



## Short Communication

## When you see it, let it be: Urgency, mindfulness and adolescent substance use



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## HIGHLIGHTS

- We explored relationships among urgency, mindfulness, and substance use.
- Positive and negative urgency were associated with greater alcohol use.
- Mindfulness associated with lower lifetime alcohol and marijuana use.
- Interactions between urgency and mindfulness were not supported.

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## ABSTRACT

The emotion-based domains of impulsivity, positive and negative urgency, are facets that have garnered attention due to their associations with substance use, and mindfulness based strategies have shown promise in reducing substance use in adults. The aim of the current study was to examine relations among urgency, mindfulness, and substance use in adolescence. Cross-sectional data were collected from students ( $N = 1,051$ ) at a large, private high school in the Pacific Northwest. Both positive and negative urgency were uniquely associated with greater likelihood of lifetime and current alcohol use; only positive urgency predicted lifetime marijuana use. Mindfulness was associated with a lower likelihood of lifetime alcohol or marijuana use. Interactions between urgency and mindfulness were not supported. Our findings highlight the need to explore relations among baseline mindfulness, skills based mindfulness, and personality in adolescent alcohol and other drug use.

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## 1. Introduction

Urgency, the impulsive tendency toward rash action, is associated with a variety of health behaviors, including problematic drinking, gambling, binge eating, and antisocial behavior (Fischer, Anderson, & Smith, 2004; Smith et al., 2009). In college students, urgency associated with positive affect (PU) and with negative affect (NU) is associated with baseline alcohol consumption, with PU showing longitudinal influence on alcohol use (Cyders, Flory, Rainer, & Smith, 2009) and engagement in illicit drug use over time (Zapolski, Cyders, & Smith, 2009). As urgency also is associated with aggression and engagement in various risky behaviors in children and young adolescents (Zapolski, Stairs, Settles, Combs, & Smith, 2010), these traits might be appropriate target for selective prevention.

One aim of mindfulness training may be to diminish the impact of mental events on behavior by supporting the position of non-judgment, openness, and acceptance of thoughts and feelings, thereby reducing

unreflective impact of emotions/thoughts on behavior (Bishop et al., 2004). Research into the developmental course of mindfulness is in its early stages. From age 10–17 years, mindfulness seems to represent a single construct associated with acting with awareness and nonjudging (Greco, Baer, & Smith, 2011). In college students, mindfulness demonstrates separate factors: acting with awareness, non-reactivity, nonjudging, describing, and observing (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Fernandez, Wood, Stein, & Rossi, 2010).

Empirically based mindfulness therapies have demonstrated success for substance use treatment (Chiesa & Serretti, 2013; Zgierska et al., 2009) and relapse prevention (Bowen et al., 2009; Witkiewitz, Marlatt, & Walker, 2005), but less is known about the relation between baseline mindfulness and alcohol and other drug use in youth. College students who scored higher on aspects of mindfulness also reported greater levels of alcohol use (Leigh, Bowen, & Marlatt, 2005; Leigh & Neighbors, 2009), and differential associations have been observed between the various factors and alcohol use and alcohol-related consequences, generally supporting mindfulness as a protective factor (Fernandez et al., 2010). In the only study examining the influence of impulsivity and mindfulness on alcohol use identified in the published literature, Murphy and MacKillop (2012) found that in college students

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the link between mindfulness and alcohol use, while robust at the zero-order level, was nonsignificant when aspects of impulsivity were considered simultaneously. Given these contradictions, further research is needed to better understand the impact of mindfulness on substance use and within the context of impulsivity.

In the present study, the interaction of urgency and mindfulness on alcohol and marijuana use in high school students was examined. Based on previous work with college students, we expected zero order relations between PU, NU, mindfulness, and alcohol and marijuana use and anticipated that mindfulness may mitigate the effects of urgency on substance use given its successful use as an intervention strategy for substance use disorders.

## 2. Method

### 2.1. Participants

Participants ( $N = 1,051$ , 49% female) were recruited from a high school in the northwestern U.S., were evenly distributed across grades 9–12 ( $M$  age = 15.6;  $SD = 1.2$ ), and were largely Caucasian (83.9%,  $n = 882$ ). A slim majority (52.1%,  $n = 548$ ) of students reported lifetime alcohol use (ALC) and 20.6% ( $n = 216$ ) reported lifetime marijuana use (MJ). Approximately half of lifetime users reported current use ( $n$  ALC = 259;  $n$  MJ = 110).

### 2.2. Measures

#### 2.2.1. UPPS Impulsivity Scale-Revised (UPPS-R: Whiteside & Lynam, 2001)

Nine NU items from UPPS-R, scored from 1 (agree strongly) to 4 (disagree strongly), were used for the present study (Cyders et al., 2007).

#### 2.2.2. Positive Urgency Measure (PUM: Cyders et al., 2007)

Ten PU items, based on the highest factor loadings obtained by Cyders et al. (2007), were administered due to time constraints (scoring: 1 [very much like me] – 4 [not at all like me]).

#### 2.2.3. Child and Adolescent Mindfulness Measure (CAMM: Greco et al., 2011)

The 10-item CAMM assesses mindfulness in youth ages 10–17 and has demonstrated acceptable reliability and validity as a unidimensional measure (Greco et al., 2011). It is scored on a 5-point scale from 0 (never true) to 4 (always true).

#### 2.2.4. Alcohol and marijuana use

Patterns of alcohol and marijuana use were assessed using items from statewide and national assessments of substance use (Johnston, O'Malley, Bachman, & Schulenberg, 2009; Office of Disease Prevention and Epidemiology, 2009). Dichotomous (nonuser = 0 vs. user = 1) lifetime use variables were computed to account for the non-normality of these variables as the data were strongly zero-inflated. Current ALC was operationalized as the number of drinking days  $\times$  average drinks per drinking day in the past month among drinkers ( $m = 5.7$ ;  $SD = 15.1$ ; range: 0–150). Current MJ was assessed on a 5-point scale from zero to 40 or more times in the past month among users ( $m = 2.3$ ;  $SD = 6.0$ ; range: 0 = 40).

### 2.3. Procedure

All study procedures received approval from the appropriate institutional review board and school administrators. Of the 1225 parental consent forms distributed, 91% were returned. Approximately 97% of students with parental consent provided assent, and 1051 participants with adequate data were included in analyses. Trained research assistants administered computer-based surveys in computer laboratories and the library. Only students taking the survey were allowed in the

assessment rooms during administration. Different versions of the survey were offered on adjacent computers; computers had privacy screens to promote confidentiality.

### 2.4. Analytic strategy

Logistic regressions were conducted in Stata 13.0 (StataCorp LP, College Station, TX). Given the overdispersion of the past 30-day count variables, negative binomial regression was used to examine the influence of urgency and mindfulness on current ALC and MJ in students endorsing lifetime use (Hilbe, 2011). The three main effects (PU, NU, mindfulness) were mean centered (Aiken & West, 1991) and included with two computed interaction terms (mindfulness  $\times$  PU and mindfulness  $\times$  NU) in the final models. Sex, race, and grade were included as covariates based on their bivariate relations with outcome.

Multiple imputation (Baraldi & Enders, 2010) compensated for patterns of missing data among predictors within the regression analyses; missing values were replaced by a set of  $m > 1$  plausible values to generate 50 data sets. Imputation equations used alcohol and marijuana use as predictors for the independent variables, and interaction terms were passively imputed from the estimated values. For each set, estimates were combined to provide parameter estimates and standard errors in the regressions (Anderson, Tomlinson, Robinson, & Brown, 2011).

## 3. Results

### 3.1. Baseline substance use, urgency, and mindfulness

Boys endorsed a significantly higher level of PU than girls,  $t(1026) = -2.43$ ,  $p = .01$ ; neither grade or race were associated with PU. None of the three demographic variables were associated with NU. Boys reported significantly higher levels of mindfulness compared to girls,  $t(1024) = -4.36$ ,  $p < .001$ . Grade,  $F(3, 1022) = 4.58$ ,  $p = .003$ , and race,  $F(4, 1021) = 2.91$ ,  $p = .02$ , also were significantly associated with mindfulness. Pairwise correlations among the predictor and outcome variables are provided in Table 1.

### 3.2. Effect of urgency on substance use outcomes

Both PU and NU significantly predicted lifetime ALC,  $B = 0.75$ ,  $SE = 0.16$ ,  $p < .001$  and  $B = 0.57$ ,  $SE = 0.13$ ,  $p < .001$ , respectively ( $F[10, 2.2e + 7] = 17.82$ ,  $p < .001$ ). Higher scores on urgency were associated with greater likelihood of lifetime ALC. Greater PU predicted greater current ALC,  $B = 0.53$ ,  $SE = 0.16$ ,  $p = .001$ ;  $F(10, 91224.6) = 5.40$ ,  $p < .001$ . NU was not associated with current ALC. Models predicting lifetime and current MJ were both significant,  $F(10, 8.8e + 6) = 15.16$ ,  $p < .001$  and  $F(9, 9.1e + 6) = 1.94$ ,  $p = .04$ , respectively. For lifetime MJ, only PU was a significant predictor,  $B = 1.01$ ,  $SE = 0.19$ ,  $p < .001$ . Neither PU nor NU was related to current MJ.

### 3.3. Effect of mindfulness on substance use

Mindfulness was a significant predictor of lifetime ALC,  $B = -0.50$ ,  $SE = 0.09$ ,  $p < .001$ , such that greater mindfulness was associated with a lower likelihood of a student having engaged in drinking behavior ( $F(9, 3.5e + 7) = 15.26$ ,  $p < .001$ ). Similar findings were observed for lifetime MJ,  $B = -0.33$ ,  $SE = 0.11$ ,  $p = .004$ ;  $F(9, 1.4e + 8) = 13.06$ ,  $p < .001$ . Although the overall models were significant for current ALC,  $F(9, 4.2e + 8) = 4.03$ ,  $p < .001$ , and MJ,  $F(8, 5.0e + 9) = 2.02$ ,  $p = .04$ , the main effect of mindfulness did not predict either outcomes.

### 3.4. Interaction effects between urgency and mindfulness on substance use

Test of the interaction effects between urgency and mindfulness on lifetime ALC and MJ are provided in Table 2. The omnibus tests for lifetime ALC and MJ were significant,  $F(13, 4.6e + 6) = 13.62$ ,  $p < .001$

**Table 1**  
Pairwise correlations among urgency, mindfulness, and substance use.

	Positive urgency	Negative urgency	Mindfulness	Lifetime alcohol use	Current alcohol use <sup>#</sup>	Lifetime marijuana use	Current marijuana use <sup>#</sup>
Positive urgency	–						
Negative urgency	0.60***	–					
Mindfulness	–0.42***	–0.48***	–				
Lifetime alcohol use	0.27***	0.27***	–0.17***	–			
Current alcohol use <sup>#</sup>	0.16***	0.06	0.01	n/a	–		
Lifetime marijuana use	0.25***	0.17***	–0.07*	0.44***		–	
Current marijuana use <sup>#</sup>	0.05	0.04	0.01	–0.08	0.29***	n/a	–

Note: All estimates are provided as *r*. <sup>#</sup>Correlations for current alcohol and marijuana use were calculated among participants endorsing lifetime use of each respective substance.

\* *p* < .05.

\*\*\* *p* < .001.

and  $F(13, 3.3e + 6) = 11.60, p < .001$ , respectively. None of the interaction terms emerged as significant predictors of lifetime use. Additionally, the main effect of mindfulness was no longer significant when the interaction terms and main effects of PU and NU were included in the model. The full model predicted current ALC among lifetime drinkers,  $F(13, 129763.2) = 4.21, p < .001$ . Greater PU predicted greater current ALC,  $B = 0.57, SE = 0.16, p < .001$ ; none of the other main or interaction effects were significant. For current MJ, the omnibus test of the overall model failed to reach significance.

#### 4. Discussion

PU was associated with initiation of drinking and marijuana use in this sample of younger adolescents, consistent with research in older adolescents (Cyders et al., 2009; Zapski et al., 2009). Substance-specific findings were observed for NU, such that NU was significantly associated with alcohol use but not marijuana use; the ALC finding is consistent with previous cross-sectional research on alcohol use in college students (e.g., Cyders et al., 2009). Although further research is needed, the present results suggest that initiation and maintenance of alcohol use may operate through different trait pathways in younger adolescents. Urgency may also differentially influence the initiation and maintenance of other substances, as illustrated by the case of lifetime and current marijuana use here.

This study was the first to examine the link between baseline mindfulness and substance use in high school students and found that mindfulness was associated with lifetime abstinence from alcohol and marijuana. Consistent with previous research (Murphy & MacKillop, 2012), mindfulness did not contribute to models including the effects of urgency on alcohol and marijuana use. While mindfulness and urgency were inversely associated, the magnitude of these effects suggests independence of these constructs. As mindfulness-based intervention strategies have shown positive effects for substance use (Bowen et al., 2009; Chiesa & Serretti, 2013), these findings suggest that more research is needed to understand whether baseline mindfulness is qualitatively different than mindfulness skills trained through intervention. Contrary to original hypothesis, the null findings for the interaction effects suggest that baseline mindfulness does not influence the effect of

**Table 2**  
Interaction effects of positive urgency and negative urgency by mindfulness on lifetime substance use.

Effect	Lifetime drinking			Lifetime marijuana		
	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>B</i>	<i>S.E.</i>	<i>p</i>
Positive urgency	0.72	0.17	<.001	1.10	0.20	<.001
Negative urgency	0.58	0.14	<.001	0.35	0.18	=.05
Mindfulness	–0.03	0.11	ns	0.13	0.15	ns
Positive urgency X mindfulness	–0.05	0.21	ns	0.25	0.26	ns
Negative urgency X mindfulness	0.12	0.16	ns	–0.09	0.21	ns

Note: Participant sex, race, and grade were included as covariates in the model, but this table only reports the main and interaction effects of urgency and mindfulness as relevant to study aims.

ns = indicates a significance level greater than 0.05.

urgency on substance use in adolescents. Due to the preliminary nature of this finding, additional research is needed to determine whether high levels of impulsivity interfere with the effectiveness of mindfulness approaches to intervention or if these related constructs fail to interact in a meaningful way when considering prevention of substance use issues in youth.

Caution must be used in interpreting these findings. Participants were largely Caucasian students attending a private high school; whether the findings generalize to a more diverse and older sample remains to be seen. The relatively low intensity of use in this sample limits the generalization of the current findings to youth who use more heavily. Given the age range and relatively normative use patterns in our sample, our results are more applicable to processes underlying early engagement with substances of abuse rather than escalation and/or maintenance of use. The current study utilized a cross-sectional design with a single data collection, thus limiting conclusions about causal relations. Longitudinal, process-oriented research is needed to better understand the interplay of urgency, mindfulness, and alcohol and marijuana use across development. Finally, mindfulness was treated as a unidimensional construct in the current study, consistent with previous research on younger populations (e.g., Greco et al., 2011). However, this literature is relatively limited and the measurement of mindfulness needs further study across different age groups in order to better understand the effects of this construct at various developmental stages of life. With these limitations in mind, the findings of the present study highlight the need to explore further the relations among baseline mindfulness, skills based mindfulness, and personality in adolescent alcohol and other drug use.

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#### Contributors

Authors JR and KA designed the study and performed the data collection. Authors JR and BL conducted literature searches and provided summaries of previous research studies. Authors KA and BL conducted the statistical analysis. Authors KA, JR, and BL wrote the initial drafts of the manuscript and all authors contributed to and have approved the final manuscript.

#### Conflict of interest

All authors declare that they have no conflicts of interest.

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