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The Role of Personality Dispositions to Risky Behavior in Predicting First Year College Drinking

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Abstract

Aims—U.S. college student drinking is associated with enormous risks to health, safety, and productivity. Recent advances in personality research that have delineated multiple, separate dispositions to engage in risky behaviors may help clarify the personality contribution to risk for this problem.

Design—The authors compared the prospective roles of sensation seeking, lack of planning, lack of perseverance, negative urgency, and positive urgency (dispositions to engage in rash action when in an unusually negative or positive mood, respectively) in predicting increases in drinking frequency, drinking quantity, and negative outcomes from consumption across the first year of college.

Setting—University of Kentucky campus.

Participants—418 first-year U.S. College Students enrolled in an Introduction to Psychology course during the first assessment. 293 participants completed both phases of the study.

Measurements—Participants completed self-report measures of personality and drinking behavior twice during the first year of college (the UPPS-R, PUM, and DSQ).

Findings—Whereas sensation seeking related to increases in the frequency with which college students drank alcohol, positive urgency predicted increases in (a) the quantity of alcohol students consumed at any given drinking episode and (b) negative outcomes experienced from drinking.

Conclusions—It appears that although sensation seeking is a risk factor for participation in drinking behaviors, risk for increased quantity of consumption and its negative outcomes may be more a function of dyscontrol stemming from high positive mood for college students.

Keywords

Emotion; alcohol; risky behavior; longitudinal; impulsivity

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Introduction

The rates of alcohol consumption, binge drinking, and adverse consequences related to consumption for American college students are extremely high [1,2,3]. This problem is of considerable clinical importance, and needs to be addressed with comprehensive risk models.

One component of a comprehensive model concerns individual differences in personality-based risk. There have been recent advances in understanding the personality contribution to risk; this report describes the first longitudinal study to apply these advances to test new, specific theories of the operation of individual differences on particular drinking behaviors during the critical first year of college. To introduce the study, we review the severity and topography of U.S. college student drinking, the centrality of personality factors during the transition into college, and these personality theory advances; we then present the specific hypotheses that drove this investigation. To anticipate: we believe sensation seeking uniquely predicts the frequency of drinking, whereas the tendency to engage in rash acts when experiencing extremely positive mood states uniquely predicts the quantity of consumption and alcohol-related problems.

The Problem of College Student Drinking

Many first year college students drink very heavily, increase their frequency and volume of consumption, and drink in new contexts [1,2,3,4,5,6,7,8]. Lindsay [9] found that approximately one-fifth of all college freshmen begin drinking during their first year of college. Among college students that drink, up to 40% engage in binge drinking [2] and 25% engage in frequent binge drinking [7].

The risk associated with this drinking is well-documented. Hingson et al. [1] reported the following estimates: 1,700 students die each year from unintended alcohol-related injuries; 599,000 experience unintentional injuries; almost 700,000 are assaulted by another student who has been drinking; and approximately 97,000 students are victims of sexual assault or rape. More than 100,000 report having been too intoxicated to know whether they consented to sex [10]; approximately 25% report negative academic consequences to their drinking [3, 11,12,13]; more than 150,000 develop alcohol-related health problems [10]; 1.2 to 1.5% report having attempted suicide due to drinking or drug use problems [14]; and many students engage in vandalism or other illegal behaviors while drinking [3]. In addition, 55% of non-drinking students report second-hand negative effects of alcohol use [7,15].

Undergraduate college students are more likely to drink on weekends, during days of celebration, and when they are not facing academic demands the following day [15]. That drinking tends to be heavy and associated with physical violence, alcohol-related injuries and deaths, driving while under the influence, and unwanted sexual intercourse [15]. Some students appear to engage in heavy drinking in order to enhance an existing positive mood, which leads to increased drinking, drinking-related problems, and involvement in risky behaviors [16].

The Importance of Personality for Drinking Risk Among College Students

When individuals make a transition into a new context, particularly one that provides new levels of behavioral freedom, personality appears to play a particularly important role in influencing behavior [17]. In new contexts, one has less information about how to behave adaptively and appropriately; as a result, one's disposition plays a larger role in shaping one's perceptions and responses [17].

Adolescence is generally characterized by high rates of risk taking behavior [18], and the rates of some types of risky behavior increase when adolescents leave home [19]. Specifically, the risk for increases in problem drinking behaviors is high during the first year of college [1,2,

3,4,5,6,7]. It follows that the first year of college is an appropriate time to study the dispositional component of problem drinking risk.

Personality Theory Advances that Clarify Risk: Multiple Dispositions Toward Rash Action

In recent years, there have been important advances in personality theory that have differentiated among previously confounded constructs and that have identified separate personality dispositions to engage in risky behavior [20,21,22,23,24]; these advances are likely to be informative as to the personality component of college drinking risk.

There is now considerable evidence that measures of traits labeled “impulsivity” either combine separate constructs, or refer to different constructs altogether [21,22]. The same is true of measures labeled “disinhibition.” The theoretical and empirical parsing of measures labeled in these ways has identified five, separate dispositions to engage in rash action; these dispositions describe different apparent pathways to risk. Two involve low conscientiousness: lack of planning (the tendency to act without thinking ahead) and lack of perseverance (the inability to remain focused on a task). Two are emotion-based dispositions: negative urgency (the tendency to act rashly when distressed) and positive urgency (the tendency to act rashly when experiencing extremely positive affect), and the fifth is sensation seeking (the tendency to seek out novel and thrilling experiences). Each of the five traits has substantial reliable variance independent of the other four traits, and they do not appear to be components of an overall impulsivity construct [20,21].

Cross-sectional research suggests that these five impulsivity-related traits have different external correlates. Both negative and positive urgency correlate with problematic involvement in several risky behaviors, including alcohol consumption, whereas sensation seeking correlates with the frequency of engaging in risky behaviors [20,21,25,26,27]. When the traits are studied together cross-sectionally, sensation seeking does not correlate with drinking problems, neither urgency trait correlates with drinking frequency, and neither lack of planning nor lack of perseverance explain unique variance in any type of drinking behavior [21]. Negative and positive urgency differentially relate to risky behaviors undertaken while in an extremely negative and positive mood, respectively [20].

The Current Study

This paper describes the first prospective test comparing the five different dispositions to rash action in their prediction of different aspects of drinking behavior. Our focus was on differentiating risk for increased first-year college drinking behavior that tends to be emotion-based, i.e., increased drinking follows intense mood states, from risk that tends to be based on the need to seek thrilling stimulation. Specifically, we considered the possibility that, although emotion-based and sensation seeking-based risk may both relate to measures of drinking behavior, different aspects of drinking behavior tend to be differentially influenced by the two kinds of risk factors. As we describe below, we believe that, when the different personality risk factors are considered together, sensation seeking will predict the frequency of alcohol consumption, whereas positive urgency will predict the quantity of consumption and problematic consumption. To test this hypothesis, we separately measured drinking frequency, drinking quantity, and problem drinking. Although these three drinking variables are substantially related, they are not isomorphic. They do refer to different aspects of drinking behavior that may well be predicted differentially by different personality traits. We tested the following hypotheses.

First, we anticipated that sensation seeking would prospectively predict increases in the frequency of alcohol consumption over and above initial levels of alcohol consumption. The theoretical basis for this prediction has two components. Sensation seekers tend to seek out

stimulation, and one form of stimulation is alcohol consumption. Because they have an ongoing need to pursue stimulation, they should tend to engage in alcohol consumption more frequently than do others. And, because sensation seekers are more likely to involve themselves in social events and parties than are others, they are more likely to be present during potentially stimulating alcohol consumption opportunities. The empirical basis for this prediction includes past evidence that sensation seeking and alcohol use are related and that, when sensation seeking is considered together with positive and negative urgency, it correlates cross-sectionally with frequency of consumption but not problem drinking [20,21,25,26,27].

Second, we hypothesized that positive urgency alone would predict increases in the quantity of alcohol consumption and the problems associated with alcohol use, over and above initial levels of these behaviors. The theoretical basis for this prediction is as follows. It appears that the experience of extreme emotions can deplete one's ability to control one's behaviors, perhaps because the need for emotional control absorbs resources that might otherwise be devoted to impulse control [28,29]. Relatedly, when experiencing intense emotions, individuals tend to focus on immediate needs and short-term considerations, at times to the neglect of their long-term interests [30]. These factors could lead an individual to less controlled consumption, resulting in (a) increases in the amount of alcohol consumed at any given drinking episode, and (b) increases in the experience of problems associated with alcohol use. Thus, individual differences in emotion-based impulsivity may predict increased quantity of consumption and problems from that consumption.

Further, there is evidence that some college students drink heavily to celebrate and to enhance positive moods, and that such drinking is associated with negative consequences [15,16], thus implicating the role of positive affect in the risk process. For that reason, we believe that positive urgency, not negative urgency, may be the relevant risk factor for high quantity and problematic consumption among college students. There is empirical support for this hypothesis, in that positive urgency relates to college student problem drinking cross-sectionally [20,25]. The theory underlying this hypothesis is spelled out more fully in [30]. It seems likely to us that negative urgency may play a more important role than positive urgency for individuals in other contexts (e.g., participating in a war, going through a divorce), but we did not study that possibility in this research.

Our hypothesis is not that sensation seeking, uncorrected for its overlap with other personality predictors, would be unrelated to drinking quantity and problem consumption. Nor is it that positive urgency, uncorrected for other personality predictors, would be unrelated to drinking frequency. Rather, it is that the unique contribution of sensation seeking, above and beyond other predictors, is to the frequency of consumption, and that the unique contribution of positive urgency, above and beyond other predictors, is to the quantity of consumption and problem consumption. Thus, when sensation seeking and positive urgency are included together as predictors of college student drinking, sensation seeking will uniquely predict drinking frequency and positive urgency will uniquely predict drinking quantity and problem drinking. If these hypotheses are supported, they may lead to the enhancement of prevention programs. Successful prevention efforts are likely to differ for emotion-based risk and sensation-based risk.

We did not predict that either lack of planning or lack of perseverance would add predictive power for any of the three drinking criteria. There is little empirical evidence that either trait predicts alcohol consumption beyond prediction provided by sensation seeking, positive urgency, and, in contexts such as alcohol treatment settings [31], negative urgency [21].

Methods

Participants

Participants were 418 first year students at a large, public mid-western university. Seventy-five percent of the sample was female and 25% male. Age ranged from 18 to 32 (mean = 18.2, SD = 0.76); 88% of the sample was Caucasian, 8% African American, 2% Asian American, 1% Hispanic American, and 2% Other. Of the 418 students who began the study, 293 (70%) completed both waves of the study.

Measures

Drinking Styles Questionnaire (DSQ)—The DSQ [32] gathers information about an individual's alcohol use. This scale provides information about an individual's alcohol use on a 5 point likert scale, including frequency of alcohol use (from *I have never had a drink of alcohol* to *I drink alcohol almost daily*) and quantity of alcohol use (from *I don't drink alcohol at all* to *I usually drink a lot of alcohol* (*more than 9 beers or drinks*) on any given occasion). Problems associated with alcohol use (e.g., experiencing blackouts, having trouble with the law due to drinking, committing illegal acts while intoxicated, etc.) are also measured. The negative outcome composite scale includes 10 dichotomous items reflecting negative outcomes from consumption (e.g., hangovers, trouble with parents/friends/school, fights, illegal acts, etc.). The negative outcome composite had coefficient alphas of 0.79 and 0.84, respectively, on each time period assessment. Test-retest reliability for the scale measuring problems associated with use was .91 over a 4-week period in the developmental sample [32]. Stability estimates of the measures over the 8 month time period in this study were as follows: drinking quantity 0.68, drinking frequency 0.71, drinking problems 0.60.

Although the DSQ was originally developed for use with an early adolescent population, the scale has been shown to be a valid and reliable measure for use with a late adolescent/college population and has been shown to be stable across assessment periods [21,25,33,34]. In order to measure alcohol use change, the questionnaire assessed alcohol frequency, quantity, and problems over a lifetime time frame (e.g., how often have you been drunk?).

The Positive Urgency Measure (PUM [25])—The PUM is a 14 item Likert-type scale to measure one's tendency to act rashly in response to a positive mood. Items are assessed from 1 (*agree strongly*) to 4 (*disagree strongly*). Factor analyses confirmed the unidimensionality of the scale [25]. The measurement of positive urgency is stable across assessment method and time, and the trait correlates cross-sectionally associated with engagement in risky behaviors while in a positive mood [20,25]. In the present sample, the coefficient alpha was 0.96. Stability of scores over the 8 month period was 0.46. Sample items include *When I am very happy, I sometimes do things that can have bad consequences* and *Others would say I make bad choices when I am in a good mood*.

The UPPS-R [22]—The UPPS-R is a 45 item Likert-type scale designed to assess lack of planning, lack of perseverance, negative urgency, and sensation seeking. Items are assessed from 1 (*agree strongly*) to 4 (*disagree strongly*). The four scales have good convergent validity across assessment method and good discriminant validity from each other [21]. In addition to scale correlates noted above, the scales relate meaningfully to scores reflecting a range of DSM-IV diagnoses [24] and have analogue scales in the NEO-PI-R (sensation seeking: the excitement seeking facet of extraversion; lack of deliberation: the deliberation facet of conscientiousness; lack of persistence: the self-discipline facet of conscientiousness; and negative urgency: the impulsivity facet of neuroticism). Therefore, the scales are thought to have sufficient stability over time. In the present sample, average internal consistencies are as follows: lack of planning 0.83, negative urgency 0.87, sensation seeking 0.84, and lack of

perseverance 0.79. The scores were relatively stable over the eight month period, with stability correlations ranging from 0.50 (lack of perseverance) to 0.64 (sensation seeking). Sample items for the scales are as follows: *When I feel bad, I will often do things I later regret in order to make myself feel better now* (negative urgency); *I usually think carefully before doing anything* (reverse scored - lack of premeditation); *I finish what I start* (reverse scored – lack of perseverance); *I welcome new and exciting experiences and sensations, even if they are a little frightening or unconventional* (sensation seeking).

Procedure—Participants were recruited through an online research participation website which advertised a longitudinal study for first-year college students. Participants were sampled two times during their first year of college: at the beginning of the fall semester and at the end of the spring semester. All participants were enrolled in an Introduction to Psychology course at their first contact and agreed to participate in both sessions. Upon arrival, participants completed demographic information and the above mentioned scales, as part of a larger self-report questionnaire assessment. All participants were assessed using a group format. For their participation in the first session, participants received course credit for an Introduction to Psychology course. For their participation in the second session, participants were paid $10.

Data Analysis—As we describe below, both the drinking behavior items (quantity and frequency) and the negative drinking outcome composite were positively skewed. We therefore conducted a square root transformation on those composite scores to reduce the skew and we present all analyses using those square root transformed scores (although results using non-transformed scores were equivalent).

After reporting bivariate, uncorrected correlations among all study variables, we used structural equation modeling (SEM) to test our prospective model. For each trait, we understand the items measuring the trait to be parallel indicators of a single construct. We therefore represented each trait as a latent variable. We used three parcels (i.e., groups) of items as indicators for each trait we included. We did so for the following reasons. First, the reliability of a parcel of items is greater than that of a single item, so parcels can serve as more stable indicators of a latent construct. Second, as combinations of items, parcels provide more scale points, thereby more closely approximating continuous measurement of the latent construct. Third, there is reduced risk of spuriously positive correlations, both because fewer correlations are being estimated and because each estimate is based on more stable indicators. Fourth, use of parcels reduces the number of degrees of freedom to be estimated in the model. Because each of the trait scales has numerous items, use of item-level indicators for each trait would prove problematic given our sample size. These advantages have been described [35,36]. The crucial relevant caution about using parcels is that they could mask multidimensionality in an item set [35,37]. In the present case, each trait we studied has been shown to be unidimensional in independent, prior factor analyses [22,25], so that concern is significantly mitigated.

We measured drinking quantity, drinking frequency, and problems associated with drinking as measured variables, not latent variables. We also included a dichotomous measure of biological sex.

To measure model fit, we relied on four fit indices: the Comparative Fix Index (CFI), the Nonnormed Fit Index (NNFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Rules of thumb are that CFI and NNFI values of .90 represent good fit and .95 or greater represent excellent fit [38,39]. RMSEA values of . 06 are thought to indicate a close fit, .08 a fair fit, and .10 a marginal fit [38,40], and SRMR values of approximately .09 tend to indicate good fit [38]. We examined overall fit across the four indices.

Results

Participant Attrition

Individuals who participated in both waves did not differ from those who participated in only the first wave on any demographic, drinking, or trait variable. Accordingly, we concluded that data were missing at random. We therefore imputed missing data using the expectation maximization (EM) procedure [41] [1]. In recent years, several monte carlo studies have been conducted that compare a set of data imputation procedures, including the EM method, to traditional, alternative methods of handling missing data, including deletion of missing cases and mean imputation [41]. Consistently, those studies have found that the EM procedure produces less biased estimates of full sample values. This resulted in a total sample size of 418 for the SEM procedure.

Descriptive Statistics

Table 1 presents the mean endorsement of each of the drinking items at times 1 and 2; the data are broken down by gender. Males and females did not differ significantly on any of the three drinking variables. On average, at the first assessment, the average participant reported drinking alcohol infrequently (M = 3.44, indicating drinking approximately 3–4 times per year). The average report was of drinking approximately 1–3 beers or drinks per drinking episode (M = 2.84), with very few negative drinking outcomes (M = 2.42 negative outcomes reported). At the second assessment, the mean reported change was relatively small. Participants reported drinking slightly more often (M = 3.57, indicating drinking between 3–4 times per year and once per month) and drinking slightly more alcohol per episode (M = 2.99, indicating drinking 2–3 beers per episode). Participants reported experiencing significantly more negative outcomes from drinking (M = 4.10 negative outcomes experienced). Males and females did not differ on the above drinking variables, either at time 1 or time 2. The most frequently endorsed negative outcomes at both time assessments were hangovers, becoming nauseated and/or vomiting, and not recalling what one did while intoxicated.

Because the three criterion variables were positively skewed, we transformed the variables by taking the square root of each. Although there was some remaining positive skew to each composite (skew values ranged from .47 to .69), the degree of skew was well within the range in which structural equation modeling can produce relatively unbiased parameter and standard error estimates [42].

Bivariate, Uncorrected Correlations Among the Five Traits, The Drinking Variables, and Sex

Table 2 presents the bivariate correlations among the study variables. As has been shown in the past, the five traits were inter-correlated. Both positive and negative urgency represent emotion-based dispositions to rash action. Not surprisingly, they correlated the most highly (r = .62). Lack of planning and lack of perseverance, both of which are understood to relate to the conscientiousness domain of personality [21,22] correlated the next most highly (r = .39). On average, the five traits shared 15.7% of their variance.

All five traits correlated significantly with both drinking quantity and drinking problems at time 1. All but lack of perseverance correlated with time 1 drinking frequency. All but lack of perseverance correlated with time 2 drinking quantity and drinking frequency, and all five traits correlated with time 2 problem drinking. For biological sex, higher scores referred to men. Being male was unrelated to drinking quantity, frequency, or problem drinking at either time

[1]Data analytic findings using imputed data did not differ from findings using data in which no missing data was imputed.

1 or time 2. Being male was associated with slightly higher scores on positive urgency, sensation seeking, and lack of perseverance.

Prospective Model of the Prediction of Drinking Behaviors

We tested a model in which sex, time 1 drinking quantity, time 1 drinking frequency, time 1 drinking problems, and all five traits predicted time 2 drinking quantity, time 2 drinking frequency, and time 2 drinking problems. Bivariate correlations of the latent traits are presented in table 3. All time 1 variables were allowed to inter-correlate, as were the three time 2 criterion variables. The model fit the data well: CFI = .96, NNFI = .94, RMSEA = .05 (90% confidence interval: .03 – .06), SRMR = .04. As figure 1 shows, our hypotheses were supported. Only positive urgency predicted time 2 drinking problems and time 2 drinking quantity above and beyond prediction from all other variables, supporting the unique role of positive urgency with respect to increases in these drinking behaviors during the first year of college. Only sensation seeking significantly predicted time 2 drinking frequency over and above all other variables, speaking to the unique role of sensation seeking in predicting increased frequency of drinking. In addition, being male further predicted increases in drinking frequency over the first year of college. Using the prediction model, 41% of the variance in time 2 drinking frequency, 37% of the variance in time 2 drinking quantity, and 26% of the variance in time 2 drinking problems were explained.

Discussion

The current study investigated the contribution of personality to drinking risk among first year U.S. college students. We applied recent advances in the basic personality literature to this problem. One of the key advances has been to differentiate between the disposition to seek new, thrilling sensations on the one hand, and the disposition to engage in rash acts secondary to the experience of intense emotions on the other hand. The former (sensation seeking) is perhaps driven by a need for stimulation. The latter (positive and negative urgency), in contrast, appears to have the characteristic of emotional dysregulation: individuals act in ways inconsistent with their long-term interests because they are either extremely distressed or extremely excited and so lack the cognitive controls that are typically in place [29,30].

Based on cross-sectional data, we believed that several of the personality traits related to rash action would correlate with subsequent drinking behavior bivariately, but that an emotion-based disposition (positive urgency) would likely play the predominant role in predicting increases in drinking quantity and problems from drinking, whereas the need to seek stimulation would likely play the predominant role in predicting the frequency with which one chooses to drink. Our hypothesis was confirmed by these prospective data. Individually, four of the five traits correlated with time 2 drinking frequency and quantity (all but lack of perseverance) and all five correlated with time 2 drinking problems. But when the traits were considered together, corrected for time 1 drinking, only sensation seeking predicted increases in the frequency with which first-year college students consumed alcohol, and only positive urgency predicted increases in both the quantity of alcohol normally consumed and in negative outcomes associated with alcohol use.

These prospective results are consistent with our theory that individuals high in sensation seeking may be inclined to pursue the stimulation of alcohol consumption and to expose themselves to drinking contexts more often, and, thus, be more likely to increase the frequency with which they drink during the first year of college. The results were also consistent with our theory that those high in positive urgency are more likely to increase their quantity of alcohol consumed and their problems associated with alcohol use due to (a) an emotion-based focus on short-term, rather than long-term considerations, and (b) the effect of emotion on self-regulatory skills. Also consistent with our theory, negative urgency was not a significant

predictor of increases in alcohol use or problems during the first year of college; our hypothesis that drinking is more of a positive mood-based action than a negative mood-based action for U.S. college freshmen was thus supported. It is important to note, however, that the respective influence of positive and negative mood-based rash action may differ based on population of interest, context, and drug of choice. This should be examined in future studies.

Surprisingly, in this study, sex was shown to be unrelated to drinking quantity, frequency, and problems at both assessment periods; however, sex did predict a significant increase in drinking frequency over and above the other variables in the model, in that males showed a greater increase in drinking frequency over the first year of college than did females. These findings were not anticipated and should, therefore, be interpreted with caution. Replication of them is both necessary and important.

We believe there are two important implications of this research. First, it is important to develop risk theories based on recognized differences among different dispositions to rash action: sensation seeking and positive urgency predicted different behaviors prospectively. Second, the findings demonstrate that a particular disposition to rash action, that based on the experience of extremely positive affect, may represent the key dispositional contributor to heavy and problem drinking among college students.

This second implication may be important for understanding how to ameliorate this problem. Currently, there are well-validated means to address high sensation seeking youth [43,44] and there are well-validated means to teach individuals to manage mood fluctuations without resorting to rash, ill-advised behavior [45]. The two interventions are quite different. The current data suggest that interventions may be wise to focus on effective mood management, rather than safer alternatives to seek stimulation, in order to address heavy volume drinking and its negative consequences among college students. At present, mood management interventions, such as emotional regulation or distress tolerance skills [45] focus on negative moods, but the principles of learning to act in ways consistent with one's long-term interests and health, even when intensely emotional, may be readily adapted to the experience of positive mood. These possibilities merit investigation.

The present findings should be understood within the context of the potential limitations of the study. It is important to appreciate that the magnitude of the prospective associations was small, raising the question of the importance of the effects we found. And, predictors not included in this study might explain some of the same variance explained by the traits under investigation here. If that proves to be true, the causal relations among overlapping predictors will need to be worked out, in order to understand their different possible roles in the risk process.

However, there are several reasons why the small effect sizes may not represent a significant limitation. First, each effect was controlled for several predictors of potential interest. For example, positive urgency predicted increased drinking problems above and beyond effects from initial drinking problems, initial drinking quantity, initial drinking frequency, scores on four other traits to dispose individuals to rash action, and biological sex. The rigorous controls employed make this test of the roles of positive urgency and sensation seeking especially stringent; there is good reason to believe their effects are stable.

Second, the impact of personality traits on subsequent drinking is likely to include indirect and moderated effects not represented in this study. For example, previous research has shown that traits (including positive urgency) interact with learning and motives to predict drinking behavior concurrently [25,34]; it is likely that both positive urgency and sensation seeking are more strongly predictive for some individuals than for others. Third, the tests we conducted were not tests of a comprehensive risk model; our intent was to isolate and investigate the

dispositional contribution to risk. The effects observed here presumably operate in conjunction with many other contributors to risk.

Other limitations are these. Because we focused on the transitional first year of college, this study does not provide information about risk for other groups. Risk processes likely vary across groups. For example, we consider it likely that negative urgency, rather than positive urgency, predicts problem drinking among individuals in other life circumstances. In addition, this prospective investigation relied on questionnaire self-report measures. Although measures of the traits have been shown to be consistent across method of assessment [20,21], it may be that interviews would have provided more accurate estimates of drinking behavior. Our retention rate of 70% is another limitation. Although the missing data appear to have been missing at random, and although the EM data imputation technique appears to present unbiased estimates of population parameters, one cannot know with certainty whether the loss of data altered the findings. Finally, the sample was predominantly Caucasian and female and included only U.S. first year college students enrolled in an Introduction to Psychology course. It is thus not clear to whom, beyond the college student population, these results generalize. Further research should be done to assess these relationships in a diverse sample to validate the use of this model on other groups of interest.

In conclusion, risk for the serious problem of heavy alcohol consumption among individuals making the transition to U.S. colleges may be increased among individuals who are disposed to act rashly when experiencing extremely positive moods. Risk for drinking frequently may, instead, be increased among those disposed to seek out new, thrilling sensations. These findings may contribute to efforts to intervene successfully with this problem.

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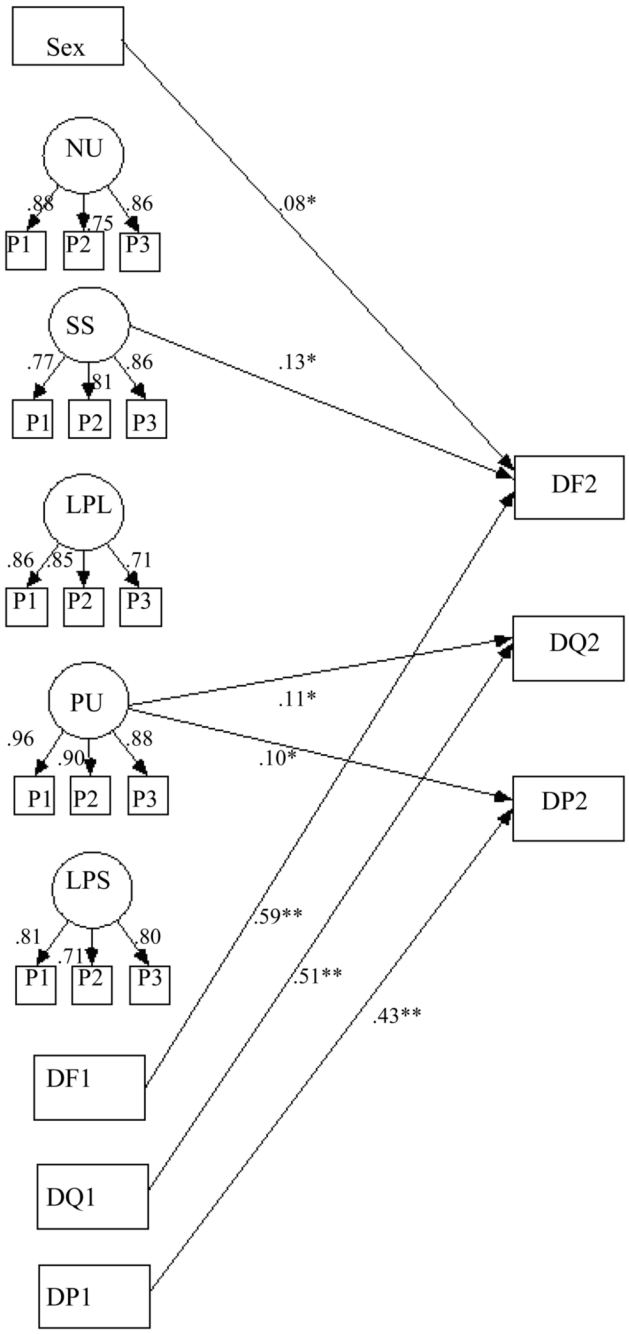

Figure 1.

This figure depicts the longitudinal structural equation model of the relationships among sex, sensation seeking, positive urgency, lack of planning, lack of perseverance, negative urgency, drinking frequency, drinking quantity and drinking-related problems. Circles reflect latent variables and squares reflect measured variables. The measured indicators of the latent traits are parcels of items: P1 stands for parcel 1 for a given factor. Straight arrows reflect factor loadings and prospective prediction pathways. Sex: biological sex; PU: positive urgency; SS: sensation seeking; LPL: lack of planning; LPS: lack of perseverance; NU: negative urgency; DP: Drinking-related problems; DQ: Drinking quantity; DF: Drinking Frequency. Time 1 assessment at beginning of first year of college; Time 2 assessment at the end of the first year

of college. Length of time between assessments = approximately 8 months. Assessment period is over the individual's lifetime. Values here include imputed values from total sample of *n* = 418. Values were unchanged using non-imputed data.

For ease of presentation, error variances, cross-sectional relationships (presented in Table 2), and non-significant paths are not depicted.

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

Table 1

Mean levels of drinking behaviors of first-year college students (n = 418)

	Males (n = 101)	**Females (n = 305)**	**Overall (n = 418)**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
Drinking quantity			
Time 1	2.89 (1.43)	2.79 (1.17)	2.84 (1.24)
Time 2	3.05 (1.15)	2.94 (0.99)	2.99 (1.04)
Drinking frequency			
Time 1	3.38 (1.61)	3.43 (1.49)	3.44 (1.51)
Time 2	3.46 (1.23)	3.59 (1.24)	3.57 (1.23)
Drinking problems			
Time 1	2.49 (2.28)	2.26 (2.10)	2.42 (2.24)
Time 2	4.46 (2.92)	3.90 (2.68)	4.10 (2.75)

Note. Time 1 assessment at beginning of first year of college; Time 2 assessment at the end of the first year of college. Length of time between assessments was approximately 8 months. Assessment period is over the individual's lifetime. Drinking quantity, drinking frequency, and drinking problems were measured using the DSQ. Values here include imputed values from total sample of n = 418. Values were unchanged using non-imputed data.

Table 2

Bivariate correlations of study variables

	PU	LPL	SS	LPS	NU	DQ1	DQ2	DF1	DF2	DP1	DP2	SEX
PU		0.31**	0.25**	0.34**	0.62**	0.26**	0.26**	0.26**	0.19**	0.34**	0.26**	0.15**
LPL			0.35**	0.39**	0.34**	0.26**	0.22**	0.30**	0.22**	0.34**	0.23**	−0.02
SS				0.01	0.19**	0.34**	0.29**	0.31**	0.25**	0.32**	0.22**	0.18**
LPS					0.36**	0.13**	0.08	0.08	0.08	0.17**	0.13**	0.12**
NU						0.29**	0.24**	0.25**	0.17**	0.33**	0.21**	0.02
DQ1							0.67**	0.81**	0.64**	0.71**	0.46**	0.03
DQ2								0.63**	0.83**	0.54**	0.54**	0.05
DF1									0.71**	0.69**	0.43**	−0.01
DF2										0.54**	0.53**	−0.05
DP1											0.54**	0.05
DP2												0.09

Note: PU = positive urgency, LPL = lack of planning, SS = sensation seeking, LPS = lack of perseverance, NU = negative urgency, DQ1 = time 1 drinking quantity, DQ2 = time 2 drinking quantity, DF1 = time 1 drinking frequency, DF2 = time 2 drinking frequency, DP1 = time 1 drinking problems, DP2 = time 2 drinking problems, SEX = biological sex. Drinking variables measured by the DSQ; PU measured with the PUM; LPL, SS, LPS, and NU measured with the UPPS-R.

Note. Time 1 assessment at beginning of first year of college; Time 2 assessment at the end of the first year of college. Length of time between assessments = approximately 8 months. Assessment period is over the individual's lifetime. Values here include imputed values from total sample of n = 418. Values were unchanged using non-imputed data.

* p<.05

** p<.01

Table 3

Bivariate correlations of latent variables included in SEM analysis

	SS	NU	PU	LPL	LPS
SS		0.23**	0.29**	0.40**	0.39**
NU			0.66**	0.38**	0.41**
PU				0.35**	0.39**
LPL					0.45**
LPS					

Note: SS = sensation seeking, NU = negative urgency, PU = positive urgency, LPL = lack of planning, LPS = lack of perseverance; traits measured using the PUM and the UPPS-R.

Note. Values here include imputed values from total sample of $n = 418$. Values were unchanged using non-imputed data.

* p<.05

** p<.01