. Participants were not allowed to leave until their BAC reached below 0.02 and their field sobriety test was negative. When a subject left, the amount of beer consumed was recorded.

Procedures for the second session were identical to the first, except that participants underwent the second mood induction condition. Then, participants were informed that we had chosen their favorite beer from the previous session and three new varieties of beer for them to rate in the beer taste test. Again, we reminded them that we were interested in which

beer would be most pleasing to undergraduate students for use in a future study. At the end of the session, the experimenter debriefed each participant and provided credit for their participation.

Results

Sample Demographics and Preliminary Analyses—The study sample consisted of a total of 45 male and female participants. However, 12 individuals were dismissed from the study due to positive drug screens and self-reported illness upon arrival for at least one of their sessions. Therefore, the final study sample consisted of a total of 33 participants. The mean age was 22.27 years (*SD* = 2.36), with 57.6% of the sample male. Ninety percent of the sample indicated their race as European-American, 3% African-American, 3% Asian-American, and 3% indicated Other. There was an average of 16.9 days (SD = 17.3) between participants' two sessions. Correlations between positive urgency and the demographic variables indicate that positive urgency was related negatively to age: $r = -0.38$, $p < .05$, but not related to any other demographic variable. Participants on average drank 663.58 ml of beer during the neutral session (SD = 370.82 ml) and 811.33 ml of beer during the positive mood session (SD 462.33 ml). This main effect was significant ($t = 2.44$, $p < .05$). Breath alcohol levels ranged from .00 to .02 (M .006, SD .009) for the positive mood condition and .00 to .02 (M .005, SD .008) for the neutral mood induction session. Participants, on average, earned $8.19 on the BART task in the current study (range $4.30–10.04, SD $1.34).

As was the case in study one, the positive mood induction appeared to be generally successful (Table 3). Participant ratings on the SAM ($t = 1.14$, $p = 0.26$), the PAS ($t = -1.25$, $p = 0.22$) and the ELA ($t = -0.47$, $p = 0.64$) pre neutral mood induction did not differ from ratings pre positive mood induction. Pre neutral mood ratings and post neutral mood ratings did not differ significantly on any of the three scales: the SAM ($t = .77$, $p = 0.44$), ELA ($t = .87$, $p = 0.39$), and the PAS ($t = 0.76$, $p = 0.45$). Pre positive mood and post positive mood induction mood ratings differed for the SAM ($t = 3.60$, $p < .001$) and the PAS ($t = 1.92$, $p < .05$), but did not differ for the ELA ($t = 1.33$, $p = 0.19$). Additionally, positive urgency was uncorrelated with the three mood scales pre-mood induction, was uncorrelated with reported changes in mood pre- to post-neutral and pre- to post-positive mood induction, and was uncorrelated with the amount of alcohol consumed post-neutral mood induction.

Effect of Positive Mood Induction on Alcohol Consumption as Predicted by Personality—We next conducted a multiple regression analysis to examine the effect of the positive mood induction on alcohol consumption as a function of reported tendencies toward rash action (Table 4). We hypothesized that positive urgency would predict increases in alcohol consumption following positive mood induction, after controlling for the amount of alcohol consumed in the neutral mood condition and the other rash action traits. We used the amount of beer consumed (measured in ml) in the positive mood condition as the dependent variable for this analysis. In step one of the analysis, we entered in amount of beer consumed during the neutral mood condition (measured in ml); we then entered the five UPPS-P traits in step 2 of the analysis. We entered in all five UPPS-P traits for this analysis given past findings supporting the relationship of many of these traits and alcohol use (Cyders et al., 2009;Lynam & Miller, 2004) and in order to control for the overlap positive urgency may have with these other rash action traits. Positive urgency was the only significant predictor ($\beta = 0.42$, $p < .05$). Its relationship with drinking quantity was significantly higher than were the relationships of three of the other four traits ($p < .05$: the fourth trait was lack of planning). Surprisingly, negative urgency would have been a significant predictor in the opposite direction, i.e., high negative urgency associated with reduced alcohol consumption ($\beta = -0.48$, $p < .05$), had we not used a one-tailed test.[2] In each of these analyses, results were the same when controlling for sex and age.

Study Two Discussion

The findings of study two provide further support for the claim that positive urgency plays a role in risky behavior involvement. First, the findings replicate the study one findings that positive urgency was unrelated to reported mood pre-mood induction and that it was unrelated to reported changes in mood ratings pre to post mood induction. Additionally, positive urgency was unrelated to consumption of alcohol in the neutral mood induction. Finally and most importantly, when individuals were placed in a positive mood, positive urgency predicted alcohol consumption over and above that which was consumed in the neutral mood condition. None of the other four dispositions to rash action predicted increased consumption while in a positive mood state.

General Discussion

Positive urgency has been shown in past research to be related to a wide range of risky behaviors both cross-sectionally and longitudinally. As encouraging as those findings have been, they have been based exclusively on self-reports of prior engagement in risky or problematic behaviors. Thus, to provide further support for the claimed contribution of positive urgency to maladaptive acts, the current studies investigated the trait using direct observation of risky behavior involvement under tight laboratory controls. In both studies we found further validation for the role of positive urgency in risky behavior and alcohol consumption.

In a laboratory risk-taking task, positive urgency predicted a negative outcome from that task: It predicted an increased likelihood of continuing to pump virtual balloons until they exploded, causing one to lose the money one had earned up until that point on the balloon. Positive urgency predicted this negative outcome, despite the finding that participants, as a whole, exploded fewer balloons and earned more money in the second trial as compared to the first trial, which is suggestive of practice effects. This finding might be understood as follows: One could make the decision to engage in multiple risk-taking behaviors, but use a strategy that mitigates one's risk for negative outcomes. In the analogue of the BART task, this approach could involve frequent balloon presses, but a limit on the number of presses one makes on any one balloon (since each balloon will eventually explode, causing money loss). This approach to risk taking might constitute an analogue to a rational risk-taking strategy. Risk-taking in a way that also mitigates possible harm is likely to be reinforced in many areas of life: Investing in the stock market, pursuing a romantic relationship, starting a business, and exposing oneself to a new environment all involve risk taking. These behaviors are most likely to be successful when one is judicious about the nature and extent of the risk to which one exposes oneself.

Such a judicious approach was not the one associated with high levels of positive urgency. In the current lab task, the trait predicted a greater tendency to continue pumping money-earning balloons until they exploded, resulting in a loss of all the money so far earned on a given balloon. The positive mood induction may have been associated with an increased risk for this non-rational approach among individuals high in positive urgency. This possibility is consistent with previously reported indications that positive urgency tends to predict negative outcomes from drinking problems (Cyders et al., 2009) and gambling (Cyders & Smith, 2008b).

[2]Positive and negative urgency are positively related (r = .54 in study two) and appear to be facets of an overall urgency construct (Cyders & Smith, 2007). We used a one-tailed test because, in both cross-sectional and prospective field work, negative urgency has been positively associated with rash acts while in a positive mood, including alcohol consumption. We are reluctant to offer an explanation for this opposite result, which represents the one way in which the laboratory findings differed from what has been observed in field studies, and which may not replicate.

Concerning drinking behavior, one cannot, of course, study problem drinking in the laboratory. One can, however, study quantity of alcohol consumed during a sitting. Our demonstration that positive urgency predicted increased alcohol consumption while in a positive mood was consistent with the findings of a field study (Cyders et al., 2009), which showed prospective prediction of increased quantity consumed per occasion by positive urgency. It may be that the relationship between positive urgency and drinking problems, which has been shown in previously (Cyders & Smith, 2007; Cyders et al., 2007a; Cyders et al., 2009), is mediated by the amount of alcohol consumed per occasion. This possibility should be tested empirically.

One interesting finding from the current studies was that variation in positive urgency was not associated with variation in baseline mood state. This finding is consistent with factor analytic findings demonstrating the trait is unrelated to extraversion as measured by the NEO-PI-R (Costa & McCrae, 1992) and its facets, including positive emotions (Cyders & Smith, 2008a). Perhaps positive urgency reflects a tendency to act rashly when experiencing very positive emotions, but not a tendency to experience those emotions more often or more intensely than do others. Additionally, since positive urgency was unrelated to reported change in mood following positive mood induction, it does not appear that individuals high in this trait experienced more extreme emotional states in this setting than did those low in positive urgency.

The current study has weaknesses, which should be noted here. First, although the laboratory setting provides stringent controls on the environment and facilitates the direct observation of behavior, perhaps the laboratory also offers behavior in a less ecologically valid context, which may work against observation of target phenomena. For instance, it is quite possible that positive urgency functions most strongly within a social context. Further research should be done to examine its role in real-life scenarios and within social contexts.

Second, the current study was generally effective in increasing mood with the positive mood induction procedures chosen; however, research has shown that positive moods are difficult to induce in laboratory settings. It is perhaps unlikely that we induced extreme positive emotions, which likely explains the small effects seen in the current study. There is, therefore, a need to develop new methods of positive mood induction that could induce the extreme emotional responses in which positive urgency is thought to be most predictive.

Third, the current study utilized a mostly Caucasian college student sample, which may limit the generalizability of the findings to other groups of individuals. However, the use of college students is also a prime sample of interest for positive urgency research. College students are in a developmental period characterized by impulsive action that often brings harm (Del Boca, Darkes, Greenbaum, & Goldman, 2004; Kelley, Schochet, & Landry, 2004; Budde & Testa, 2005; Hingson, Heeren, Winter, & Wechsler, 2005; Wechsler, Moeykens, Davenport, Castillo, & Hansen et al., 1995), and that may involve a high level of positive urgency (Cyders et al., 2009), thus facilitating observation of these phenomena.

Study two suffers from a small sample size, with limited power to show relationships; however, despite this, positive urgency was still able to emerge as a predictor in the experimental analysis. Study one is limited in that BART performance was measured pre and post positive mood induction, thus lacking strict counter-balancing of effects, which leaves the study open to time/trial confounds. Both studies had the participants complete the self-report measures prior to lab task measurement, and therefore, it is possible that this could have affected results.

Although it is of course difficult to demonstrate a causal role for a personality trait that, by definition, cannot be manipulated, the combination of demonstrating that (a) the trait

predicts subsequent increases in risky behaviors, over and above stringent statistical controls and (b) experimental induction of positive mood leads to increased risky behavior only for those high in the trait suggests the plausibility of a causal role for positive urgency. Because this study was the first to show support for this relationship through an experimental manipulation of mood, perhaps it plays a useful role in the validation of positive urgency theory. Important future steps include replicating the findings reported here and the use of ecological momentary assessment to validate the role of positive urgency in problematic risky behavior in real-life settings. Finally, studies which can establish a longitudinal pathway from positive urgency to the initiation of risk-taking behaviors are important as well.

In conclusion, the convergence of findings from cross-sectional, prospective, and experimental research suggests it is likely that positive urgency plays a role in the risk process. The trait appears important for the volume of alcohol consumed and for negative outcomes related to that consumption (Cyders & Smith, 2007; Cyders et al., 2007a; Cyders & Smith, 2008a; Cyders et al., 2009), pathological gambling behaviors (Cyders & Smith, 2008b) and other risky behaviors, such as illegal drug use and risky sexual encounters (Zapolski et al., 2009). Research aimed at developing interventions to mitigate the impact of positive urgency on the behavior of high-risk individuals seems indicated.

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References

Budde AM, Testa M. Rates and predictors of sexual aggression among students and nonstudents. Journal of Interpersonal Violence 2005;20:713–724. [PubMed: 15851538]

Costa, PT.; McCrae, RR. Revised NEO Personality Inventory manual. Odessa, FL: Psychological Assessment Resources; 1992.

Cyders MA, Flory K, Rainer S, Smith GT. The role of personality dispositions to risky behavior in predicting first year college drinking. Addiction 2009;104:193–202. [PubMed: 19149813]

Cyders MA, Smith GT. Mood-based rash action and its components: Positive and negative urgency. Personality and Individual Differences 2007;43:839–850.

Cyders MA, Smith GT. Emotion-based dispositions to rash action: Positive and negative urgency. Psychological Bulletin 2008a;134:807–828. [PubMed: 18954158]

Cyders MA, Smith GT. Clarifying the role of personality dispositions in risk for increased gambling behavior. Personality and Individual Differences 2008b;45:503–508. [PubMed: 19088857]

Cyders MA, Smith GT. Longitudinal validation of the urgency traits in first-year college students. Journal of Personality Assessment 2010;92:63–69. [PubMed: 20013457]

Cyders MA, Smith GT, Spillane NS, Fischer S, Annus AM, Peterson C. Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. Psychological Assessment 2007;19:107–118. [PubMed: 17371126]

Del Boca FK, Darkes J, Greenbaum PE, Goldman MS. Up close and personal: Temporal variability in the drinking of individual college students during their first year. Journal of Consulting and Clinical Psychology 2004;72:155–164. [PubMed: 15065951]

Hingson R, Heeren T, Winter M, Wechsler H. Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24: Changes from 1998 to 2001. Annual Review of Public Health 2005;26:259–279.

Kelley, AE.; Schochet, T.; Landry, CF. Risk taking and novelty seeking in adolescence: Introduction to part I. In: Dahl, RE.; Spear, LP., editors. Adolescent brain development: Vulnerabilities and opportunities. New York, NY: New York Academy of Sciences; 2004. p. 27-32.

Lang, PJ.; Bradley, MM.; Cuthbert, BN. International affective picture system (IAPS): Technical Manual and Affective Ratings. Gainesville, FL: The Center for Research in Psychophysiology, University of Florida; 1999.

Lejuez CW, Aklin WM, Zvolensky MJ, Pedulla CM. Evaluation of the Balloon Analogue Risk Task (BART) as a predictor of adolescent real-world risk-taking behaviours. Journal of Adolescence 2003;26:475–479. [PubMed: 12887935]

Lejuez CW, Read JP, Kahler CW, Richards JB, Ramsey SE, Stuart GL, et al. Evaluation of a behavioral measure of risk taking: The Balloon Analogue Risk Task (BART). Journal of Experimental Psychology: Applied 2002;8:75–84. [PubMed: 12075692]

Lynam DR, Miller JD. Personality pathways to impulsive behavior and their relations to deviance: Results from three samples. Journal of Quantitative Criminology 2004;4:319–341.

Lynam, D.; Smith, GT.; Cyders, MA.; Fischer, S.; Whiteside, SA. The UPPS-P: A multidimensional measure of risk for impulsive behavior. Unpublished technical report. 2007.

Osgood, CE.; Suci, GJ.; Tannenbaum, PH. The measurement of meaning. Champaign, IL: University of Illinois Press; 1957.

Settles RF, Cyders MA, Smith GT. Longitudinal validation of the acquired preparedness model of drinking risk. Psychology of Addictive Behaviors. (in press).

Smith GT, Fischer S, Cyders MA, Annus AM, Spillane NS, McCarthy DM. On the validity and utility of discriminating among impulsivity-like traits. Assessment 2007;14:155–170. [PubMed: 17504888]

Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology 1988;54:1063–1070. [PubMed: 3397865]

Weafer J, Fillmore MT. Individual differences in acute alcohol impairment of inhibitory control predict ad libitum alcohol consumption. Psychopharmacology 2008;201:315–324. [PubMed: 18758758]

Wechsler H, Moeykens B, Davenport A, Castillo S, Hansen J. The adverse impact of heavy episodic drinkers on other college students. Journal of Studies on Alcohol 1995;56:628–634. [PubMed: 8558894]

Westermann R, Spies K, Stahl G, Hesse FW. Relative effectiveness and validity of mood induction procedures: A meta-analysis. European Journal of Social Psychology 1996;26:557–580.

Whiteside SP, Lynam DR. The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. Personality and Individual Differences 2001;30:669–689.

Wills TA, Sandy JM, Yaeger A. Temperament and adolescent substance use: An epigenetic approach to risk and protection. Journal of Personality 2000;68:1127–1151. [PubMed: 11130735]

Zapolski TCB, Cyders MA, Smith GT. Positive urgency predicts illegal drug use and risky sexual behavior. Psychology of Addictive Behaviors 2009;23:348–354. [PubMed: 19586152]

Table 1

Mean scores for self-reported mood variables pre and post mood manipulation in study one

	Pre-induction mean (SD)	Post induction mean (SD)
SAM[a]		
Control group	3.36 (1.12)	3.55 (0.93)
Positive group	3.36 (1.26)	2.19 (1.10)
PANAS POS scale[b]		
Control group	19.45 (5.54)	17.18 (6.18)
Positive group	20.82 (5.81)	23.11 (6.47)
PANAS ELA scale[b]		
Control group	14.27 (5.22)	13.27 (4.00)
Positive group	16.42 (5.20)	20.86 (6.25)

[a] higher scores indicate less positive mood reported;

[b] higher scores indicate more positive mood reported

Table 2

Multiple regression of BART exploded balloons on impulsivity traits

	B	SE B	β	sr^2	R^2	df
Step One					0.70	1,89
EXP	0.89**	0.06	0.82	0.81		
Step Two					0.72	2,87
SS	−0.02	0.38	−0.01	−0.00		
PUR	0.68*	0.35	0.12	0.10		

Note. EXP = number of exploded balloons pre-mood induction, PUR = positive urgency, and SS = sensation seeking; Dependent variable = number of exploded balloons post positive mood induction

Note.

** $p < .001$,

* $p < .05$

Table 3

Mean levels of self-reported mood ratings pre and post positive and neutral mood inductions for study two

	Pre-induction mean (SD)	Post induction mean (SD)
SAM[a]		
Neutral mood condition	2.87 (0.76)	2.78 (0.66)
Positive mood condition	3.13 (1.38)	2.40 (1.10)
PANAS POS[b]		
Neutral mood condition	1.83 (0.43)	1.79 (0.42)
Positive mood condition	1.74 (0.43)	1.86 (0.42)
PANAS ELA[b]		
Neutral mood condition	2.45 (0.68)	2.42 (0.69)
Positive mood condition	2.41 (0.60)	2.32 (0.65)

Note.

[a] higher scores indicate less positive mood reported;

[b] higher scores indicate more positive mood reported

Table 4

Multiple regression of beer consumption during positive mood condition on impulsivity traits

	B	SE B	β	r	pr	sr	R^2	df
Step One							0.43	1, 30
CONN	0.66**	0.21	0.53	0.66	0.54	0.41		
Step Two							0.60	5,25
LP	239.41	175.48	0.23	0.15	0.26	0.17		
NUR	−431.22*	162.93	−0.48	−0.21	−0.47	−0.34		
SS	138.90	125.63	0.17	0.38	0.22	0.14		
LPS	−27.43	181.82	−0.03	0.22	−0.03	−0.02		
PUR	273.53*	146.56	0.42	0.19	0.35	0.24		

Note. CONN = Amount of beer consumed during neutral mood induction measured in ml, PUR = positive urgency, NUR = negative urgency, LP = lack of premeditation, LPS = Lack of perseverance, and SS = sensation seeking. Dependent variable = Positive mood induction condition beer consumption in ml. B: raw beta weight; SE B: standard deviation of beta weight; β: standardized beta weight; r: bivariate correlation; pr: partial correlation; sr: semi-partial correlation; R^2: multiple correlation squared; df: degrees of freedom.

Note.

** $p < .001$,

* $p < .05$