Interactions Between Internalizing Symptoms and Urgency in the Prediction of Alcohol Use and Expectancies Among Low-Income, Minority Early Adolescents

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ABSTRACT: This study examined whether urgency, a disposition to rash action under conditions of strong emotion, moderates associations between internalizing symptoms and alcohol use and related expectancies. Data from the Camden Youth Development Study, a longitudinal, community-based study of early adolescents ($N = 144$, mean age at intake = 11.9 years; 65% Hispanic, 30% African-American; 50% male), were used. Self-report questionnaire measures of depressive symptoms, social and generalized anxiety symptoms, urgency, alcohol use, and alcohol expectancies were used. Mixed models were used to examine the effects of internalizing symptoms, urgency, and their interaction on alcohol use and expectancy trajectories over time. Depressive symptoms interacted with urgency such that youth with high levels of both tended to have elevated levels of global positive alcohol expectancies. Social anxiety symptoms interacted with urgency to be associated with increasing levels of social behavior alcohol expectancies such that youth with high levels of both tended to experience particular increases in these expectancies over time. Generalized anxiety was not found to be associated with alcohol-related constructs. Therefore, high levels of urgency combine with depressive and social anxiety symptoms to be associated with particularly increased risk for alcohol expectancies that are associated with later alcohol use and problems, indicating particular risk for youth with these combinations of personality traits and psychopathology symptoms.

KEYWORDS: urgency, internalizing, depression, anxiety, alcohol use, alcohol expectancies

Introduction

Internalizing symptoms and substance use often co-occur within individuals.[1,2] This is frequently explained by the self-medication model of substance use and the concept of "negative affect alcoholism,"[3–5] which are based on the idea that people who experience significant anxious or depressive feelings may use substances to help them cope with those feelings. However, research evidence has provided conflicting findings about the nature and strength of these associations, as well as the direction of effect, indicating the importance of research on possible mediators and moderators of these links. There is also increasing interest in applying emerging models of impulsivity to studies of alcohol use; of particular interest is urgency, a construct indicating a predisposition to rash action under conditions of strong emotion.[6] This study was designed to test the possibility that urgency moderates the association between internalizing symptoms and alcohol use, such that youth with both high levels of internalizing symptoms and a

tendency to engage in rash action when experiencing strong emotion (ie, high levels of urgency) are at particular risk for alcohol use. We focused on the early-adolescent period due to the connection between alcohol use and related risk factors during this period and later heavy and/or problematic alcohol use, and we examined three different types of internalizing symptoms separately (depressive, generalized anxiety, and social anxiety) due to evidence that they may relate differently to alcohol use.[7–9]

Evidence linking internalizing symptoms to alcohol use is mixed. In one study, depressive and generalized anxiety symptoms at baseline (ages 9, 11, and 13 years) were related to alcohol use initiation 3 years later; in contrast, the number of separation of anxiety symptoms at baseline was negatively related to alcohol use initiation.[7] In a study of ninth- and tenth-grade students, depressed mood was related to alcohol use initiation two years later.[10] However, high school seniors with high levels of internalizing symptoms in the fall were

less likely to initiate alcohol use by the spring semester,[11] and major depression in preadolescence (age, 11 years) did not relate to drinking at the age of 14 years.[12] Among boys, both generalized and social anxiety predicted first use of alcohol, though once delinquent behavior was adjusted for, only generalized anxiety predicted first use of alcohol.[8] In summary, it appears that generalized anxiety may be associated with alcohol use initiation, while evidence is mixed for depressive symptoms and there is limited research on links between other specific types of internalizing symptoms and alcohol use among adolescents.

In this study, our focus is on the possibility that a personality trait, urgency, affects the association between internalizing symptoms and alcohol-related constructs. Previous research has demonstrated that personality traits relate to both internalizing disorders and substance use and may contribute to risk for these problems.[13] Personality may be a vulnerability for psychopathology among children and adolescents, though evidence to date does not rule out the possibility that personality represents a more mild point on the spectrum of psychopathology.[14] However, personality and psychopathology can be distinguished, and research has demonstrated that youth who have a particular form of psychopathology as well as a particular personality trait may be at higher risk for negative outcomes. For example, youth with antisocial behavior who have high levels of negative emotionality and low levels of disinhibition are more likely to have the life-course persistent subtype of antisocial behavior than the adolescence-limited subtype.[15] The present study is based on the idea that those youth with both symptoms of psychopathology (ie, internalizing disorders) and a certain personality trait (ie, high levels of urgency) may be at particular risk for substance use, above and beyond the risk associated with each factor taken individually.

The study of urgency began when Whiteside and Lynam[16] proposed a new, multifactorial model of impulsivity and identified a predisposition to rash action when experiencing strong negative emotion (negative urgency) as one facet of impulsivity. Since that time, positive urgency (a predisposition to rash action when experiencing strong positive emotion) has been added to that model of impulsivity,[6] and the model has been extended downward in age so that these dispositions to rash action can be measured in children in a reliable and valid way.[17] Urgency may be uniquely related to addictive behaviors (aside from the effects of other types of impulsivity): in brief, behaviors related to addiction occur during intense emotion for many people, and these behaviors are reinforcing in part due to their effects on managing distress.[6] Consistent with this, newer motivational theories of alcohol use[18] posit that people use alcohol to regulate both positive and negative emotions; those who are prone to rash action during intense emotion (ie, high in urgency) may be particularly prone to use alcohol for this purpose. People who frequently experience distress – ie, have internalizing symptoms – may therefore be particularly susceptible to alcohol use when they are high in urgency; conversely,

people high in urgency may be particularly susceptible to alcohol use when they experience internalizing symptoms.

Negative and positive urgency may relate to alcohol use for different reasons. Specifically, negative urgency is associated with drinking alcohol to cope, while positive urgency predicts increases in the quantity of alcohol consumed and alcohol-related problems (as reviewed in the study by Cyders and Smith[6]). Similarly, people may drink to regulate positive and negative emotions for different reasons.[18] Despite these potentially differing pathways to alcohol use among people with negative positive urgency, the correlation between positive and negative urgency is quite high; their correlates are similar (eg, both predict problem drinking[6]) and an assessment of the hierarchical structure of five dispositions to rash action supported combining positive and negative urgency into a single urgency trait, representing a predisposition toward rash action under conditions of strong emotion.[19] Therefore, in this study, we consider urgency as a unitary construct, though when significant results were found, we repeated the analyses considering negative and positive urgency separately to assess whether the results differed between the two urgency subtypes.

Previous research has shown that urgency is a risk factor for alcohol use,[6,16] and even when compared to other subtypes of impulsivity, urgency is a strong predictor of alcohol use and related problems among adolescents specifically.[20] The present study is predicated on the idea that urgency may be a particularly potent risk factor for alcohol use among adolescents who have problems with emotion regulation (operationalized in this study by internalizing symptoms). A tendency to act rashly under conditions of strong emotion (high levels of urgency) combined with a tendency to experience negative emotion (depressive or anxious symptoms) may be a particularly toxic combination when it comes to risk for alcohol use among adolescents.

In this study, we were primarily interested in alcohol use among early adolescents, given the strong associations between early alcohol use and later heavy alcohol use and related problems. However, alcohol use was quite minimal in this young sample, providing little variance for the prediction of the hypothesized small-to-moderate effects. Therefore, we also examined alcohol expectancies as a secondary outcome, as a proxy for risk for alcohol use. Evidence supports the notion that alcohol expectancies in early adolescence predict later alcohol use and problem drinking,[21,22] including those in the adulthood.[23] Specifically, we examined three subtypes of alcohol expectancies. First, we examined global positive expectancies, or the belief that drinking alcohol results in positive effects, because of the strong differentiation between a general adolescent population and adolescent alcohol abusers in these expectancies.[24] Second, we examined tension-reduction expectancies, or the belief that using alcohol can help reduce stress or anxiety, due to the possibility that youth with internalizing symptoms could be particularly affected by beliefs about alcohol's ability to change mood. Third, we examined

social behavior expectancies, or the belief that using alcohol affects behavior in social situations, due to the possibility that youth with social anxiety may be particularly affected by these types of beliefs about alcohol due to their anxiety about social interactions. Supporting this line of research, studies have found that alcohol expectancies such as tension-reduction expectancies can predict drinking, particularly under conditions of negative affect.[25]

A strength of this study was its focus on understudied sample: specifically, minority (African-American and Hispanic), low-income youth. At the same time, it is important to keep in mind that different ethnic groups have been found to have different patterns of alcohol use, which may limit the generalizability of this study. Specifically, research across different age groups consistently finds that African-Americans, as a group, have the lowest rates of alcohol use, with Whites significantly higher and Latinos generally having intermediate rates of use.[26–28] In addition, our focus on early adolescence is supported by the negative outcomes frequently experienced by youth who begin drinking early,[29] though the results of this study may not generalize to older age groups among whom alcohol use is more common.

Based on the expectation that youth with high levels of depressive symptoms who had a tendency to act rashly under conditions of strong emotion would be at risk for alcohol use, we hypothesized that depressive symptoms and urgency would interact to predict relatively high and increasing frequencies of alcohol use and positive alcohol expectancies (particularly global positive). Similarly, we expected that anxiety symptoms would interact with urgency to predict relatively high and increasing frequencies of alcohol use and positive alcohol expectancies (particularly tension-reduction expectancies for youth with high levels of generalized anxiety symptoms and social behavior expectancies for youth with high levels of social anxiety symptoms).

Methods

Participants. Data were drawn from the Camden Youth Development Study, a longitudinal study of middle-school students in the mid-Atlantic region of the United States. Sixth- and seventh-grade students participated in the study ($n = 144$; 72 males, 72 females; mean age at intake = 11.9 years, SD = 0.8, range, 10–14) and were followed up every 4 months for a total of five assessments (16 months from the initial wave to the final wave of data collection). According to self-reports, 65% were Hispanic, 30% were African-American, 0.6% were Asian, 5% were Native American, 2% were white, and 6% endorsed being from another racial or ethnic category (youth could endorse more than one category). Among students in these grades at school, 81% were qualified for free lunches and 43% of families received public assistance (not including unemployment or social security benefits).

A total of 88% of parents consented to their child's participation, and at the initial assessment, 96% of students whose parents gave consent assented and participated in the initial wave of data collection. Follow-up rates were strong (over 85% at each wave among youth still attending the school, with 96% participating at the final wave; $n = 134$ at the final assessment). This study was approved by the IRB of Rutgers University. The research was conducted in accordance with the principles of the Declaration of Helsinki.

Measures. *Depressive symptoms.* Depressive symptoms were assessed using the Mood and Feelings Questionnaire.[30,31] This scale correlates highly with diagnoses of depression based on structured interviews as well as other questionnaire measures of depression.[32] It comprises 33 items, each scored on a 3-point scale (0 = not true, 1 = sometimes true, and 2 = true). Higher scores indicate more depressive symptoms. At the initial assessment, internal consistency reliability was high ($\alpha = 0.93$).

Anxiety symptoms. The Screen for Child Anxiety and Related Disorders[33–35] was used to assess anxiety-related symptoms. This questionnaire correlates highly with other questionnaire and structured interview-based assessments of anxiety.[35] It has 41 items, each scored on a 3-point scale (0 = not true, 1 = somewhat true 2 = very true). The Generalized Anxiety (9 items; α at initial assessment = 0.71) and Social Anxiety (7 items; α at initial assessment = 0.74) subscales were used in this study. Higher scores indicate more anxiety.

Urgency. The UPPS-R-Child Version (UPPS = urgency, planning, perseverance, and sensation seeking) was used to assess urgency.[17] It is a modification of the UPPS-R[16] that shortens the measure and reduces the reading level to be appropriate for children. The modification, resulting psychometric properties, reliability, and validity are described by Zapolski et al.[17] Supporting our use of a unitary urgency scale, internal consistency reliability of the (combined) urgency subscale in this sample at Wave 1 was high ($\alpha = 0.92$). Sample items include: "When I feel bad, I often do things I later regret in order to make myself feel better now" and "I tend to act without thinking when I am very, very happy."

Alcohol use. Frequency of drinking alcohol (defined as beer, wine, or hard liquor) in the past four months (the time between each assessment) was assessed on a five-point scale: 0 = none, 1 = less than once a month, 2 = at least once a month, but less than once a week, 3 = 1–3 times a week, or 4 = most days. The questions specified that a drink of alcohol had to be "not just a sip or taste of someone else's," and the questions provided anchors in order to enhance recall for the four-month time period asked about (eg, "Since the fall, when school started"). Rates of alcohol use in this sample were low: at Wave 1, 89% reported no use in the previous four months, while at Wave 5, 84% reported no use in the previous four months.

Alcohol expectancies. Items from the Alcohol Expectancy Questionnaire – Adolescent Version[21,24] were used to assess alcohol expectancies at each assessment. Three subscales were used and scored according to directions from the measure's author (personal communication): Alcohol is a Powerful Agent

that Makes Global Positive Transformation (Global Positive, 15 items, eg, "Drinking alcohol makes a person feel good and happy"; Wave 1, $\alpha = 0.80$); Alcohol Can Enhance or Impede Social Behavior (Social Behavior, 17 items, "eg, Drinking alcohol makes people more friendly"; Wave 1, $\alpha = 0.70$); and Alcohol Promotes Relaxation or Tension Reduction (Tension Reduction, 13 items, eg, "Drinking alcohol can take a person's mind off his/her problems at home"; Wave 1, $\alpha = 0.82$). This widely used measure has excellent reliability and validity[24] and has been shown to predict drinking behavior among adolescents.[21–23]

Statistical analyses. Participants' data were not included in the analyses if they endorsed being only *kind of honest* instead of *totally* or *mostly* honest or endorsed used of a fake drug (this eliminated three questionnaires at the initial assessment, one questionnaire at Wave 2, three questionnaires at Wave 3, nine questionnaires at Wave 4, and eight questionnaires at Wave 5). For Waves 4 and 5 (those with the most eliminated questionnaires), we compared eliminated with noneliminated questionnaires on the age, race, and gender of the participant. The only difference at either time point was that those completing eliminated questionnaires at Wave 5 were older than those completing noneliminated questionnaires (mean = 14.0 vs. 13.2; $t = -2.81$, $P < 0.01$).

All analyses were adjusted for the effects of age, gender, and race (African-American yes/no). The number of depressive symptoms and frequency of alcohol use were log-transformed due to skew.

Multilevel models (sometimes referred to as growth curve models or mixed effects models[36]) were used to investigate the effect of internalizing symptoms on alcohol use and expectancies over time. Models were estimated using PROC MIXED in the Statistical Analysis System (SAS) version 9.3. Full-information maximum-likelihood estimation was employed in order to use all available data (missing data were treated as missing at random).[37] The Bayesian information criterion (BIC) was the primary measure used to assess model fit because of its adjustment for parsimony (number of parameters in the model).[37]

Prior to substantive analyses being conducted, it was determined based on fit statistics and an examination of significant parameters that linear slope models fit the data best (compared to model without slope terms and models that also included quadratic terms) for all dependent variables (alcohol use frequency and all three types of alcohol expectancies).

First, depressive symptoms, urgency, and their interaction at the initial assessment were entered as predictors of alcohol use frequency intercept and slope (interaction with time). Next, nonsignificant predictors were removed (eg, the three-way interaction among depressive symptoms, urgency, and time) and the fit statistics of the models were compared to ensure that model fit was not being sacrificed for parsimony. The pared-down, best-fitting model was used to guide interpretation of the results. Next, three analogous models were

estimated using initial levels of depressive symptoms as the independent variable and (1) global positive expectancies, (2) tension-reduction expectancies, and (3) social behavior expectancies as the dependent variables, using the same procedure described above for alcohol use. Finally, all models were rerun using (1) generalized anxiety symptoms and (2) social anxiety symptoms as the independent variables, and the same procedure was used as described for depressive symptoms [initially including all terms, including interactions between the predictor variables for the intercept and slope (interaction with time), then paring down the models, guided by both predictor significance level and fit statistics]. When significant results were found for the interaction effects of interest, we repeated the analysis in two ways: (1) adjusting for initial levels of other internalizing symptoms (to assess the specificity of the finding) and (2) separating negative from positive urgency (to assess whether the pattern of results differed across these two urgency subtypes).

These analyses resulted in models in which the main effects of each predictor variable (or interactions between predictor variables) reflected the association between the predictor(s) and the initial level of the dependent variable. Interaction effects of the predictors with the slope terms indicated how the predictor variable was associated with the slope of the individual's score on the dependent variable. A nonsignificant interaction between the independent variable and the slope term indicated that the association between these constructs remained similar at different ages. A significant interaction between the independent variable and the slope term indicated that the effect of the predictor was associated with change over time in the dependent variable. In mixed models of this type, the intercepts and slopes are estimated independently, indicating that each can be interpreted separately. For example, if an intercept is found to be significant, that does not imply anything regarding the slope over time (it may go up, down, or remain stable), and conversely, if a slope term is found to be significant, that does not imply anything regarding the initial level (intercept).

Results
Means, standard deviations, and ranges for all measures are provided in Table 1. Multilevel model results are presented separately for each type of internalizing syndrome (Tables 2–4), with both full models (ie, including all predictors) and final models (models that were pared-down based on the significance of the predictors as well as fit statistics) presented for each dependent variable (alcohol use, global positive expectancies, and tension-reduction expectancies). Within each table, the top set of rows presents the parameter estimates for predictors of the intercept, and the lower set of rows presents the parameter estimates for predictors of the slope (time and interactions with time).

Demographic factors. Across models (Tables 2–4), being African-American was associated with lower alcohol use frequencies. Increasing age was generally associated with

Table 1. Descriptive statistics.

	MEAN (STANDARD DEVIATION)	RANGE
W1 depression	12.8 (11.3)	0–44
W1 generalized anxiety	6.31 (3.57)	0–16
W1 social anxiety	6.28 (3.16)	0–14
W1 urgency	2.50 (1.29)	0–5.75
W1 alcohol use frequency	0.15 (0.47)	0–3
W5 alcohol use frequency	0.23 (0.61)	0–3
W1 global positive expectancies	4.88 (3.28)	0–14
W5 global positive expectancies	5.87 (4.92)	0–15
W1 tension reduction expectancies	6.90 (3.57)	0–13
W5 tension reduction expectancies	7.25 (4.72)	0–13
W1 social behavior expectancies	3.97 (2.85)	0–14
W5 social behavior expectancies	5.86 (3.60)	0–14

Abbreviations: W1, Wave 1 (initial assessment); W5, Wave 5 (final assessment).

increasing positive alcohol expectations, while gender was not significantly associated with the outcome variables.

Depressive symptoms and urgency predicting alcohol-related constructs. Neither urgency nor depressive symptoms (nor their interaction) predicted the intercept or slope of frequency of alcohol use or tension-reduction or social behavior alcohol expectancies. In contrast, the interaction between urgency and depressive symptoms was associated with global positive alcohol expectancies, such that youth with higher urgency and depressive symptoms had higher global positive alcohol expectancies at the initial assessment, and this link remained unchanged throughout the study period (ie, nonsignificant slope effect; Table 2).

In order to examine whether this effect remained when other internalizing symptoms were adjusted for, we ran an additional analysis adding initial levels of generalized anxiety and social anxiety to the final model. The interaction between urgency and depressive symptoms remained significant in the prediction of higher global positive expectancies (parameter estimate = 0.47, Standard Error (SE) = 0.21, t = 2.23, degrees of freedom (df) = 118, P = 0.03).

In order to examine whether this effect applied to negative urgency, positive urgency, or both, we reran the final model with these types of urgency separated. The results were similar for both types of urgency, with the results remaining significant for negative urgency (parameter estimate = 0.81, SE = 0.38, t = 2.10, df = 122, P = 0.04) and dropping slightly to a trend level for positive urgency (parameter estimate = 0.74, SE = 0.41, t = 1.82, df = 121, P = 0.07).

Generalized anxiety symptoms and urgency predicting alcohol-related constructs. Initial levels of urgency were associated with initial levels of alcohol use frequency, while initial levels of generalized anxiety symptoms were not associated with alcohol-related constructs. There were no significant interaction effects between generalized anxiety and urgency

in the prediction of alcohol-related constructs (either initial levels or change over time; Table 3).

Social anxiety symptoms and urgency predicting alcohol-related constructs. Initial levels of urgency were associated with initial levels of alcohol use frequency, while initial levels of social anxiety symptoms were not associated with alcohol-related constructs. Social anxiety and urgency did not interact in the prediction of alcohol use frequency or global positive or tension-reduction expectancies, but they did interact with time to predict growth in social behavior alcohol expectancies over time (Table 4). This indicates that youth with higher levels of social anxiety and urgency tend to increase their beliefs about alcohol's effects on social behavior during this early-adolescent period.

In order to examine whether this effect remained when other internalizing symptoms were adjusted for, we ran an additional analysis adding initial levels of depressive symptoms and generalized anxiety to the final model. The interaction between urgency, social anxiety symptoms, and time remained significant in the prediction of growth in social behavior expectancies (parameter estimate = 0.05, SE = 0.02, t = 2.17, df = 164, P = 0.03).

In order to examine whether this effect applied to negative urgency, positive urgency, or both, we reran the final model with these types of urgency separated. The results were similar for both types of urgency, with the interaction of social anxiety and time with positive urgency remaining significant (parameter estimate = 0.11, SE = 0.04, t = 2.41, df = 164, P = 0.02) and negative urgency being slightly reduced to a trend level (parameter estimate = 0.09, SE = 0.05, t = 1.78, df = 164, P = 0.08).

Discussion

The results of this study indicate that urgency moderates the associations between certain types of internalizing symptoms and alcohol-related constructs, such that the combination of high levels of urgency and internalizing symptoms is associated with particularly elevated alcohol expectancies among early adolescents. Specifically, urgency and depressive symptoms interact to be associated with higher levels of global positive alcohol expectancies, and urgency and social anxiety symptoms interact to predict growth in social behavior alcohol expectancies. These effects remained significant when other internalizing symptoms were adjusted for and were similar when negative and positive urgency were considered separately. In contrast, no interaction effects between generalized anxiety symptoms and urgency were found in the prediction of alcohol-related constructs, and contrary to hypotheses, tension-reduction alcohol expectancies were not associated with internalizing symptoms or urgency (or their interaction).

High levels of urgency together with high levels of depressive symptoms may be a particularly toxic combination in increasing risk for global positive alcohol expectancies, and in turn risk for alcohol use, among young people. This is consistent

Table 2. Depressive symptoms, urgency, and their interaction in the prediction of alcohol use and alcohol expectancy trajectories.

	ALCOHOL USE FREQUENCY: FULL MODEL	ALCOHOL USE FREQUENCY: FINAL MODEL	GLOBAL POSITIVE EXPECTANCIES: FULL MODEL	GLOBAL POSITIVE EXPECTANCIES: FINAL MODEL	TENSION REDUCTION EXPECTANCIES: FULL MODEL	TENSION REDUCTION EXPECTANCIES: FINAL MODEL	SOCIAL BEHAVIOR EXPECTANCIES: FULL MODEL	SOCIAL BEHAVIOR EXPECTANCIES: FINAL MODEL
Initial Status:								
Intercept	−0.58 (0.37)	−0.54 (0.37)	−2.25 (4.53)	−2.72 (4.5)	−3.6 (5.09)	−3.38 (5.05)	−7.57* (3.62)	−6.96* (3.54)
Age	0.04 (0.03)	0.05 (0.03)	0.65 (0.36)	0.67 (0.36)	0.84* (0.40)	0.82* (0.40)	0.93** (0.28)	0.92** (0.28)
Gender	−0.01 (0.05)	−0.01 (0.05)	0.18 (0.56)	0.19 (0.56)	−0.24 (0.63)	−0.24 (0.63)	0.01 (0.44)	0.04 (0.44)
African-American	−0.10* (0.05)	−0.10* (0.05)	−0.08 (0.60)	−0.10 (0.60)	0.38 (0.66)	0.35 (0.66)	−0.89 (0.47)	−0.95* (0.46)
T1 urgency	0.06 (0.05)	0.03 (0.05)	−0.86 (0.61)	−0.75 (0.58)	−0.27 (0.71)	−0.35 (0.64)	0.49 (0.57)	0.03 (0.47)
T1 depression	0.04 (0.05)	0.02 (0.05)	−0.65 (0.58)	−0.52 (0.55)	−0.15 (0.67)	−0.26 (0.61)	−0.26 (0.53)	−0.47 (0.44)
T1 urgency* T1 depression	−0.01 (0.02)	0.00 (0.02)	0.46* (0.22)	0.44* (0.21)	0.23 (0.26)	0.30 (0.24)	0.06 (0.21)	0.25 (0.17)
Rate of Change:								
Time	0.04 (0.05)		−0.51 (0.63)		0.00 (0.77)		0.84 (0.53)	0.48*** (0.11)
Time* T1 urgency	−0.02 (0.02)		0.16 (0.28)		−0.10 (0.34)		−0.33 (0.24)	
Time* T1 depression	−0.02 (0.02)		0.17 (0.26)		−0.13 (0.32)		−0.17 (0.22)	
Time* T1 urgency* T1 depression	0.01 (0.01)		−0.02 (0.10)		0.08 (0.12)		0.14 (0.09)	
BIC	53.3	37.8	2138.4	2122.5	2171.1	2153.2	1465.4	1455.1

Notes: *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$. Values provided are parameter estimates, with standard errors in parentheses below each one. *Full* models included all predictors, while *final* models were the best-fitting models arrived at after nonsignificant predictors were removed and the fit statistics of the models were compared to ensure that model fit was not being sacrificed for parsimony.

Table 3. Generalized anxiety symptoms, urgency, and their interaction in the prediction of alcohol use and alcohol expectancy trajectories.

	ALCOHOL USE FREQUENCY: FULL MODEL	ALCOHOL USE FREQUENCY: FINAL MODEL	GLOBAL POSITIVE EXPECTANCIES: FULL MODEL	GLOBAL POSITIVE EXPECTANCIES: FINAL MODEL	TENSION REDUCTION EXPECTANCIES: FULL MODEL	TENSION REDUCTION EXPECTANCIES: FINAL MODEL	SOCIAL BEHAVIOR EXPECTANCIES: FULL MODEL	SOCIAL BEHAVIOR EXPECTANCIES: FINAL MODEL
Initial Status:								
Intercept	−0.65 (0.36)	−0.62 (0.36)	−5.50 (4.51)	−6.12 (4.50)	−4.66 (4.98)	−5.42 (4.95)	−8.67* (3.52)	−8.98** (3.45)
Age	0.05 (0.03)	0.05 (0.03)	0.77* (0.36)	0.79* (0.36)	0.92* (0.40)	0.91* (0.40)	1.03*** (0.28)	1.02*** (0.28)
Gender	0.00 (0.05)	0.00 (0.05)	0.50 (0.57)	0.50 (0.57)	−0.01 (0.62)	−0.02 (0.62)	0.29 (0.44)	0.27 (0.43)
African-American	−0.10* (0.05)	−0.10* (0.05)	−0.06 (0.61)	−0.08 (0.61)	0.34 (0.67)	0.34 (0.67)	−0.97* (0.47)	−0.98* (0.46)
T1 urgency	0.09* (0.04)	0.07* (0.04)	0.37 (0.46)	0.57 (0.44)	0.19 (0.53)	0.43 (0.49)	0.75 (0.42)	0.73* (0.35)
T1 generalized anxiety	0.01 (0.01)	0.00 (0.01)	−0.01 (0.17)	0.04 (0.16)	−0.09 (0.19)	0.00 (0.18)	−0.16 (0.14)	−0.11 (0.12)
T1 urgency* T1 generalized anxiety	0.00 (0.00)	0.00 (0.00)	0.00 (0.06)	−0.01 (0.05)	0.04 (0.06)	0.01 (0.06)	0.00 (0.05)	0.01 (0.04)
Rate of Change:								
Time	0.04 (0.04)		−0.66 (0.51)		−0.99 (0.62)		0.21 (0.43)	0.47*** (0.11)
Time* T1 urgency	−0.02 (0.02)		0.28 (0.21)		0.29 (0.26)		−0.03 (0.18)	
Time* T1 generalized anxiety	−0.01 (0.01)		0.08 (0.07)		0.11 (0.09)		0.04 (0.06)	
Time* T1 urgency* T1 generalized anxiety	0.00 (0.00)		−0.02 (0.03)		−0.03 (0.03)		0.07 (0.02)	
BIC	54.2	39.4	2144.4	2128.7	2172.8	2156.2	1466.6	1455.1

Notes: *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$. Values provided are parameter estimates, with standard errors in parentheses below each one. *Full* models included all predictors, while *final* models were the best-fitting models arrived at after nonsignificant predictors were removed and the fit statistics of the models were compared to ensure that model fit was not being sacrificed for parsimony.

Table 4. Social anxiety symptoms, urgency, and their interaction in the prediction of alcohol use and alcohol expectancy trajectories.

	ALCOHOL USE FREQUENCY: FULL MODEL	ALCOHOL USE FREQUENCY: FINAL MODEL	GLOBAL POSITIVE EXPECTANCIES: FULL MODEL	GLOBAL POSITIVE EXPECTANCIES: FINAL MODEL	TENSION REDUCTION EXPECTANCIES: FULL MODEL	TENSION REDUCTION EXPECTANCIES: FINAL MODEL	SOCIAL BEHAVIOR EXPECTANCIES: FULL MODEL
Initial Status:							
Intercept	−0.54 (0.37)	−0.54 (0.37)	−4.78 (4.56)	−4.96 (4.55)	−3.77 (4.99)	−3.71 (4.96)	−6.40 (3.49)
Age	0.04 (.03)	0.05 (0.03)	0.74* (0.36)	0.74* (0.36)	0.89* (0.39)	0.88* (0.39)	0.93*** (0.27)
Gender	0.02 (0.05)	0.02 (0.05)	0.70 (0.58)	0.71 (0.58)	0.34 (0.63)	0.33 (0.63)	0.44 (0.44)
African-American	−0.12* (0.05)	−0.12* (0.04)	−0.16 (0.61)	−0.19 (0.61)	0.19 (0.66)	0.20 (0.66)	−0.97* (0.46)
T1 urgency	0.09* (0.04)	0.09* (0.04)	0.44 (0.49)	0.59 (0.47)	0.50 (0.56)	0.41 (0.51)	0.44 (0.44)
T1 social anxiety	0.00 (0.02)	0.00 (0.02)	−0.09 (0.20)	−0.08 (0.19)	−0.20 (0.23)	−0.24 (0.21)	−0.28 (0.18)
T1 urgency* T1 social anxiety	−0.01 (0.01)	0.00 (0.01)	0.00 (0.07)	−0.02 (0.06)	−0.01 (0.08)	0.02 (0.07)	0.02 (0.06)
Rate of Change:							
Time	0.01 (0.05)		−0.26 (0.58)		−0.12 (0.71)		0.78 (0.48)
Time* T1 urgency	0.00 (0.02)		0.21 (0.20)		−0.07 (0.25)		−0.26 (0.17)
Time* T1 social anxiety	0.00 (0.01)		0.01 (0.08)		−0.04 (0.10)		−0.08 (0.07)
Time* T1 urgency* T1 social anxiety	0.00 (0.00)		−0.01 (0.03)		0.03 (0.04)		0.05* (0.02)
BIC	53.0	36.0	2143.4	2126.9	2169.9	2152.6	1456.9

Notes: *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$. Values provided are parameter estimates, with standard errors in parentheses below each one. *Full* models included all predictors, while *final* models were the best-fitting models arrived at after nonsignificant predictors were removed and the fit statistics of the models were compared to ensure that model fit was not being sacrificed for parsimony.

with our expectation (discussed in the "Introduction" section) that youth who have difficulties with emotion regulation (eg, youth with depression) and who also have a tendency to act rashly under conditions of strong emotion (ie, high urgency) could be particularly likely to have positive impressions of alcohol use and perhaps turn to its use in the future instead of more healthy coping mechanisms. Future research on larger samples, older participants, and a longer follow-up period would be useful in clarifying this association.

Similarly, the interaction between social anxiety and urgency in the prediction of growth in social behavior alcohol expectancies is striking and may help explain the conflicting literature on associations between social anxiety and alcohol use. Based on the results of this study, it seems that those youth high in both social anxiety and urgency are particularly prone to beliefs that alcohol affects social behavior, which may put them at risk for later problematic alcohol use.[21] This effect is particularly concerning because social behavior expectancies appear to be associated particularly strongly with problem

drinking one year later among young adolescents (compared with other alcohol expectancy subtypes[21]).

Our hypotheses regarding alcohol use (in contrast to expectancies) were not supported, likely due to minimal alcohol use in our sample. The participants were young [mean age was 11.9 years (SD = 0.77) at the first assessment, mean age was 13.2 years (SD = 0.82) at the final assessment]. Alcohol use was relatively rare, even at the final assessment (with only 6.5% of the sample reporting at least monthly use), so there was minimal variance to predict. Future research examining youth over a longer time period and into middle and later adolescence will be informative; given the association between alcohol expectancies and later alcohol use, it seems possible that the associations detected when examining expectancies will extend to use later in adolescence.

We did not find an association between generalized anxiety symptoms and any alcohol-related constructs. This is consistent with some research that does not find positive associations between anxiety and alcohol use among adolescents and early

adults,[38,39] though somewhat inconsistent with other research showing that boys with higher levels of generalized anxiety are at increased risk for first use of alcohol.[8] Given the relatively robust link between alcohol dependence and generalized anxiety disorder among adults,[28] future research examining how this association develops is warranted. It seems possible that this association changes across development, such that in early adolescence generalized anxiety may not be associated with alcohol use, but in adulthood these constructs are significantly associated. Consistent with this, previous research has demonstrated that unique among the anxiety disorders, generalized anxiety disorder tends to onset after the first substance use disorder.[40] That said, we are unaware of any overarching theory of change in the association between generalized anxiety disorder and alcohol use (and/or problems) across development. One possible explanation, among many, is that among early adolescents, alcohol use is illegal and somewhat deviant, and youth with significant generalized anxiety symptoms may be concerned about potential consequences of use (eg, getting caught). Later in development, drinking is legal and fairly normative; people with generalized anxiety symptoms may then begin drinking and find it particularly reinforcing due to alcohol's anxiety-reducing effects. Alternatively, physiological effects of heavy substance use could predispose individuals to the development of generalized anxiety; because heavy substance use becomes more common with increasing age, this could account for the difference observed. These explanations are purely speculative; future research confirming this developmental change and examining possible reasons is warranted.

We did not find significant interaction effects for any internalizing measure and urgency in the prediction of alcohol use frequency. The most likely explanation for this is the minimal alcohol use in this young sample (Table 1); there was simply minimal variance to predict. That said, if future research using larger samples with more alcohol users replicate this finding, this may mean that urgency and internalizing syndromes represent distinct pathways to substance use. Just as adults may use alcohol to self-medicate internalizing symptoms or as part of a broader externalizing syndrome (including disinhibition[41]), the presence of urgency in addition to internalizing symptoms may not increase risk for frequent alcohol use among youth above and beyond the additive effects of these factors. It is unclear, however, why significant interaction effects were found for alcohol expectancies, given the association between expectancies and alcohol use. It is possible that internalizing symptoms and alcohol expectancies could be related due to cognitive biases that are common among people with internalizing disorders, and these may not translate into actual behaviors (ie, alcohol use) for these youth. We do not know of research addressing this possibility; future research with samples with more variance in alcohol use would be helpful in understanding this pattern of results.

The results of this study may have clinical implications. When considering risk for alcohol use among young adolescent clients with internalizing syndromes, clinicians might consider those with high levels of urgency to be particularly at risk, at least for the development of positive alcohol expectancies (which are generally associated with later alcohol use). This may particularly be true for youth with depressive and/or social anxiety symptoms.

This study has several strengths, including the community-based sample of a demographic population that is underrepresented in research, the repeated assessments over 16 months with good retention rates, and the in-depth information about subtypes of internalizing symptoms and alcohol use expectancies. It also had limitations. As noted above, the minimal variance in alcohol use may have resulted in limited power to detect effects. In addition, although prior research indicates that alcohol expectancies are strong predictors of later use and problem drinking,[21–23] we were unable to test that in this sample, so it is unclear whether youth with these alcohol expectancies will go on to develop heavy and/or problem use. The generalizability of this study is unclear, due to the low-income, ethnic minority (Latino and African-American) nature of this sample; these results may not generalize to other racial or ethnic groups. In addition, those completing eliminated questionnaires at T5 (due to concerns about the validity of their responses) were slightly older than those completing retained questionnaires; it is possible that youth who were starting to use alcohol were less likely to be honest on the questionnaire. Finally, the sample size in this study was relatively small and this, combined with the minimal alcohol use in the sample, resulted in limited power to detect some effects. Future research with larger samples, guided by the present findings, is warranted.

Conclusion

The results of this study indicate that urgency, a disposition to rash action under conditions of strong emotion, moderates the association between certain internalizing symptoms and alcohol expectancies among young adolescents. Specifically, the combination of depressive symptoms and urgency is associated with high levels of global positive alcohol expectancies, while the combination of social anxiety symptoms and urgency is associated with growth in social behavior alcohol expectancies. These findings may help explain prior contradictory research on associations between certain internalizing syndromes and alcohol use: it appears to be those with higher levels of urgency who are most at risk, based on alcohol expectancies. Future research following participants for longer periods and examining how these results translate to risk for problematic alcohol use would increase our understanding of these associations and could inform future prevention efforts.

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Author Contributions

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