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Hierarchical Linear Modeling of Drinking to Cope with Anxiety among College Students

Bradley Wetzell, Matthew R. Pearson, Dr. James Henson

Abstract

Previous research has assumed that drinking motives (reasons for drinking) remain fairly stable over time (traits). The current study examines how drinking motives of college students may vary over time (states). Weekly measures were completed by 125 undergraduates at Old Dominion University, which examined how average levels of anxiety interacted with anxiety coping motives to influence drinking. Using Hierarchical Linear Modeling, it was found that anxiety coping motives were less predictive for participants with elevated average anxiety levels, as opposed to participants with normal to low anxiety levels. Implications and possible explanations are discussed.

Drinking motives, or self-reported reasons for drinking, are often examined as proximal precursors to alcohol consumption. Typically, these motives are treated as stable individual differences, in that they are assumed to vary from person to person (high *between-persons variability*), yet remain stable within each person over time (low *within-persons variability*). Research has suggested, however, that drinking motives do not appear to remain stable within-persons, especially with regard to motives related to coping with *anxiety*, or the self-reported negative mood state characterized by apprehension regarding the future (Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007).

Cox and Klinger (1988) examined the idea of motivation as the central pathway toward the decision to drink, by attempting to map the motivational influences that eventually lead to the decision. Their model begins with "historical factors" (i.e., personality characteristics, social/environmental influences, and biological predisposition to alcohol's effects), from which the decision proceeds to "current factors" (i.e., current emotional state along with situational variables) (p. 171). According to Cox and Klinger, the final decision to drink is filtered through the "expected effects" from the alcohol, which the researchers divide into "direct, chemical effects" and "indirect, instrumental effects" (p. 171). The net result of Cox and Klinger's model is that the decision to consume alcohol can be characterized by the motivation to either (a) directly alter one's internal emotional state via its pharmacology, or (b) to influence externally generated rewards, such as social acceptance.

Cooper (1994) suggested that these characterizations could be organized within a matrix which reflects their valence (i.e., positive or negative, or whether the individual hopes to gain something positive, versus avoid something negative), and their source (i.e., internal or external, or whether the individual is drinking in response to internal, versus external cues).

As illustrated in Table 1,

Matrix of drinking motives (Content from Cooper, 1994)

	Internally Generated Motives	Externally Generated Motives
Positive Reinforcement	Enhancement	Social
Negative Reinforcement	Coping	Conformity

this organization results in four distinct motivations for drinking, which Cooper called *enhancement* (i.e., drinking to enhance the current emotional state), *social* (i.e., drinking to positively affect social interaction), *coping* (i.e., drinking to avoid a negative emotional state) and *conformity* (drinking to avoid negative social outcomes). From these dimensions, a four factor scale of drinking motives was developed and subsequent testing revealed that this model better accounted for alcohol consumption patterns than previous models, with the enhancement and coping motives being the strongest predictors of alcohol use, heavy drinking and problem drinking. The model was further supported by the fact that each of the motives revealed a unique set of drinking patterns and outcomes that were consistent with expectation. For example, social motives were significantly related to consumption of alcohol at parties or with friends, but were not related to problem drinking; while coping motives were correlated with solitary consumption in patterns consistent with problem drinking.

In an effort to further examine the coping dimension of drinking motives, it was later proposed that it be subdivided into *coping-depression* and *coping-anxiety* (Grant et al., 2007). In the first half of their study, Grant et al. expanded Cooper's scale to include items representative of the two constructs, and found this new five-factor scale to exceed the previous scale in predicting patterns of consumption. They were further able to demonstrate that the two new dimensions were distinct from each other, in that each predicted different patterns of drinking and outcomes.

However, inconsistent with Cooper's findings, the researchers found that neither of the coping motives were related to frequency of drinking, and only coping-depression was mildly (and inconsistently) related to number of drinks per occasion. Next, Grant et al. conducted a longitudinal analysis in which they found that high coping-depression motives prospectively predicted increased numbers of drinks, while high coping-anxiety motives were found to prospectively predict decreased numbers of drinks. Interestingly, however, high coping-anxiety motives prospectively predicted *more* alcohol-related problems (when frequency of drinking at time-point 2 was controlled for). Though this seems to contradict logic (high coping-anxiety predicts less drinking but more problems from drinking), it is consistent with other studies (Dawson, Grant, Stinson, & Chou, 2005; Morris, Stewart, & Ham, 2005), and may be a clue to the existence of within-persons motivational variation, which isn't typically analyzed because it is assumed to be stable.

Therefore, the purpose of the current research was to investigate the possibility that coping-anxiety drinking motives may vary within-persons over time, allowing for differential consumption patterns in response to anxiety. Drinking motives are defined as the self-reported reasons for drinking. Anxiety is defined as the self-reported negative affective state characterized by apprehension regarding the future. Weekly measures were completed by 125 undergraduate students at Old Dominion University which sought to ascertain how average anxiety levels interacted with anxiety coping motives to influence drinking. It was believed that the relationship between anxiety and drinking would change over time in response to variation in anxiety coping motives.

Method

Participants

The participants in this study consisted of 125 undergraduate students at Old Dominion University, who participated in the study in exchange for optional course credit. The study was limited to participants 18 years of age or older, and the sample consisted predominantly of Caucasian females, with a median age of 20 years. Participants were recruited online using the SONA system, and were known to the researcher only by a unique and randomly assigned five digit identification number. Prior to beginning the study, the participants were presented with an electronic notification statement, which informed them of their anonymity, their right to discontinue participation at any time without negative consequences, and their right to not answer any question which made them uncomfortable. All ethical guidelines were followed.

Measures

Drinking Motives. A modified version of the Drinking Motives Questionnaire- Revised (DMQ-R) was used to ascertain drinking motives (Cooper, 1994). The DMQ-R measures motives for drinking along four dimensions: Enhancement, social, coping, and conformity. Each dimension is assessed using five items, to which participants respond on a 5-point Likert scale ranging from *1 = almost never / never* to *5 = almost always / always*. The DMQ-R was modified using eight additional items from Grant, et al. (2007), which separate the coping dimension into *coping-depression* and *coping-anxiety* with four items each. Only the coping-anxiety dimension was analyzed for the present study, and composite scores were created by calculating the average of the scale.

Anxiety. Weekly anxiety levels were assessed using items from the International Personality Item Pool (IPIP) (Goldberg et al., 2006). The scale consisted of 10 items, and participants responded on a 5-point Likert scale ranging from *1 = strongly agree* to *5 = strongly disagree*. Composite scores were created from the average of the scale, and coded such that higher scores indicated higher levels of anxiety.

Alcohol Use. Weekly alcohol use was assessed using a 7-day grid, in which participants indicated how many drinks they consumed each day of the previous week. Composite scores were calculated as the sum of the number of drinks for each day, resulting in a *total drinks per week* score.

Demographics. A standard demographics questionnaire was administered, which included *age, gender, race/ethnicity, marital status, housing status, Greek membership status, height, and weight*.

Procedure

Participants selected an appointment time from a list of available timeslots posted on the SONA system. They were scheduled in groups of up to four to report to a research lab on campus, where they were seated at one of four standard desktop computers. After being presented with the notification statement, participants were instructed that by clicking "next" at the bottom of the screen they were giving their informed consent to participate. Participants were then presented with a battery of assessments via the computer. After completing the assessments, participants were instructed on how to take part in the follow-up assessments. The baseline procedure took approximately one hour. Every Monday following their initial participation, participants were sent an email via their confidential SONA identification number, which included a link to the follow-up surveys, each of which required about 15 minutes to complete. They were permitted to complete up to seven follow-ups. Participants received 1 hour of participation credit for the baseline procedure, and 0.25 hours of credit for each follow-up completed.

Analysis

The data analyzed for the purpose of this study included only follow-ups where participants endorsed drinking at least once during the previous week ($N = 293$). Before meaningful analysis could begin, preliminary steps were taken to ensure the data met the necessary assumptions. The distribution of the dependent variable (total drinks per week) was plotted with a histogram, revealing a unipolar distribution that appeared to be positively skewed. However, skewness (1.43) and kurtosis (2.03) were found to be within reasonable limits, suggesting that the dependent variable was approximately normally distributed. A preliminary analysis of multivariate outliers was conducted using Cook's- D and Mahalanobis distances, both of which revealed acceptable results. For the purposes of interpretation, level-1 predictors were group-mean centered, and level-2 predictors (except gender) were grand-mean centered.

Hierarchical Linear Modeling (HLM) was used to test the hypothesis, which is a statistical technique that allows for an estimate of both within-subject (level-1) and between-subject (level-2) predictors of the dependent variable. At level-1, weekly coping-anxiety motives and weekly anxiety levels were used as within-subject predictors of *total drinks per week*. At level-2, gender, average coping-anxiety motives, and average anxiety levels were used as between-subjects predictors of average consumption.

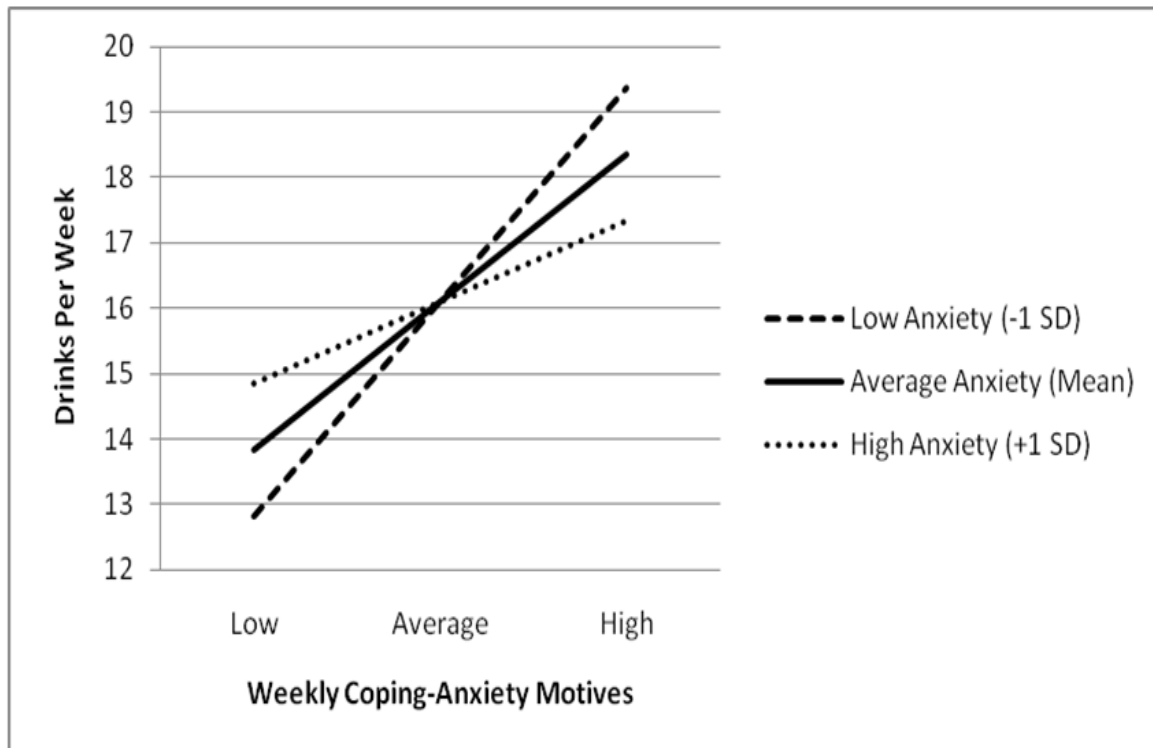
Results

Analysis of the data revealed that a typical man during a typical week can be expected to drink approximately 6.5 more drinks than a typical woman during a typical week ($\beta_{01} = -6.47$, $t(122) = -3.31$, $p < .01$). Additionally, for a typical man during a typical week, a one unit increase in average coping-anxiety motives is associated with drinking 2.31 more drinks per week ($\beta_{02} = 2.31$, $t(122) = 2.82$, $p < .01$), while a one unit increase in weekly coping-anxiety motives is associated with drinking 2.38 more drinks per week ($\beta_{10} = 2.38$, $t(123) = 2.38$, $p < .05$). Furthermore, this relationship between weekly coping-anxiety motives and total drinks per week decreased as average anxiety levels increased ($\beta_{11} = -0.36$, $t(123) = -2.39$, $p < .05$).

Discussion

The purpose of the current research was to investigate the possibility that coping-anxiety drinking motives may vary within-persons over time, allowing for differential consumption patterns in response to anxiety. It was believed that the relationship between anxiety and drinking would change over time in response to variation in anxiety coping motives. In accordance with the hypothesis, the results revealed temporal variation in the relationship between drinking and anxiety, suggesting that coping-anxiety motives did not remain stable. Additionally, coping-anxiety motives became less predictive of weekly drinking for participants who exhibited relatively high average levels of anxiety, versus those with relatively low average levels of anxiety (see figure 1)

Plot of results illustrating how Weekly Coping-Anxiety Motives interact with Average Anxiety levels to affect drinking.



The variable relationship between average anxiety levels and drinks per week is surprising, and further investigation is needed to determine possible factors involved. Perhaps individuals with high-average anxiety levels are less likely to become aware of a situational flux in anxiety, and therefore do not feel the need to utilize coping mechanisms. It is also possible that these individuals have developed other tactics to cope with high-average anxiety levels that do not involve alcohol. Furthermore, individuals with low-average anxiety levels may have a tendency to overreact to situational fluctuations in anxiety, and thus overcompensate with greater amounts of alcohol.

Future studies should make an effort to investigate whether certain personality traits might contribute to the decision to drink in response to anxiety, as well as how demographic variables (i.e., race/ethnicity, age) might contribute to the differences. A more complete understanding of how individuals use alcohol to cope with anxiety could provide important clues to the development of more effective intervention programs aimed at curbing alcohol abuse.

Finally, it is important for future research to further investigate the dynamics that lead to within-persons fluctuations in coping motives, as well as whether such fluctuations also exist in other drinking motives. Such an understanding would provide insight into how changes in an individual's motivations to drink may place them at higher risk for alcohol-related problems during particular times, which could certainly be an important development in the prevention of alcohol abuse and dependence.

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Biographical Sketch

Bradley Wetzell is a senior undergraduate in the College of Sciences majoring in Psychology. He is currently working as a research assistant in the Department of Psychology under the supervision of **Dr. James Henson**, where he is in the process of completing an honors thesis, entitled *A Longitudinal Analysis of Sex-Related Alcohol Expectancies as Moderators of the Relationship between Alcohol and Risky Sex*. He is also assisting with research at Eastern Virginia Medical School's Division of Community Health and Research under the supervision of Dr. Kelli England-Will. Mr. Wetzell is the Treasurer of ODU's chapter of Psi Chi (The International Honor Society for Psychology) and APS (Association of Psychology Students), and Associate Justice on the ODU Honor Council. After graduation in May 2010, Mr. Wetzell hopes to enter a Ph.D. program in Neuroscience, where he would like to study Behavioral Pharmacology.