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Socio-cognitive Factors and Perceived Consequences Associated with Alternative Forms of Alcohol Use

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Abstract

Objective—Popular media have highly publicized alternative forms of alcohol use (e.g., eyeballing, inhaling alcohol vapor) among college students as a growing concern, possibly associated with severe health risks. Formative research indicates rarity of use.

Participants and Methods—College students (Study 1: $n = 411$; Study 2: $n = 687$) completed an online survey.

Results—Findings confirmed infrequent use of alternative methods of alcohol use and low likelihood of trying them in the future (Study 1). Participants indicated varied reasons for possibly trying each alternative form of alcohol use, but consistently perceived consequences for all forms (i.e., health concerns), as well as very low perceived approval from close friends (Study 2). Social and environmental contextual factors associated with possible use were also explored.

Conclusions—College students in the current sample have low prevalence and future likelihood of alternative forms of alcohol use. This information can be used by campus health practitioners to promote accurate normative data for alternative forms of alcohol use. However, with increased perceptions of approval and media presence, future trends could change. Findings revealed important risk factors for these potentially hazardous forms of alcohol use.

Keywords

Alternative alcohol use; nontraditional alcohol administration; college drinking; alcohol motives; injunctive norms

Recent media attention has focused on nontraditional methods of alcohol use (i.e., other than orally ingesting liquid). Alternative forms of alcohol use may include nontraditional forms of alcohol substance (i.e., powder or vapor) or alternative methods of ingestion (i.e., not orally). These alternative ways to administer alcohol may include ingestion through "smoking" alcohol vapor or inhaling alcohol mist (i.e., "Vaportini")[1], alcohol enemas[2,3],

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vaginally (i.e., “vodka tampons” or “slimming”)[4], through the eye (i.e., “eyeballing”)[5], and powdered alcohol (e.g., “Palcohol”)[6]. Motives for these alternative methods of use, as suggested through media reports, are primarily to achieve greater intoxication faster.[7,8] Other motives include avoiding detection of alcohol on one’s breath,[9] decreasing caloric intake,[7] and preventing vomiting or hangover symptoms.[2,7]

Many health-related harms are linked with these methods of alcohol use. Eyeballing is associated with tissue damage, infections, and vision loss;[5] inhaling alcohol vapor could possibly contribute to respiratory infections by drying out the nasal passages.[7] Importantly, alternative methods of alcohol use could increase the likelihood of alcohol poisoning. A concentrated form of alcohol can enter the body without being metabolized through the stomach and liver; thus, greater intoxication can occur. Moreover, the body is not able to vomit to prevent overdose because the alcohol is not in the stomach[7,10]. Given these harms, empirical studies are warranted to determine actual rates of nontraditional alcohol use among college students.

Reports about the prevalence of alternative forms of alcohol use are mixed. While some media reports label these as a “rapidly emerging trend”,[4] others report uncertainty.[2,7] Specifically, alcohol vapor cocktails have been reported as trending only in urban cities (e.g., Chicago).[11,12] One method that may gain popularity is powdered alcohol. The U.S. Alcohol and Tobacco Tax and Trade Bureau (TTB) recently approved labels for the brand Palcohol.[13] Despite media concern, only one study has been conducted in which the prevalence of alternative forms of alcohol use was empirically examined.[10] Findings revealed only 1.1% of their 2,349 college student sample engaged in an alternative method of alcohol administration in their lifetime. However, confirmation in additional samples is necessary to strengthen or temper these conclusions of rarity. In addition, studies in which potential antecedents of alternative methods (i.e., motives, perceived consequences, context, perceived acceptability by peers) are examined will further our understanding of these forms of alcohol use.

The present pair of studies were conducted to expand the literature about the underexplored topic of alternative alcohol administration methods. Study 1 was designed to identify level of familiarity and prevalence of these alternative forms of alcohol use in a sample of college students. It also included an exploratory investigation as to the motivations behind why one might use these alternative forms, and potential negative consequences perceived for each. Responses from Study 1 (Fall 2014) guided item creation for the issues assessed in Study 2 (Spring 2015), to determine the strength of motivations associated with *using* or *not using* alternative forms of alcohol. In Study 2, we also examined injunctive normative perceptions (i.e., perceived peer approval) and contextual factors associated with alternative forms of alcohol use.

Study 1

Methods

Participants in Study 1 were 411 college students age 18 or above (M = 21.58 years, SD = 3.98): 131 (32.0%) identified as male, 275 (67.2%) as female, and three students (0.7%) as

questioning. The sample was mostly White/Caucasian (48.5%), or Black/African-American (34.7%), and the majority (72.3%) reported past-month alcohol use.

Materials and procedure—Psychology students at a midsize public university in the southeastern United States were recruited and participated through an online study participation system, and received course credit as compensation. Participants provided informed consent, and the study was classified as exempt by the institution's College of Sciences Human Subjects Committee (COSHSC).

Within a larger survey of overall substance use, participants reported their alcohol consumption for the 30 days prior to completing the survey. This information was used to determine drinker status (i.e., if they drank or abstained in the 30 days prior to the survey). In addition, participants were presented with a list of alternative forms of alcohol use derived from popular media (see Table 1 rows), and asked to indicate their current familiarity with each type of alternative form of alcohol use. Possible responses included: 1 (*I have never heard of this*), 2 (*I have heard of it, but have never tried it*), 3 (*I have tried it once*), 4 (*I have tried it several times*), and 5 (*I do this regularly*). Participants were also asked to indicate how many times they had engaged in each type of alternative form of alcohol use, if applicable. A single item assessed how likely participants were to use one of the alternative forms of alcohol use listed if available, from 1 (*Very Unlikely*) to 5 (*Very Likely*). Finally, they were asked open-ended questions about each type of alternative form: why they might use it, what benefits they might get, and what problems might be associated with it.

Results

Familiarity with each type of alternative form of alcohol use was relatively normally distributed across each type, though select types (i.e., misting alcohol, inhaling alcohol vapor) were slightly skewed due to the predominance of the sample being unfamiliar with it (highest skewness value = 2.82). Similarly, likelihood of future use was positively skewed (skew = 5.41) due to most participants endorsing very low likelihood of future use. However, parametric statistics were used to compare these constructs across demographic characteristics. The alternative (i.e., analyzing these same constructs via non-parametric chi-square analyses for each response category) would result in hundreds of analyses, which would greatly inflate the likelihood of committing a Type I error. Controlling the Type I error rate (e.g., using a Bonferroni correction on alpha) would yield an alpha level too small to be realistically obtainable or informative.

Participants reported being most familiar (i.e., endorsing *2* or higher) with alcohol enemas (40.9%), followed by soaking a tampon in alcohol (29.9%), inhaling alcohol vapor (21.5%), eyeballing (19.9%), eating powdered alcohol (17.6%), misting alcohol (17.1%), and snorting powdered alcohol (16.1%). As seen in the top half of Table 1, when familiarity was compared between past month drinkers (i.e., one drink or more in the 30 days prior to the survey) versus abstainers (i.e., zero drinks in the 30 days prior to the survey), past month drinkers were more familiar with alcohol enemas, $p = .015$, soaking a tampon in alcohol, $p < .001$, and eyeballing, $p = .033$, than the abstainers. No significant differences between past month drinks and abstainers were observed for inhaling alcohol vapor, misting alcohol,

eating powdered alcohol, or snorting powdered alcohol. Similarly, males were more familiar with alcohol enemas than females, $p = .026$, and White participants were more familiar with soaking a tampon in alcohol than other races, $p = .048$. No other significant differences were observed by sex or race (see Table 1). Age was unrelated to familiarity with different alternative forms of alcohol use.

An overwhelming majority of participants reported being *unlikely* ($n = 7$, 1.7%) or *very unlikely* ($n = 383$, 94.6%) to use any of the alternative forms of alcohol use. As seen at the bottom of Table 1, no significant differences were observed by participant sex, $p = .182$, race, $p = .517$, or drinker status, $p = .060$, on likelihood of using any alternative form, nor was age related to likelihood of use ($p = .957$). As seen in the lower half of Table 1, the most commonly used alternative form of alcohol use was inhaling alcohol vapor ($n = 6$, 1.5% of sample tried), followed by misting alcohol ($n = 3$, 0.7%), soaking a tampon ($n = 3$, 0.7%), eyeballing ($n = 3$, 0.7%), eating powdered alcohol ($n = 3$, 0.7%), snorting powdered alcohol ($n = 3$, 0.7%), and alcohol enemas ($n = 1$, 0.2%). Frequency of use for each form did not differ significantly by participant sex, race, drinker status, or age (see lower half of Table 1) with the exception of snorting powdered alcohol. There was a weak but significant correlation with age, such that older participants were more likely to have snorted powdered alcohol than younger participants, $r(383) = .10$, $p = .048$.

Interactions among demographic variables with drinker status were also explored. MANOVAs indicated there was not a significant drinker by age interaction for familiarity across all alternative forms of alcohol use, $F(7,364) = 1.14$, $p = .340$, or frequency of use across all alternative forms, $F(5,371) = 0.36$, $p = .874$. Similarly, MANOVAs across all alternative forms indicated there was not a significant drinker by race interaction for familiarity, $F(7,378) = 1.39$, $p = .210$, or frequency of use, $F(6,385) = 0.39$, $p = .887$, nor was there a significant drinker by participant sex interaction for familiarity, $F(7,380) = 1.73$, $p = .101$, or frequency of use, $F(7,385) = 0.21$, $p = .984$. A series of ANOVAs indicated there was not a significant drinker by age interaction for likelihood of use, $F(1,376) = 1.20$, $p = .274$, nor was there a significant drinker by race interaction, $F(1,391) = 0.03$, $p = .863$, nor a significant drinker by participant sex interaction, $F(1,392) = 0.63$, $p = .428$.

Study 2

Methods

Participants were 687 college students ($M = 21.64$ years, $SD = 4.05$): 194 (28.5%) identified as male, 486 (71.4%) as female, and one (0.1%) as questioning. The sample was mostly White/Caucasian (47.5%), or Black/African-American (34.2%), and the majority (78.5%) reported using alcohol in the month prior to the survey. Participation in Study 1 (as tracked through the online study participation system) precluded students from participating in Study 2, yielding two distinct samples. The study was approved by the institution's COSHSC and all participants provided informed consent.

Materials and procedure—Within a larger survey of overall substance use, participants were presented with a list of *potential motivations* and *perceived consequences* for engaging in alternative forms of alcohol use (see rows for top half of Table 2) developed from the

responses to Study 1. Given limited endorsement from Study 1, in Study 2 we focused on perceptions of alternative forms of alcohol use by all students, regardless of prior use. Participants were asked to check all that apply for reasons why they might use that particular alternative form of alcohol use (*potential motivations*) or why they might avoid it (*perceived consequences*). In addition, they were asked to indicate their likely social and environmental context (see rows for lower half of Table 2) if using alternative forms of alcohol use, checking all that apply for each form. To assess injunctive norms (i.e., perceptions of approval or disapproval), they were asked how their close friends would respond to each form, ranging from 1 (*Strong Disapproval*) to 7 (*Strong Approval*).

Results

Injunctive norms ratings were normally distributed for most types of alternative forms of alcohol use (i.e., inhaling alcohol vapor, misting alcohol, eating/drinking powdered alcohol, snorting powdered alcohol), though select types were positively skewed (i.e., alcohol enemas skew = 3.72, soaking a tampon skew = 4.45, eyeballing alcohol skew = 3.84) because of the predominance disapproval ratings. As with Study 1, parametric statistics were used in Study 2 to compare these constructs across demographic characteristics to avoid inflating the Type I error rate via a multitude of non-parametric analyses, or using overly punitive alpha corrections.

Novelty and getting intoxicated faster were the most common reasons specified for possibly using most alternative forms of alcohol use, although hiding alcohol use and avoiding the taste of alcohol were most common for eyeballing and soaking a tampon in alcohol (see top half of Table 2). Most participants reported avoiding alternative forms of alcohol use because they perceived them to be bad for their health in general (see top half of Table 2). Other reported potential consequences included more specific health concerns (e.g., bad for internal organs, acquiring infections).

Participants generally reported their friends would disapprove using alternative forms of alcohol (see bottom of Table 2). Strongest perceived disapproval was for soaking a tampon in alcohol, followed by eyeballing, then alcohol enemas. As seen in Table 3, those who indicated they had consumed alcohol in the month prior to the survey perceived more approval for inhaling alcohol vapor, $p < .001$, misting alcohol, $p < .001$, and eating powdered alcohol, $p = .013$, than those who abstained. No significant differences were observed for injunctive norms for alcohol enemas, soaking a tampon in alcohol, eyeballing, or snorting powdered alcohol. Similarly, White participants perceived more approval for inhaling alcohol vapor, $p = .022$, eating powdered alcohol, $p = .027$, and snorting powdered alcohol, $p = .043$, than other races. Consistent with these findings, males perceived more approval for eating powdered alcohol than females, $p = .003$. Surprisingly, males also perceived more approval for eyeballing, $p = .049$, than females. There were no other significant effects for participant sex or race. Age was not significantly associated with perceptions of approval for any form.

The most frequently cited social context for potentially using alternative forms of alcohol use was with friends, other than alcohol enemas and soaking a tampon in alcohol, which were most often cited as being used when alone. Potential use at a party was the most

commonly cited location (consistent with the social context of “with friends”), other than for alcohol enemas or soaking a tampon, which was done in in the participants’ own home (consistent with the social context of “alone”; see bottom half of Table 2).

Interactions among demographic variables with drinker status were also explored. MANOVAs indicated there was not a significant drinker by age interaction for normative perceptions across all alternative forms, $F(7,616) = 1.27$, $p = .262$. Similarly, MANOVAs across all alternative forms indicated there was not a significant drinker by race interaction, $F(7,631) = 0.53$, $p = .811$, nor was there a significant drinker by sex interaction for normative perceptions, $F(7,636) = 0.91$, $p = .495$.

Comment

The current pair of studies helps to address the dearth of empirical research regarding alternative forms of alcohol use, despite prominent media attention.[4,7] Study 1 corroborates early evidence of infrequent use of these methods[10] and low likelihoods of trying them in the future. It also produced an important set of potential motives and consequences perceived by college students. Study 2 extended these findings by establishing that potential motives for use may vary by consumption type; novelty, increasing rate of intoxication, hiding consumption, or avoiding the taste of alcohol were all reported as reasons why one might use these alternative forms of alcohol use. Conversely, participants consistently endorsed health concerns as perceived potential consequences for all forms. Moreover, they perceived strong disapproval from their close friends of alternative forms of alcohol use. It is worth noting *strong disapproval* was endorsed by more than 50% of the sample for all items.

Drinking status selectively influenced familiarity and injunctive norms. Although past-month drinkers were more familiar with the most well-known forms of alcohol use, drinker status was unrelated to familiarity for more obscure forms (e.g., eyeballing alcohol, alcohol enemas, soaking tampons in alcohol), and was unrelated to likelihood of future use. There was no difference between drinkers versus abstainers for items with the strongest disapproval by peers (i.e., alcohol enemas, soaking tampons in alcohol, eyeballing, or snorting powered alcohol), with greater perceived approval emerging for drinkers only for items where disapproval was not as severe (i.e., inhaling alcohol vapor, misting alcohol, and eating powdered alcohol).

Similarly, participant sex and race had an effect only on select types of alternative forms of alcohol use. Males and White participants were more familiar with some forms of alternative alcohol use (i.e., alcohol enemas for males, soaking tampons for White participants) than female or non-White participants, but were not more likely to have tried them nor were they more likely to indicate they might use these forms in the future. As with drinker status, male participants perceived higher approval for select forms (i.e., eyeballing alcohol, eating powdered alcohol) than female participants, and White participants perceived higher approval for select forms (i.e., inhaling alcohol vapor, eating powdered alcohol, snorting powdered alcohol) than other races. However, age was unrelated to familiarity, past frequency of use, future likelihood of use, and perceptions of approval with one exception.

Older participants were more likely to indicate they snorted powdered alcohol in the past than were younger participants.

These findings indicate media hype about alternative forms of alcohol use may be overblown. Low prevalence, low future likelihood of use, strong perceived consequences, and perceived disapproval from friends indicate that alternative forms of alcohol use are not as widely prevalent as portrayed in the media. However, low prevalence may be due, at least in part, to perceptions of health risks and perceived peer disapproval. The Health Belief Model[14] and Theory of Planned Behavior[15] posit that socio-cognitive factors such as perceived risk and peer approval can predict likelihood of behavior engagement. Alternative forms of alcohol use may have low prevalence due to high perceived risk and low peer approval, but with federal approval of sale of powered alcohol and the resulting media attention, trends in use could change. For example, though rates of use remained low within our sample, inhaling alcohol vapor was the alternative form most commonly used, had the highest peer approval ratings, and had the second-lowest perceived consequences. This may be because inhaling alcohol vapor has more media presence and is used at some bars (e.g., Chicago's Red Kiva lounge).[16] Thus, if other alternative forms of alcohol use gain more media attention *and* become more accessible, their rates of use could increase, particularly among those who perceive lower risk and higher injunctive norms. Because this is speculative, future research should explore the role media plays in influencing socio-cognitive factors (e.g., perceptions, motives) related to using and not using alternative forms of alcohol use, as well as influencing behaviors (e.g., actual use of alternative forms of alcohol use). Furthermore, given the variety of alternative forms of alcohol use in which one may partake, research is needed to provide a comprehensive list of potential health-related consequences that may occur from using these forms. Such information, in addition to accurate normative data of the prevalence of alternative forms of alcohol use among college students from the current Study 1, would aid prevention and intervention efforts aimed at reducing involvement in this risky behavior.

Limitations

The current study has several limitations. Generalizability of study findings may be limited, as recruitment was through a psychology research pool at a single institution. Moreover, only a very small portion of students reported engaging in these behaviors, so reported potential motives and perceived consequences predominantly reflect the opinions of non-users of alternative forms of alcohol use. Low familiarity, low likelihood of future use, and low perceived peer approval also contributed to positively skewed ratings for select forms, so analyses should be interpreted with caution. Additional research is needed as any use is potentially problematic given highly elevated health risks. Replication at multiple sites and using large-scale national surveys could establish more accurate and reliable prevalence rates. Researchers should also longitudinally explore the trajectory of rates across time.

Conclusions

Alternative forms of alcohol use (e.g., eyeballing, inhaling alcohol vapor) among the college population have been highly publicized in the media as a growing concern. However, early

empirical evidence suggests very low prevalence of college student engagement in these activities.[10] Findings from Study 1 affirmed early empirical evidence of infrequent use of these methods in a sample of college students, and low likelihoods of trying them in the future. In Study 2, participants indicated varied motivations for possibly trying each alternative form of alcohol use, but consistent perceived potential negative consequences for all forms (i.e., health concerns). Moreover, injunctive normative perceptions indicated strong disapproval of alternative forms of alcohol use from their close friends. Finally, environmental contextual factors associated with potential use (e.g., with friends, at a party) were fairly consistent across type of alternative form, with a few exceptions. The current findings regarding potential motives, perceived consequences, and context of possible use could be translated into understanding important risk factors to identify those most likely to engage in hazardous consumption.

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Table 1

Familiarity, Frequency of Prior Use, and Likelihood of Future Use across Participant Characteristics

		Male	Female			White	other			Drinker	Abst.			Age	
	n (%)	*M* (*SD*)	*M* (*SD*)	*t*	*p*	*M* (*SD*)	*M* (*SD*)	*t*	*p*	*M* (*SD*)	*M* (*SD*)	*t*	*p*	*r*	*p*
Familiarity															
Inhaling alcohol vapor	–	1.29 (0.47)	1.21 (0.54)	1.38	.168	1.23 (0.46)	1.26 (0.57)	0.58	.562	1.25 (0.49)	1.22 (0.60)	−0.45	.653	−.01	.875
Misting alcohol	–	1.21 (0.43)	1.17 (0.45)	0.88	.378	1.16 (0.37)	1.22 (0.51)	1.47	.142	1.17 (0.39)	1.24 (0.56)	1.26	.208	−.03	.524
Alcohol enemas	–	1.51 (0.55)	1.38 (0.53)	2.23	.026	1.49 (0.50)	1.38 (0.57)	−1.97	.050	1.47 (0.52)	1.32 (0.57)	−2.46	.015	−.00	.930
Soaking tampons in alcohol	–	1.27 (0.48)	1.33 (0.50)	−1.26	.209	1.36 (0.48)	1.27 (0.50)	−1.99	.048	1.37 (0.50)	1.18 (0.45)	−3.63	.000	−.01	.789
Eyeballing alcohol	–	1.22 (0.45)	1.20 (0.43)	0.55	.586	1.21 (0.41)	1.21 (0.46)	−0.08	.934	1.24 (0.44)	1.13 (0.44)	−2.15	.033	.04	.484
Eating powdered alcohol	–	1.21 (0.43)	1.16 (0.38)	1.12	.262	1.21 (0.41)	1.14 (0.38)	−1.76	.080	1.19 (0.39)	1.15 (0.41)	−0.90	.366	−.04	.402
Snorting powdered alcohol	–	1.21 (0.43)	1.14 (0.36)	1.58	.116	1.18 (0.39)	1.14 (0.38)	−1.07	.287	1.17 (0.38)	1.16 (0.41)	−0.31	.754	−.04	.412
Frequency															
Inhaling alcohol vapor	6 (1.5)	1.02 (0.20)	1.05 (0.63)	−0.52	.607	1.06 (0.72)	1.03 (0.22)	−0.51	.609	1.06 (0.61)	1.01 (0.10)	−0.79	.432	−.03	.521
Misting alcohol	3 (0.7)	1.00 (0.00)	1.01 (0.11)	−1.74	.083	1.00 (0.00)	1.01 (0.10)	1.42	.158	1.01 (0.10)	1.00 (0.00)	−1.74	.083	.04	.498
Alcohol enemas	1 (0.2)	1.00 (0.00)	1.01 (0.12)	−0.70	.488	1.00 (0.00)	1.01 (0.14)	0.98	.329	1.01 (0.12)	1.00 (0.00)	−0.62	.537	.02	.724
Soaking tampons in alcohol	3 (0.7)	1.01 (0.09)	1.01 (0.09)	0.03	.978	1.00 (0.00)	1.01 (0.12)	1.74	.083	1.01 (0.10)	1.00 (0.00)	−1.74	.083	.06	.233
Eyeballing alcohol	3 (0.7)	1.00 (0.00)	1.01 (0.11)	−1.74	.083	1.00 (0.00)	1.01 (0.12)	1.74	.083	1.01 (0.10)	1.00 (0.00)	−1.74	.083	.07	.167
Eating powdered alcohol	3 (0.7)	1.02 (0.18)	1.02 (0.25)	−0.13	.896	1.01 (0.07)	1.03 (0.31)	1.08	.281	1.02 (0.27)	1.00 (0.00)	−0.95	.344	.02	.717
Snorting powdered alcohol	3 (0.7)	1.00 (0.00)	1.02 (0.23)	−1.61	.109	1.01 (0.14)	1.02 (0.22)	0.50	.615	1.02 (0.22)	1.00 (0.00)	−1.61	.109	.10	.048
Likelihood of Use	–	1.18 (0.66)	1.09 (0.51)	1.34	.182	1.09 (0.43)	1.12 (0.59)	0.65	.517	1.13 (0.58)	1.05 (0.34)	−1.89	.060	.00	.957

Note. Data are from Study 1. *n* (%) = number and percentage of sample who tried that alternative form of alcohol use. Abst. = Abstainer. Participant sex analyses dropped the category of "questioning" due to small cell size. Similarly, because a series of ANOVAs revealed no significant differences across all races, race analyses presented here collapsed across minority categories to increase cell size and associated power. Drinker status was on the basis of the past 30 days. All correlations presented are for the variable listed with age.

Table 2

Motivations, Perceived Consequences, Contextual Associations, and Injunctive Normative Perceptions for Alternative Forms of Alcohol

	Inhaling alcohol vapor	Misting alcohol	Alcohol enemas	Soaking tampons in alcohol	Eyeballing alcohol	Eating powdered alcohol	Snorting powdered alcohol
Motivations							
For the novelty (or it sounds cool)	**323 (47%)**	**243 (35.4%)**	47 (6.8%)	45 (6.6%)	67 (9.8%)	**107 (15.6%)**	78 (11.4%)
To get drunker faster	199 (29%)	140 (20.4%)	**135 (19.7%)**	108 (15.7%)	87 (12.7%)	106 (15.4%)	**137 (19.9%)**
To get drunk slower	115 (16.7%)	134 (19.5%)	32 (4.7%)	61 (8.9%)	37 (5.4%)	69 (10%)	16 (2.3%)
To avoid calories	216 (31.4%)	167 (24.3%)	92 (13.4%)	112 (16.3%)	105 (15.3%)	41 (6%)	79 (11.5%)
To fit in if others are using it	198 (28.8%)	147 (21.4%)	59 (8.6%)	51 (7.4%)	73 (10.6%)	100 (14.6%)	88 (12.8%)
To hide the fact that you are consuming alcohol	128 (18.6%)	92 (13.4%)	100 (14.6%)	**167 (24.3%)**	77 (11.2%)	95 (13.8%)	50 (7.3%)
To avoid a hangover	172 (25%)	127 (18.5%)	78 (11.4%)	87 (12.7%)	83 (12.1%)	67 (9.8%)	38 (5.5%)
It is safer than traditional alcohol use	183 (26.6%)	146 (21.3%)	36 (5.2%)	44 (6.4%)	23 (3.3%)	68 (9.9%)	22 (3.2%)
To avoid the taste of alcohol	178 (25.9%)	125 (18.2%)	129 (18.8%)	165 (24%)	**169 (24.6%)**	46 (6.7%)	78 (11.4%)
To keep your breath fresh	118 (17.2%)	100 (14.6%)	106 (15.4%)	142 (20.7%)	131 (19.1%)	47 (6.8%)	82 (11.9%)
Perceived Consequences							
Easier to get alcohol poisoning	240 (34.9%)	183 (26.6%)	323 (47%)	302 (44%)	262 (38.1%)	261 (38%)	286 (41.6%)
Could get addicted	229 (33.3%)	187 (27.2%)	158 (23%)	140 (20.4%)	141 (20.5%)	220 (32%)	328 (47.7%)
Getting drunk too quickly	223 (32.5%)	171 (24.9%)	260 (37.8%)	213 (31%)	177 (25.8%)	202 (29.4%)	245 (35.7%)
Too expensive	240 (34.9%)	205 (29.8%)	155 (22.6%)	111 (16.2%)	97 (14.1%)	212 (30.9%)	230 (33.5%)
Bad for your internal organs	250 (36.4%)	211 (30.7%)	387 (56.3%)	370 (53.9%)	316 (46%)	256 (37.3%)	297 (43.2%)
Could lead to blindness	74 (10.8%)	71 (10.3%)	61 (8.9%)	58 (8.4%)	**467 (68%)**	63 (9.2%)	66 (9.6%)
Could cause infertility	91 (13.2%)	80 (11.6%)	150 (21.8%)	428 (62.3%)	75 (10.9%)	79 (11.5%)	84 (12.2%)
Could lead to bacterial or infections	125 (18.2%)	112 (16.3%)	326 (47.5%)	408 (59.4%)	300 (43.7%)	107 (15.6%)	181 (26.3%)
Bad for your health in general	**413 (60.1%)**	**395 (57.5%)**	**446 (64.9%)**	**460 (67%)**	452 (65.8%)	**420 (61.1%)**	**446 (64.9%)**
Social Context							
Alone	135 (19.7%)	82 (11.9%)	**109 (15.9%)**	**130 (18.9%)**	74 (10.8%)	75 (10.9%)	74 (10.8%)
With friends	**345 (50.2%)**	**293 (42.6%)**	88 (12.8%)	62 (9%)	**126 (18.3%)**	**190 (27.7%)**	**170 (24.7%)**

	Inhaling alcohol vapor	Misting alcohol	Alcohol enemas	Soaking tampons in alcohol	Eyeballing alcohol	Eating powdered alcohol	Snorting powdered alcohol
With family	122 (17.8%)	88 (12.8%)	16 (2.3%)	22 (3.2%)	23 (3.3%)	48 (7%)	9 (1.3%)
With work colleagues	153 (22.3%)	112 (16.3%)	23 (3.3%)	24 (3.5%)	27 (3.9%)	50 (7.3%)	25 (3.6%)
Location							
Own home	231 (33.6%)	171 (24.9%)	**141 (20.5%)**	**143 (20.8%)**	105 (15.3%)	130 (18.9%)	114 (16.6%)
Party	**297 (43.2%)**	**269 (39.2%)**	65 (9.5%)	55 (8%)	**111 (16.2%)**	**164 (23.9%)**	**156 (22.7%)**
Bar	202 (29.4%)	166 (24.2%)	28 (4.1%)	23 (3.3%)	29 (4.2%)	65 (9.5%)	35 (5.1%)
Restaurant	131 (19.1%)	101 (14.7%)	21 (3.1%)	26 (3.8%)	17 (2.5%)	55 (8%)	12 (1.7%)
Perceptions of Approval	2.55 (1.89)	2.49 (1.83)	1.33 (1.01)	1.25 (0.94)	1.31 (1.04)	2.01 (1.62)	1.63 (1.32)

Note. Many participants skipped the context items, likely due to their low intentions to use these forms of consumption. Most frequently endorsed context response for each form of alcohol use is indicated with bold text. For context items, cells indicate number of people endorsed (*n*), with percentage in parentheses. For injunctive normative perceptions, cells indicate approval mean (range 1–7), with standard deviation in parentheses. Data are from Study 2.

Table 3

Injunctive Normative Perceptions across Participant Characteristics

	Male	Female			White	other			Drinker	Abst.			Age	
	M (*SD*)	*M* (*SD*)	*t*	*p*	*M* (*SD*)	*M* (*SD*)	*t*	*p*	*M* (*SD*)	*M* (*SD*)	*t*	*p*	*r*	*p*
Perceptions of Approval														
Inhaling alcohol vapor	2.70 (1.89)	2.49 (1.89)	1.32	.186	2.72 (1.90)	2.39 (1.86)	−2.29	.022	2.68 (1.93)	2.10 (1.66)	−3.58	.000	−.01	.866
Misting alcohol	2.70 (1.87)	2.40 (1.81)	1.88	.061	2.57 (1.81)	2.39 (1.83)	−1.30	.193	2.62 (1.87)	2.04 (1.61)	−3.62	.000	−.01	.812
Alcohol enemas	1.40 (1.02)	1.30 (1.00)	1.17	.243	1.30 (0.94)	1.34 (1.03)	0.55	.584	1.33 (1.03)	1.32 (0.92)	−0.09	.928	−.06	.114
Soaking tampons in alcohol	1.28 (0.87)	1.24 (0.95)	0.51	.611	1.24 (0.90)	1.24 (0.93)	−0.07	.948	1.24 (0.94)	1.29 (0.92)	0.53	.599	−.03	.525
Eyeballing alcohol	1.44 (1.09)	1.26 (1.01)	1.97	.049	1.34 (1.08)	1.26 (0.95)	−0.97	.331	1.30 (1.04)	1.34 (1.03)	0.33	.739	−.04	.275
Eating powdered alcohol	2.32 (1.78)	1.88 (1.53)	2.99	.003	2.14 (1.66)	1.86 (1.56)	−2.22	.027	2.09 (1.67)	1.74 (1.42)	−2.49	.013	−.01	.820
Snorting powdered alcohol	1.72 (1.25)	1.60 (1.35)	1.11	.266	1.73 (1.41)	1.53 (1.21)	−2.03	.043	1.68 (1.35)	1.47 (1.21)	−1.77	.077	−.04	.270

Note. Data are from Study 2. Abst. = Abstainer. Participant sex analyses dropped the category of “questioning” due to small cell size. Similarly, because a series of ANOVAs revealed no significant differences across all races, race analyses presented here collapsed across minority categories to increase cell size and associated power. Drinker status was on the basis of the past 30 days. All correlations presented are for the variable listed with age.