College Student Awareness of Signs of Alcohol Poisoning

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ABSTRACT

This study examined the prevalence and characteristics of students who could correctly discriminate signs of alcohol poisoning from other physiological complaints. Freshmen (N=336) completed an online survey assessing alcohol use and the ability to identify signs of alcohol poisoning from other physiological symptoms. Only 36.6% students could correctly identify all six signs of alcohol poisoning. Many students made errors of commission, endorsing distractor items. Only 24.7% of students showed correct discrimination and regression analyses indicated better discriminability of correct symptoms by heavier, more frequent drinkers, non-Caucasian and non-Greek affiliated students. Findings suggest that current psychoeducational efforts may not be resonating with students, and providers and administrators may want to consider alternative means to make this important information more salient to students.
Various studies have highlighted the specific negative consequences of alcohol misuse in college students. Repercussions from problematic drinking behavior include an increase in physical assaults and academic problems (Boekeloo, Bush, & Novik, 2009; Wechsler et al., 2002), as well as health problems, sexual assaults, unintentional injuries, and even death (Hingson, Heeren, Winter, & Wechsler, 2005). Studies have demonstrated that a large proportion of alcohol-related negative consequences in college students are linked to acute episodes of heavy drinking, rather than chronic consumption practices (Turner & Shu, 2004; Wechsler et al., 1994; Beets et al., 2009). In addition, research on high risk drinking practices like pregaming, 21st Birthday celebrations, training, and drinking games highlight the adverse effects that can occur from consuming alcohol in immoderate amounts over short periods of time (Borsari, 2004; Borsari et al., 2007; Pedersen & LaBrie, 2007; Rutledge, Park & Sher, 2008; DeJong, De Ricco, Schneider & Kessel, 2010; Martinez, Steinley & Sher, 2010; Zamboanga et al., 2010). Though not directly mentioned in these studies, risky consumption also includes the possibility of overconsumption, even alcohol poisoning, and there is a clear need for students to be cognizant of the signs of alcohol poisoning so that they may be able to recognize when a peer may be in imminent medical danger due to their drinking.

It has been estimated that about 30,000 college students in the U.S. are treated for an alcohol overdose annually (Lewis & Marchell, 2007) and over 1,800 students die of alcohol-related causes each year (Hingson, 2010). Furthermore, these numbers may be increasing in recent years despite stronger prevention efforts on campus. For example, the Centers for Disease Control and Prevention (CDC, 2007) reported that deaths due to accidental poisonings rose approximately 63% from 1999-2004, with the adolescent/college student demographic (i.e., age 15-24) experiencing the greatest increases. Although these statistics include deaths attributable to both alcohol and other drugs, it is likely that alcohol poisoning provided a significant contribution to this increase. In addition, there is evidence to suggest that first year college students may be at particular risk, with one report highlighting that college freshmen account for about one third of the alcohol-related deaths on campus, even though they constitute about one quarter of the student body (Davis & DeBarros, 2006), and others showing that freshmen are involved in disproportionately more alcohol-related emergency room visits than students in other class years (Bergen-Cico, 2000; Wright & Slovis, 1996). Overall, these studies highlight the magnitude of the alcohol overdose issues, as well as the importance of understanding more about factors that contribute to this problem.

Traditionally alcohol overdose, also known as “alcohol poisoning,” is defined as an acute toxic condition resulting from exposure to excessive quantities of alcohol within a short period of time (Adinoff, Bone, & Linnoila,
While a limited amount of research has examined the specific number of college student deaths due to alcohol poisoning per year, some studies have examined rates of excessive drinking in such individuals. Research suggests the prevalence of episodes of immoderate drinking are higher in college students than same-aged peers (O’Malley & Johnston, 2002), and have been shown to be associated with increased incidents of alcohol poisoning (Lewis & Marchell, 2007; Martinez et al., 2010). Additionally, evidence indicates that despite the serious behavioral and cognitive symptoms associated with alcohol poisoning, many college students experience confusion when trying to evaluate the signs of alcohol poisoning in their peers, and struggle to distinguish what alcohol-related symptoms are not a sign of alcohol poisoning (Oster-Aaland et al., 2009). Both the widespread practice of heavy alcohol consumption at universities, and the apparent difficulty students experience in correctly distinguishing the signs of alcohol poisoning, underscores the importance of knowing more about the college students that can accurately identify the signs of overdoses in their peers.

While research has demonstrated that college students are likely to feel concern for and offer assistance to other students in alcohol-related emergencies, (Howard et al., 2007; Colby, Raymond, & Colby, 2000) the literature has focused on examining individual characteristics that are associated with students who help their peers in alcohol-related medical emergencies (e.g., heavier drinking peers; Oster-Aaland et al., 2009), as well as situations that increase the likelihood of peer assistance in these emergencies (i.e., medical amnesty policies; Lewis & Marchell, 2006). However, it is still unclear whether students that help are identifying symptoms appropriately, and understanding when the symptoms they see in a peer are indicative of alcohol poisoning and not some other medical issue. College students receive a substantial amount of information about the signs and symptoms of alcohol poisoning through social norming campaigns, (Berkowitz, 2004; Perkins & Berkowitz, 1986), and psychoeducational efforts (Schroeder & Prentice, 1998; Larimer et al., 2001). Yet, limited research has looked at whether such efforts are effective at teaching students to be able to identify the specific symptoms of alcohol overdoses and recognize them in a peer in need of assistance.

The current study examines whether college students are accurate in their ability to discriminate the signs of alcohol poisoning from other physiological symptoms, and seeks to identify demographic, substance use, and helping history characteristics of students who can correctly discriminate the known signs of alcohol poisoning from their peers who are less accurate. Understanding these factors will help in evaluating whether current psychoeducational efforts are sufficient, and whether college students are attending to them.
METHOD

Participants

Participants consisted of first year freshmen (N=336; Mean age = 18 years) taking part in a larger longitudinal study on college substance use. The sample was relatively diverse (53% female; 70.0% Caucasian, 17.3% Asian/Pacific Islander, 8.3% Latino/a, 3.0% African American, and 1.4% other/not specified) and nearly all participants (97.3%) resided on campus. The majority of students reported prior alcohol use (83.3%). Drinkers reported consuming an average of 5.91 drinks per occasion (SD = 3.02) and 67.3% (n = 226) and reported heavy episodic drinking in the past two weeks (Binge Drinking Defined, 2004).

Description of Performance Site and Existing Alcohol Education Programming

The study was conducted at a private university in the San Francisco Bay Area with an undergraduate population of approximately 5,100 students. The majority of first year students reside on-campus in residential learning communities (RLCs) housed in suite-based or traditional dormitory buildings, and there are no fraternity or sorority houses on campus. Alcohol prevention programming is emphasized by administration, and all entering students (freshmen and transfer) were required to take an online alcohol prevention and education program within the first quarter of attendance. In addition, the administration provided each student at orientation with a personal water bottle that had the symptoms of alcohol overdose printed on it, and every restroom stall in the residence halls had psychoeducational posters listing the signs of alcohol poisoning. The water bottles were a one-time media exposure (i.e., given to each student at the beginning of the school year); however, the posters remained in the restrooms throughout the year and were replaced if existing ones were severely damaged or missing.

Design and Procedures

Students residing in three of the on-campus RLCs (approximately 35% of the total entering class for that academic year) were selected for recruitment into the larger study during university-sponsored orientation activities, with students who were age 18 or older invited to participate. Consenting students completed a paper-and-pencil survey, an orientation which assessed their alcohol and drug use practices at orientation (lifetime and past 90 days), with recent use (past 90 days) re-assessed at the end of each academic quarter. Participants were informed at recruitment that that their responses would be confidential throughout the study and that only aggregate data would be shared
with university administration. The online survey took approximately 10 minutes to complete and students received $5 into their university flex spending accounts as incentive for completion. The study received Institutional Review Board approval of all study procedures prior to data collection.

Assessment of the signs of alcohol poisoning was conducted during the final data collection, occurring at the end of the spring quarter (Mid-May 2009). This time point was selected so that students would have a full year’s exposure to campus alcohol programming and educational efforts prior to completing questions that assessed their knowledge of the signs of alcohol poisoning, and perhaps have experience helping a peer who had drank too much. Participants were notified of the spring assessment via invitation sent to their campus email account, and was sent out on Sunday of Week 8 to all participants. It was resent to all participants who had not completed the assessment at three other times (i.e., reminder emails sent on Wednesday of week 8, and Sunday and Wednesday of week 9). Follow-up rates were good, with a large percentage (76%) of the recruited participants completing the spring assessment. The questionnaire asked a series of questions about alcohol use, including: age of initiation, typical quantity, and frequency of use (i.e., during the spring quarter, how many days per month did you drink alcohol?) with responses given on a 13-point Likert scale ranging from “never” to “daily.” Heavy episodic drinker (HED) status was determined by asking participants to report the number of times in the past two weeks they consumed 5+ and 4+ drinks on a single occasion, and the time spent drinking, which were later used to calculate HED status in accordance with NIAAA National Advisory Council recommendations (Binge Drinking Defined, 2004).

Subsequent to assessing drinking behaviors and consequences, participants were directed to a page assessing knowledge of the signs of alcohol poisoning. Students were presented with the prompt “How would you know if a peer had had too much to drink and might have alcohol poisoning? That is, what behaviors would lead you believe that they may need help?” and were directed to a list of 11 physiological complaints. Participants were asked to check all items they felt were symptoms of alcohol poisoning. Actual symptoms were identified based on literature provided on the NIAAA College Drinking Prevention website (NIAAA, 2007) with wording of the six items taken from the published list: “student was vomiting as a direct result of drinking,” “student blacked out and cannot be roused,” “student looks pale or bluish,” “breathing becomes shallow or very slow,” “body temperature falls,” and “student can have a seizure.” In addition, the list contained five distractor symptoms, including: “coordination gets severely impaired but student is still conscious,” “student blacked out as a result of drinking but can be roused,” “student looked red or flushed,” “breathing increases or person hyperventilates,” and “body tem-
perature rises.” Actual wording on the NIAAA website uses the symptom “Mental confusion, stupor, coma, or person cannot be roused.” However, pilot testing of this item indicated that the students felt the term “blackout” was more commonly used and better understood by the students and this was substituted in the final measure. Distractor items were included to assess whether students were able to differentiate alcohol poisoning from 1) more moderate levels of intoxication and 2) symptoms consistent with stimulant use/overdose. The 11 items were then dummy coded (0 = not endorsed; 1 = endorsed), stratified into two categories (actual symptom or distractor), and summed to create two variables (number of actual symptoms endorsed and number of distractor symptoms endorsed).

Data Analyses

Data were downloaded from the online data collection program and converted from Excel to SPSS Version 18. Though nearly all participants who began the survey completed it and provided usable data based on reliability items built into the questionnaire, students who endorsed all 0’s (summed score = 0) or all 1’s (summed score = 11) on the alcohol poisoning items were removed from the analyses (n = 88, 26.2% of larger sample) due to possible response bias. Final analyses, including the demographics in the methods section, were conducted with the remaining subset (n = 336). Participants were stratified into two groups based on their knowledge of the correct signs of alcohol poisoning: knows all signs (as measured by a score of 6 on the correct symptom summed score) and does not know all signs (as indicated by a correct symptom summed score of less than 6). A contingency table was created to evaluate overall sensitivity and specificity as measured by the ability to correctly identify the signs of alcohol poisoning and discern them from the distractors. Frequency analyses were conducted to determine the percentage of students who correctly identified the signs of alcohol poisoning, as well as the most common errors reported by students. Chi-square tests were done to determine if endorsement frequency for individual items varied by symptom endorsement status (i.e., knows signs vs. does not know all signs).

Multiple regression was used to identify which characteristics were associated with better knowledge of the correct signs of alcohol poisoning. For this analysis, the number of incorrect symptoms endorsed was subtracted from the number of correct symptoms to create a dependent variable representing discriminability, with higher scores indicating a better ability to discriminate correct symptoms from distractors. Descriptives (i.e., sex, ethnicity, Greek status, estimated spring quarter GPA) and alcohol use characteristics (i.e., HED frequency, frequency and quantity of drinking) were entered as predictors.
Variables were included in the final equation if they contributed a significant amount of unique variance as indicated by p-values ($p < .05$).

**RESULTS**

*Identification of Alcohol Poisoning Symptoms*

Results indicated that 36.6% ($n = 123$) of students were able to correctly identify all six signs of alcohol poisoning. The majority (63.4%; $n = 213$) made at least one error, with the following distribution: five correct ($n = 97, 28.9\%$ of sample); four correct ($n = 43, 12.8\%$); three correct ($n = 36, 10.7\%$); and less than three making up the minority ($n = 27, 11.0\%$). Individual symptom endorsement by identification status (knows signs vs. does not know all signs) is presented in Table 1. All participants identified vomiting as a correct symptom; however, overall rates of correct symptom endorsement for the other items ranged from 53.2% (seizures) to 85.7% (slow, shallow breathing). The most common errors included the following symptoms: decrease in body temperature (correctly endorsed by 49.1%) and student looking pale or bluish (endorsed by 64.3%). It is distressing to note that only 23.4% of non-correct identifiers recognized seizure activity as a sign of alcohol poisoning. With the exception of vomiting, the groups significantly differed in symptom endorsement of the correct signs, as would be expected (all $p < .01$).

Errors of commission were rampant as indicated by the frequency of endorsement for the distractor items, with only 24.7% ($n = 83$) of students showing correct discrimination. The most prevalent errors were made on items that asked participants to distinguish symptoms of intoxication from poisoning. These included mistaking impaired coordination as overdose (51.4% of all participants), and being unable to discern the severity of a blackout that cannot be roused from one that can (41.8% of participants). Interestingly, about a third of the sample endorsed distractor symptoms paradoxical to alcohol poisoning that were, in fact, symptoms of stimulant intoxication and/or overdose. These included: increased body temperature (29.6% overall endorsement), red or flushed appearance (21.8% overall), and hyperventilation (40.4% overall). It is interesting to note that the correct identifiers made more errors of commission than their peers in the other group, suggesting that they may be more prone to endorsing any symptom rather than being able to correctly distinguish the true signs of poisoning from other physiological symptoms.

*Sensitivity and Specificity in Responses*

Given the high rate of distractor endorsement, a 2x2 contingency table (knowledge of distractors by knowledge of correct signs) was created to look
at student sensitivity and specificity in correctly identifying poisoning symptoms from distractors. Overall, results indicated that the students had difficulty correctly identifying the true symptoms (sensitivity = .15) but were modestly better at discriminating distractor items (specificity = .70). As shown in Figure 1, only 5.7% of students were able to correctly distinguish all six of the alcohol poisoning symptoms from distractor items, and a high percentage of students made errors identifying both correct signs and distractors (44.3%).

*Student Characteristics Associated with Discriminating Correct Symptoms from Distractors*

Linear regression was used to identify student characteristics associated with better discriminability of the correct signs of alcohol poisoning. Intercorrelations for the variables in the equation are shown in Table 2. As shown in Table 3, results indicated that recognition of the correct signs of alcohol poisoning was better for students who were not fraternity or sorority members (Greek affiliation), and reported higher consumption (greater quantity per average occasion, increased frequency, and more HED episodes), $R^2=.23$, $F(7, 328) = 14.60, p < .01$.

**DISCUSSION**

Alcohol poisoning is a significant health concern in college students and results of the current study indicate that, despite the information students receive about the symptoms of alcohol poisoning, the majority struggle to correctly identify the known signs of alcohol overdose from other acute health consequences. In fact, the current study found that about one in three students could correctly identify all six signs of alcohol poisoning identified in the NIAAA website. And, even among these students, the vast majority made errors of commission and endorsed items that were indicative of acute intoxication but not necessarily overdose like impaired coordination. Likewise, many students were unable to discriminate physiological problems that can arise from other substances, from those experienced with alcohol poisoning. For example, almost half the students mistakenly reported hyperthermia, increased respiration and a flushed appearance as signs of alcohol overdose. Though they may be prominent health concerns, these symptoms are in fact paradoxical to those experienced in alcohol overdose and provide further substantiation that students are not completely accurate in their knowledge. It appears as if students are sensitive to when a peer may be experiencing physiological distress after using a substance, but lack the discrimination to be able to identify those problems as occurring from excessive alcohol intake and/or when the symptoms are indicative of acute intoxication that does not necessitate medical care from those that are a medical emergency. This is consistent with prior research sug-
sugest that many college students experience confusion when evaluating the signs of alcohol poisoning in their peers, and struggle to distinguish between alcohol poisoning symptoms and non-symptoms (Oster-Aaland et al., 2009).

On a more positive note, some of the heavily reported distractor items may in fact be precursors to alcohol poisoning and it is a good sign that many students identified these lesser, but still significant problems, as potential overdose symptoms. For example, about 45% of students who did not get all the signs of alcohol poisoning correct identified "coordination gets severely impaired but student is still conscious" and 39% endorsed "student blacked out as a result of drinking but can be roused." Though neither is a true sign of alcohol poisoning, they are both symptoms of a high blood alcohol level that could potentially progress to overdose and suggest that a modest subset of students may be erring on the more conservative side in considering these to be symptoms of alcohol overdose.

Despite this upside, the overall findings are particularly alarming given the increased attention that many campuses place on alcohol psychoeducation, including the signs of alcohol poisoning. For example, students in this study were exposed to psychoeducational media on the signs of alcohol poisoning at orientation (by being given individual water bottles with the symptoms printed on them for reference) as well as posters distributed on campus. Given the amount of information presented to the students, and low rate of perfect accuracy in reporting symptoms, it would appear is if current efforts to educate students on this issue may not be resonating with students and/or they are not attending to the messages. Overall, results highlight the need for alcohol poisoning education that is more salient to students and/or uses different media transmission sources. This could be done with existing applications by conducting focus groups with students to pilot social norms and psychoeducational media for impact prior to disseminating campaigns on campus, and using media that is eye-catching and culturally relevant to students (Johannessen & Glider, 2003). Another strategy may be to target campaigns to high risk groups. For example, given that Greek status was associated with poorer accuracy one suggestion would be to target an alcohol overdose campaign to the fraternity and sorority culture by including messages that promote more responsible drinking and better knowledge of alcohol poisoning. Additionally, campuses may want to consider utilizing technology in their psychoeducational efforts. Examples include disseminating a phone app that has the signs of alcohol poisoning as a hand-held reference, with links available to contact campus emergency services and 911 on the same screen. An important consideration in any of these prevention programs is dissemination university-wide. Though freshmen are at higher risk for alcohol poisoning (Bergen-Cico, 2000; Wright & Slovis, 1996), many upper classmen also experience this con-
sequence and prevention programs should be implemented campus-wide and/or include special "booster sessions" for students in their later years in college.

To date, research on alcohol poisoning and helping-behaviors has focused on identifying who is more likely to help (Oster-Aaland et al., 2009), which is one important component in helping in an emergency. However, in the model of situational influences that lead to helping behaviors, Latane and Darley (1970) posited that other important steps include noticing that there is a problem, and recognizing the issue as an emergency. This study extends the work by Oster-Aaland and colleagues (2009) by presenting data on the percentage of students who can recognize an alcohol overdose emergency, and providing initial information about the kinds of students that can correctly discriminate signs of alcohol poisoning from other physiological symptoms. Similar to the Oster-Aaland et al. (2009) study, this project found that heavier drinking was related to increased accuracy of symptom recognition. This makes sense intuitively; these students may be more aware of the effects of drinking heavily versus overdose symptoms because they have more experience with alcohol use and potential consequences themselves. Additional research is needed to confirm these hypotheses and better understand how such variables contribute to college students' ability to discriminate. Such information would provide useful information to administrators and practitioners regarding to whom they may need to provide additional alcohol poisoning education (i.e., Fraternity/sorority members, Caucasians, and students who drink less often), so that more targeted programming can be designed and implemented on campus.

Limitations

Findings from the current study should be interpreted while taking into consideration a few issues. First, participants in the study were first year freshmen from a private university in the San Francisco Bay Area. Though this study illustrates the disconnect between alcohol education efforts on campus and knowledge retention by students, it is limited in that it was conducted at a single site with entering freshman and may not be generalizable to all universities and/or the student body at large. The authors acknowledge this possible limitation, but highlight that participants were diverse with regard to ethnicity and sex, and feel that the issue of generalizability is one that cannot be determined until additional studies are conducted at different universities and/or the issue is examined with a multi-site trial design. Also, this study also did not directly assess whether students had seen the alcohol poisoning media on campus (i.e., water bottles and bathroom posters) so it is unclear if they did not attend to the psychoeducational campaign, did not see it, or misunderstood the message.
Another potential limitation is the wording used in the items assessing alcohol-related blackouts. This deviates from wording in the NIAAA website, and was done based on feedback from our pilot study. However, it may be misconstrued by students with a milder form of altered consciousness like “passing out” and students may in fact blackout without losing consciousness. Though this study did include the additional phrasing of “blacked out and cannot (or can) be roused” the authors acknowledge this deviates from the actual wording of what constitutes a lapse of consciousness in the NIAAA criteria. Future research may want to minimize this measurement issue by using the exact wording of the symptoms as published by the guidelines.

A final consideration has to do with the statistical methods used to identify student characteristics associated with better discriminability. The current study sought to identify demographics associated with discriminability and did so using linear regression. However, predictor variables identified for this study identified less than 25% of the explained variance in discriminability and the sample size prohibited replication in a hold-out validation sample. Further research is warranted to replicate these results to show generalizability and identify other factors that may be related to correct identification of alcohol poisoning symptoms.

CONCLUSIONS

The current study indicates that a minority of students can correctly identify the signs of alcohol poisoning, and even fewer can distinguish the correct signs from distractor symptoms. Though participants did receive education about the correct symptoms from multiple sources as part of campus prevention efforts, it appears as if they were unable to recognize the correct information and it is unclear if they would be able to discriminate alcohol poisoning from other substance-induced physiological symptoms in a peer. These results provide preliminary support for the need to ramp up psychoeducational efforts about the signs of alcohol overdose and consequences of problematic drinking, either by increasing the visibility of information on campus and/or making the messages more salient to students in some manner. Preliminary evidence is found for the importance of considering ethnicity, current levels of drinking, and Greek affiliation when developing programming to increase the accuracy of correct identification and discrimination of the signs and symptoms of alcohol overdoses. Overall, results suggest that campus intervention efforts may not be impacting students as intended, and health educators and administrators may want to consider alternative messages and/or media to make this important information more salient to students.
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AUTHOR NOTE

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drinking games in mandated students. *Addictive Behaviors, 32*, 2964-2705. doi: 10.1016/j.addbeh.2007.05.003


*Statistical Package for the Social Sciences*, Version 18.0. Chicago, IL.


### FIGURE 1

**Possible Categories of Responses Student Can Provide for Knowing Correct Signs of Alcohol Poisoning**

Identification of Distractors as NOT Being Symptoms

<table>
<thead>
<tr>
<th>Correct</th>
<th>Not Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of all 6 Symptoms of Alcohol Poisoning</td>
<td>Able to identify correct symptoms and discriminate distractors $n = 19$ (5.7%)</td>
</tr>
<tr>
<td>Not Correct</td>
<td>Able to correctly identify all distractors but missed at least one symptom of alcohol poisoning $n = 64$ (19.0%)</td>
</tr>
<tr>
<td>Item</td>
<td>Overall Endorsement</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Correct Symptoms</td>
<td></td>
</tr>
<tr>
<td>Vomiting as a direct result of drinking</td>
<td>336</td>
</tr>
<tr>
<td>Blacked out and could NOT be roused</td>
<td>280</td>
</tr>
<tr>
<td>Shallow, slow breathing</td>
<td>284</td>
</tr>
<tr>
<td>Body temperature falls</td>
<td>219</td>
</tr>
<tr>
<td>Seizures</td>
<td>176</td>
</tr>
<tr>
<td>Student looked blue or pale</td>
<td>260</td>
</tr>
<tr>
<td>Distractor Symptoms</td>
<td></td>
</tr>
<tr>
<td>Impaired coordination but conscious</td>
<td>175</td>
</tr>
<tr>
<td>Blacked out but could be roused</td>
<td>146</td>
</tr>
<tr>
<td>Looked red or flushed</td>
<td>78</td>
</tr>
<tr>
<td>Hyperventilation</td>
<td>138</td>
</tr>
<tr>
<td>Body temperature rises</td>
<td>105</td>
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</table>
### TABLE 2

*Means, Standard Deviations, and Intercorrelations for Variables Entered in Regression Analysis*

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>Criterion Variables</td>
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</tr>
<tr>
<td>Discriminability</td>
<td>2.72</td>
<td>1.82</td>
<td>-.20*</td>
<td>.11*</td>
<td>.09</td>
<td>-.01</td>
<td>.7</td>
<td>.08</td>
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<td>Predictor Variables</td>
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<td></td>
</tr>
<tr>
<td>1. Ethnicity</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-.14*</td>
<td>.05</td>
<td>-.09</td>
<td>-.10</td>
<td>.09-</td>
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<tr>
<td>2. Spring GPA</td>
<td>3.33</td>
<td>0.41</td>
<td>---</td>
<td>-.11*</td>
<td>-.11*</td>
<td>-.13*</td>
<td>.01</td>
<td>-.10</td>
</tr>
<tr>
<td>3. Sex</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>.20</td>
<td>-.36**</td>
<td>-.12*</td>
<td>.07</td>
<td>.07</td>
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<tr>
<td>4. Greek status</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-.05</td>
<td>.03</td>
<td>.23</td>
<td>.33**</td>
<td>.33**</td>
</tr>
<tr>
<td>5. Average quantity</td>
<td>5.91</td>
<td>2.74</td>
<td>---</td>
<td>-.23**</td>
<td>.33**</td>
<td>.17</td>
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<tr>
<td>6. Number HED episodes</td>
<td>4.54</td>
<td>4.96</td>
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<td>---</td>
<td>.17</td>
<td>.17</td>
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<td>.17</td>
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<tr>
<td>7. Frequency of drinking</td>
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<td>---</td>
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<td>---</td>
<td>---</td>
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</tbody>
</table>

*Note:* *p<.05. **p<.01. M and SD not calculated on Ethnicity, Gender, Greek status, and Frequency of drinking due to nominal scaling.

### TABLE 3

*Regression Analysis Summary for Student Characteristics Predicting Alcohol Poisoning Symptom Discriminability*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SE B</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity*</td>
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<td>-.05</td>
<td>.36</td>
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<tr>
<td>Gender*</td>
<td>.28</td>
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<td>.10</td>
<td>.08</td>
</tr>
<tr>
<td>Greek Affiliation*</td>
<td>-.63</td>
<td>.23</td>
<td>-.14</td>
<td>.01</td>
</tr>
<tr>
<td>Anticipated GPA for Spring Quarter</td>
<td>-.30</td>
<td>.23</td>
<td>-.07</td>
<td>.133</td>
</tr>
<tr>
<td>Average Quantity/Drinking Occasion</td>
<td>.09</td>
<td>.04</td>
<td>.14</td>
<td>.250</td>
</tr>
<tr>
<td>Frequency of Drinking During Spring*</td>
<td>.46</td>
<td>.07</td>
<td>.37</td>
<td>.667</td>
</tr>
<tr>
<td>Number HED Episodes/ Past 2 Weeks</td>
<td>.06</td>
<td>.02</td>
<td>.17</td>
<td>.33</td>
</tr>
</tbody>
</table>

*Note.* Adjusted $R^2=.23$. *Coded as 0 = Non-Caucasian, 1 = Caucasian. *Coded as men = 0 and women = 1. *Coded as 0=nonmember and 1=pledge/member. *Frequency of drinking measured on 13-point Likert scale ranging from (0) never/abstainer to (12) daily.