HHS Public Access

Author manuscript

Emerg Adulthood. Author manuscript; available in PMC 2022 October 01.

Published in final edited form as:

Emerg Adulthood. 2021 October ; 9(5): 531–540. doi:10.1177/2167696820986742.

Changes in college student alcohol use during the COVID-19 pandemic: Are perceived drinking norms still relevant?

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Abstract

With widespread concern for increased alcohol use during the COVID-19 pandemic, there is a pressing need to examine changes in young adults' alcohol use and to identify antecedents of increased use. We tested the hypothesis that self-reported changes in alcohol use during the pandemic (frequency, quantity, heavy episodic drinking) would relate to perceptions of peers' changes in alcohol use. In April of 2020, 507 college students self-reported changes in their alcohol use and perceived changes in use for typical students at their university (i.e., norms). Most students in our sample reported decreased alcohol use and perceived decreases in peers' alcohol use. Perceptions of peers' changes in alcohol use behavior strongly related to changes in students' own alcohol use. Findings provide strong support for norms-based strategies that can correct normative misperceptions by highlighting the fact that most college students are not in fact engaging in heavier alcohol use during the COVID-19 pandemic.

Keywords

COVID-19; Social Norms; Peer Influence; Personalized Normative Feedback; Heavy Episodic Drinking

The novel Coronavirus (COVID-19) pandemic has had a tremendous impact on society. Within the United States, college students have faced notable lifestyle changes as a result of campus closures. While such physical distancing and isolation measures are critical to combating the spread of the virus, there is an urgent need to examine and understand the effects that these distressing times have had on health behaviors (Holmes et al., 2020). Notably, there is concern among alcohol researchers for increased alcohol use during the COVID-19 pandemic (Clay & Parker, 2020), and evidence that college students may be drinking more than prior to the pandemic (Charles et al., 2020; Lechner et al., 2020). Emerging evidence suggests, however, that adolescents and young adults may not be increasing their overall alcohol use, instead drinking more frequently but in lower quantities per occasion (Dumas et al., 2020; Graupensperger, Fleming, et al., 2020). The current study

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addresses the call to action for research examining pandemic-specific changes in alcohol use among college students.

Prior to restrictions related to COVID-19, alcohol use among college students was known to be prevalent and problematic, leading to many adverse health consequences (Hingson et al., 2017). It is nevertheless unclear how college student alcohol use has changed during this unique time. As campuses closed, many students may be living with their parents, which is associated with less alcohol use relative to living on or near college campuses (Patrick et al., 2020; Patrick & Terry-McElrath, 2017). Indeed, students who had easy access to alcohol and engaged in more social alcohol use prior to the pandemic, such as those in Greek fraternities and sororities (Scott-Sheldon et al., 2008), may drink less during the pandemic. Although physical distancing measures have likely led to fewer social gatherings involving alcohol use (e.g., house parties), students may have more free time while taking courses online and some may engage in more alcohol use to combat boredom and loneliness. Given that college students are a high-risk group for alcohol misuse, it is critical to examine the extent that alcohol use patterns have changed during the COVID-19 pandemic, and to identify potential risk and protective factors. Such information is needed to inform alcohol use interventions that are tailored to the unique circumstances surrounding the COVID-19 pandemic. Indeed, college students are in a critical stage for intervention as alcohol-related lifestyle habits are largely formed during early adulthood (Arria et al., 2016), meaning that increased alcohol use during the pandemic could have long-term negative effects.

The news media has highlighted recent upticks in alcohol sales and use during the COVID-19 pandemic (e.g., Bote, 2020; Bremner, 2020; Lofton, 2020; Polkavic, 2020), which may send a message to college students that alcohol use among peers and the general public has increased during this time. Media messaging can have a salient influence on young adults' substance use behaviors via social learning processes as reporting population-level increases in alcohol use portrays this behavior as normative (Jackson et al., 2018). The focus theory of normative conduct (Cialdini et al., 1990) highlights descriptive norms – perceptions of how others behave in a given situation – as a powerful influence on individuals' behaviors. Young adults are particularly susceptible to peer influences and, as such, perceived peer drinking norms play a central role in shaping college students' decisions to engage in alcohol use (Burnett et al., 2011; Teunissen et al., 2012). Perceived norms pertaining to alcohol use are indeed considered to be among the strongest influences on students' drinking (Neighbors et al., 2007; Perkins, 2002); the belief that others engage in more alcohol use than oneself, corresponds with heavier drinking patterns (Lewis et al., 2015; Litt et al., 2015).

Social norms theory (Berkowitz, 2004) acknowledges that perceptions of others' behaviors are often inaccurate, which is particularly problematic given that college students tend to *overestimate* their peers' alcohol use (Cox et al., 2019; Perkins et al., 2015). Accordingly, norms-based interventions such as personalized normative feedback (PNF) have been designed to correct over-inflated normative perceptions, which can subsequently reduce students' alcohol use (Dotson et al., 2015; Neighbors et al., 2018; Patrick et al., 2014). Largescale norm-correcting campaigns have also been shown to reduce college students' alcohol use, but only among those who believed that their peers had decreased alcohol use

following the campaign (Mattern & Neighbors, 2003). This finding indicates that changes in alcohol use behaviors are closely related to perceived changes among peers. Researchers have also found that perceived drinking norms may have within-person associations with young adults own alcohol use, such that young adults report relatively greater alcohol use at timepoints in which they perceived peers were drinking more than usual or were more approving of alcohol use than usual (Dumas et al., 2019; Graupensperger, Jaffe, et al., 2020).

There is strong theoretical support and empirical evidence of positive associations between perceived drinking norms and alcohol use, but it is unclear how event-specific changes in descriptive norms may relate to changes in college students' alcohol use behaviors. Given that peer drinking norms may be a key antecedent for college students' drinking during COVID-19, there is a clear rationale for examining potential influences of perceived norms regarding changes in peers' alcohol use during the COVID-19 pandemic. Establishing a link between perceived changes in drinking norms and changes in individuals' alcohol use specifically during this time of physical distancing is a logical next step toward developing COVID-19-specific harm-reduction interventions.

Current Study

The current study entailed a cross-sectional design in which data were collected during the first month of mitigation strategies for the COVID-19 pandemic. We examined college students' reports of how their alcohol use, as well as the alcohol use of typical students at their university (i.e., perceived norms), have changed in terms of frequency, quantity, and heavy episodic drinking behaviors (i.e., 4+ drinks per occasion for women / 5+ drinks per occasion for men). The first aim was to descriptively examine the extent to which college students reported increasing/decreasing alcohol use, relative to before the pandemic. Although we anticipated that students, on average, may increase alcohol use during this time (Charles et al., 2020; Lechner et al., 2020), we also expected heterogeneity in these self-reported changes in students' drinking patterns. Related to this first aim, we explored whether changes in alcohol use behaviors differed for students who reported living with their parents during the pandemic, and whether changes differed by Greek status (i.e., those in fraternity/sorority groups). The second aim of this study was to descriptively examine perceptions of peers' drinking changes during the COVID-19 pandemic. Due in part to media reports of increased alcohol use, we anticipated that students would hold over-inflated perceptions regarding increases in peers' alcohol use. Finally, the primary aim of this research was to examine the extent to which changes in students' own alcohol use behaviors were associated with perceived changes in peer drinking norms. We hypothesized that perceptions of peers' changes in alcohol use would be positively associated with changes in participants' own alcohol use, even after controlling for relevant covariates regarding demographics (age, birth sex, living with parents) and typical alcohol use. Findings from this research will inform the timely development of a PNF intervention that is specific to normative influences on young adults' alcohol use during the COVID-19 pandemic.

Method

Procedure and participants

In April of 2020, just over a month after local campus closures and shelter-in-place orders, we sent e-mail invitations to 1,603 randomly selected first, second, and third-year undergraduates from a large public university on the west coast to participate in a web-based survey. This survey served as a screener for enrollment into an ongoing alcohol use intervention study and was adapted to include items specific to alcohol use behaviors during COVID-19. Participation in this survey was incentivized by a $10 gift card and complete responses were received from 507 students (31.63% response rate; 65.48% women; M_{age} = 18.90 ± 0.93). The sample comprised 35.31% first-year students, 41.42% second-year students, and 22.88% third-year students. Most of the sample reported living at home with their parents during the COVID-19 pandemic (63.71%), which is much higher than reported in previous studies from this specific university (i.e., 10.95% and 13.90% reported living at home with parents in Lee et al., 2020 and Larimer et al., 2009, respectively). We can thus infer that most of the students who reported living with parents during the pandemic had moved back in from their usual college living arrangement (e.g., dorms). Others in the sample reported living in campus residence halls (9.07%), in fraternity/sorority housing (6.11%), in off-campus housing (19.53%), and other (1.58%). Approximately a quarter of the sample (23.67%) reported being affiliated with a Greek organization, which is slightly oversampled in relation to the university website that estimates approximately 15% of undergraduates are in a Greek organization. Pertaining to race, 46.35% of the sample identified as White/Caucasian, 37.48% identified as Asian/Asian-American, 8.48% identified as mixed-race, 2.37% identified as African American, and 5.32% identified as another race. Moreover, 9.47% identified as ethnically Hispanic. All study procedures received approval from the authors' Institutional Review Board.

Measures

Alongside standard demographic items, six items were created to examine students' self-reported changes in alcohol use and perceptions of peers' changes in alcohol use. Three items asked participants to report changes in their alcohol use: *Compared to before COVID-19, the*: (1) *Frequency of my drinking (how often I drink alcohol) has been…* (2) *Amount I drink on each drinking occasion has been…* (3) *Number of occasions on which I have had 4*+(women)/5+(men) *drinks has been…* Response options were 1 (*a lot less*), 2 (*less*), 3 (*the same*), 4 (*more*) and 5 (*a lot more*). Using the same response options, three similar items assessed participants' perceptions of how peers' alcohol use has changed during the pandemic: *Compared to before COVID-19, the*: (1) *Frequency of drinking for the typical [University Name] student (how often they drink alcohol) has been…* (2) *Amount the typical [University Name] student drinks on each drinking occasion has been…* (3) *Number of occasions on which the typical [University Name] student has had 4*+(women)/*5*+(men) *drinks has been…* We also assessed the typical number of drinks that participants consumed in a given week during the last 30 days (during-COVID) using the Daily Drinking Questionnaire (DDQ) (Collins et al., 1985). This instrument asks participants to report the number of drinks they typically consumed on each day of a typical week in the past 30 days, and values are summed to create an index of typical weekly alcohol consumption.

Analysis

As a first step, response frequencies were examined for each item pertaining to changes in drinking and perceived changes in peers' drinking. Bivariate correlations were estimated among study variables. Spearman's rank-order correlations were computed for associations between the change in alcohol use and perceived change in drinking norms variables, whereas Kendall's rank correlation was computed to estimated correlations between ranked change variables and other study variables. Next, separate multiple regression models were estimated predicting the three measures of change in respondents' drinking. These models were specified as multivariable ordinal logistic regression models (sometimes referred to as cumulative probability models) to match the ordinal response options, and the proportional odds assumption was tested for each independent variable. Because this assumption is often violated in practice, researchers can instead use generalized ordinal logistic regression (i.e., partial proportional odds models) that can be used to restrict or control the distance between consecutive thresholds between ordinal response options (Williams, 2016).

The independent variable of interest was participants' perceptions of peers' changes in the drinking behavior being predicted in the respective model. For example, the model predicting participants' changes in heavy episodic drinking occasions featured perceptions of peers' changes in heavy episodic drinking occasions as the independent variable. Age, birth sex, whether participants were living at home with their parents, Greek status, and typical number of weekly drinks were entered as covariates in all models. Students who reported not living with their parents during the pandemic were collapsed to enable contrasting living with parents vs. not living with parents, as there were not enough students reporting other living arrangements to make specific comparisons (e.g., living on-campus).

Results

Descriptive statistics and bivariate correlations are presented in Table 1. Student reports of typical number of drinks per week during the COVID-19 pandemic were generally lower than anticipated. Only 10.38% of men reported consuming 14 drinks or more per week, and only 16.72% of women reported consuming 7 drinks or more per week (i.e., 14 drinks per week for men and 7 drinks per week for women are the recommended upper limits for low-risk alcohol use consumption suggested by the National Institute of Alcohol Abuse and Alcoholism (NIAAA). Moreover, students living at home during the pandemic reported significantly lower weekly alcohol use ($M_{\text{drinks}} = 2.45$) relative to those living in fraternity/sorority housing ($M_{\text{drinks}} = 12.70$, $p < .001$), but not significantly lower than those in on-campus housing ($M_{\text{drinks}} = 2.73$, $p = .99$) or in off-campus housing ($M_{\text{drinks}} = 3.34$, $p = .61$).

Mean values for participants' reported changes in alcohol use and perceptions of peers' changes were all below the scale midpoint, indicating that most participants in this sample reported drinking less alcohol during the COVID-19 pandemic and reported perceptions that peers were also engaging in less alcohol use, on average. There was nevertheless variability in these perceptions: some participants reported increased alcohol use and many perceived peers to have increased alcohol use (a visual display of the frequencies is shown in Figure 1). The frequencies listed in Table 1 also suggest that participants may hold over-inflated

misperceptions pertaining to whether peers who have increased alcohol use during the pandemic, with 19.96% to 28.21% perceiving an increase in use, compared to only 2.67% to 10.45% reporting increases in personal alcohol use (depending on the specific outcome).

For each discrete form of alcohol use behavior, there were moderate positive correlations between self-reported changes and perceived changes among peers. Significant negative correlations indicated that college students living at home with their parents during the pandemic were more likely to have decreased their alcohol use frequency, and more likely to have perceived decreases in peers' drinking frequency and heavy episodic drinking. Moreover, students living at home with parents reported less weekly alcohol use (i.e., typical number of drinks per week) during the pandemic. Greek-affiliated students were more likely to have decreased their alcohol use across all three indicators and were more likely to have perceived decreases in peers' alcohol use, but still reported more weekly drinks during the pandemic, relative to non-Greek-affiliated students.

Pertaining to the multivariable ordinal regression models, a preliminary check of the proportional odds assumption revealed that the weekly drinking variable (DDQ) violated this assumption in all three models, likely given the large variability in participants' weekly alcohol consumption (SD = 5.43). As such, we employed a generalized ordinal regression approach and specified an 'equidistant' threshold, which restricts the distance between consecutive response options to be equally spaced (Christensen, 2018).[1] The resulting models met the assumption of proportional odds for all covariates, indicating that the coefficients for each predictor value are consistent, or have parallel slopes, across each level of the outcome variable.

The results from the generalized ordinal logistic regression models are presented in Table 2. Changes in alcohol use behaviors during the COVID-19 pandemic were not associated with age, sex, living with parents, or number of drinks students consumed in a typical week during the pandemic. Strong negative associations indicated that Greek-affiliated students reported decreasing all three indices of alcohol use to a greater extent than those who did not report a Greek affiliation. Perceived changes in peer drinking norms were positively associated with participants' own changes in alcohol use behaviors. This effect held across changes in (a) frequency of alcohol use (β = .72), (b) quantity of alcohol use per occasion (β = .69), and (c) the number of heavy episodic drinking occasions (β = .62). The adjusted odds ratios of these effects were around 2 (i.e., 2.06, 1.99, and 1.86), indicating that a one-unit increase in category of perceived change in peers' alcohol use (e.g., '*a lot more*' vs. '*more*') doubled or nearly doubled the odds of being in a higher category of self-reported change in alcohol use.

Discussion

Despite being a high-risk population for alcohol use, descriptive findings from this study suggest that college students, on average, reported decreased alcohol use during the initial

[1]Models estimated using ordinal logistic regression were nearly identical to those using generalized ordinal logistic regression, but the latter approach is warranted given minor violation of the proportional odds assumption.

weeks of the COVID-19 pandemic. In fact, many students reported drinking '*a lot less*' during this time. There was nevertheless heterogeneity indicating that some students are indeed engaging in more alcohol use, relative to before the COVID-19 pandemic. Furthermore, decreased use on average may not mean safe or non-problematic levels of alcohol use for everyone, as 10.38% of men and 16.72% of women reported drinking at levels above NIAAA recommendations. Students generally perceived decreases in peers' alcohol use, but many also indicted that they thought peers have increased their alcohol use during the pandemic, which represent a potentially at-risk subgroup of college students.

In support of the primary study hypothesis, perceptions of peers' changes in alcohol use behavior were strongly associated with self-reported changes in students' own alcohol use and this association held across several indices: alcohol use frequency, quantity of alcohol use during a drinking occasion, and heavy episodic drinking. This robust positive association between college students' changes in alcohol use behaviors and perceptions of changes in peer drinking norms also held after controlling for demographic covariates and typical alcohol use. While this shows that those who perceived peers as having increased alcohol use may be at risk for increasing their own alcohol use, it also follows that those who believe their peers have *decreased* their alcohol use may be more likely to have decreased their own use. These findings build on prior literature detailing strong associations between behaviors and perceived norms (Neighbors et al., 2007; Perkins, 2002), and suggest that these associations may persist even in the context of physical distancing, when most students are no longer located on or near campus. Given evidence that drinking norms for proximal referents (e.g., close friends) may be a stronger predictor of students' alcohol use than distal referents (e.g., typical university students), an important future direction is to examine students' perceptions of how their close friends' alcohol use may have changed during the pandemic (Neighbors et al., 2008). These proximal norms may be particularly salient while students are engaging in physical distancing as they are likely only keeping in touch with closer friends and having less exposure to other students on campus.

Alongside the pressing need to examine health-risk behaviors during the COVID-19 pandemic (Holmes et al., 2020), the current study makes novel theoretical and practical contributions to our understanding of normative influences and how they can be employed within harm-reduction strategies. Findings revealed that although most students perceived a decrease in peers' use, a number of students (20-28%) thought that peers had increased their alcohol use during the pandemic, whereas self-report data showed that in fact very few students (3-10%) reported having increased their alcohol use. Considering that young adults may hold overinflated normative perceptions pertaining to the extent that peers have increased alcohol use, norms-based interventions must be rapidly adapted to address high-risk drinking during the COVID-19 pandemic. Because there was a subset of college students who reported increased alcohol use and held normative perceptions that peers have increased their alcohol use, PNF strategies that correct normative misperceptions may be particularly valuable for this at-risk subset of students who hold misperceptions that peers have increased their alcohol use.

Whereas we have strong theoretical and empirical support that perceived norms predict one's own behavior at a static-level (Cialdini et al., 1990; Neighbors et al., 2007; Perkins,

2002), these novel findings extend this association to behavioral *changes* around a specific event. Alongside perceptions of what others typically do, people may be particularly motivated to change their behavior if they believe that others are changing their behavior as well (Sparkman & Walton, 2019). Although additional translational studies are needed, there may be value in tailoring norms-based approaches to include normative information regarding peers' *reductions* in alcohol use, which aligns with findings that norm-correcting campaigns may only work for those who believe others are reducing their alcohol use as well (Mattern & Neighbors, 2003). Additional research is therefore needed to test whether change-specific norms are comparable to, or even more influential than static norms.

Finally, it is important to consider the unique impact of campus closures on students' alcohol use behaviors. Many college students are not able to legally purchase alcohol and, as such, students may have had greater access to alcohol prior to COVID-19 when living on or near campus (e.g., house parties). This may explain why Greek-affiliated students, who tend to drink more than non-Greek-affiliated students, reported greater decreases in alcohol use. That is, because Greek-affiliation is strongly associated with heavy alcohol use, Greek-affiliated students in our sample had more room to decrease. Interestingly, however, the Greek-affiliated students still reported engaging in more weekly alcohol use relative to their non-Greek peers.

We also included an indicator of students' current living situation to examine the potential effects of living at home with parents. Bivariate associations indeed revealed that those who lived with their parents during the pandemic engaged in lower levels of alcohol use, but the regression models indicated that there were no statistically significant effects of living situation on changes in students' alcohol use behaviors after accounting for change-related norms, typical drinking, age, and birth sex. However, it is important to note that we only asked about current living situation, whereas specifically asking if students had *moved back in* with parents may have enabled deeper exploration of how living with parents relates to student alcohol use during the COVID-19 pandemic. An additional next step would be to examine parental permissiveness as this factor could play an important role in terms of accessibility to alcohol while living at home.

Limitations

Despite the timeliness of this research, several limitations should be considered. Although there was a strong theoretical rationale for examining norms as a predictor of behavior, our cross-sectional design precludes making causal inferences or assessing the direction of these effects. It is indeed possible that students who have increased their drinking during the pandemic assume that their peers must also be engaging in increased use, for example. Also related to the cross-sectional design, we had no access to students' level of alcohol use prior to the pandemic, which would have allowed us to confirm self-reported changes in alcohol use. Changes in drinking during the pandemic is an emerging area of study, and although the current study focused on normative influences as one of the most robust predictors of college students' alcohol use (Neighbors et al., 2007), additional antecedents should be studied in future research. For example, some students may be facing more extreme distress during this time, which could potentially moderate associations between perceived changes in norms

and changes in alcohol use behavior. We also note that the response rate for the current study (31.63%) was relatively low, likely due to random invitation via e-mail and modest incentive ($10 gift card). Also, circumstances regarding the COVID-19 pandemic may have contributed to the low response rate (e.g., students receiving many e-mails from university administration). Non-response bias may be a concern for all COVID-19 research studies. Although participation in college student surveys has declined over recent decades, low response rates do not necessarily bias the results of survey-based studies (Fosnacht et al., 2017). Because the data were collected from a single U.S. university, additional studies are needed to assess the extent to which these findings generalize. A final consideration is that these data were collected roughly one month following campus closures and shelter-in-place orders, which may provide only an initial glimpse at how the early stages of the pandemic impacted students' alcohol use and other health behaviors. As the pandemic is ongoing, continuing to monitor changes in students' health behaviors is crucial.

Conclusion

Despite concerns of increases in alcohol use, the average college student in the current study self-reported decreases in alcohol use behavior since the COVID-19 pandemic began. Building on prior theoretical and empirical research demonstrating normative perceptions as a predictor of behavior, normative perceptions of changes in drinking for a typical college student were associated with personal changes in drinking. These findings highlight the importance of normative perceptions for drinking behavior in college students, even while students are physically distanced from campus and peers. Although norms and personal drinking were strongly associated on average, a sizable number of students may have overestimated their peers' drinking during the pandemic, indicating a need for norm-correcting interventions (e.g., PNF) to further reduce alcohol-related harm. Such strategies may be especially important for those students who may have increased their own alcohol use in response to normative influences (i.e., thinking that the typical university student has increased drinking).

Certainly, when campuses return to "normal" with fully occupied residence halls, fraternities, sororities, and off-campus houses, it will be equally important to assess behavior related to alcohol use and for campuses to have a prevention plan in place. For students who were drinking heavily prior to the pandemic and experienced a reduction in tolerance to alcohol, resuming drinking the way they did before schools closed could pose increased risk for harmful outcomes. For students who historically report alcohol use to manage social anxiety or social awkwardness, the reality of having had limited face-to-face interaction with peers for months could lead to excessive use upon a return to social gatherings. Moreover, those who experienced increased distress during the pandemic (and who reported increased substance use in response to unwanted affect), providing access to support services upon a return to campus will be essential. Additional research to understand college student alcohol use patterns and predictors during the COVID-19 pandemic is nevertheless critical to further reduce health-risk behavior during these challenging times, as will be researching possible changes once the pandemic is behind us.

Acknowledgements:

This research was funded by the National Institute on Alcohol Abuse and Alcoholism (R01AA012547, R37AA012547, and T32AA007455). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

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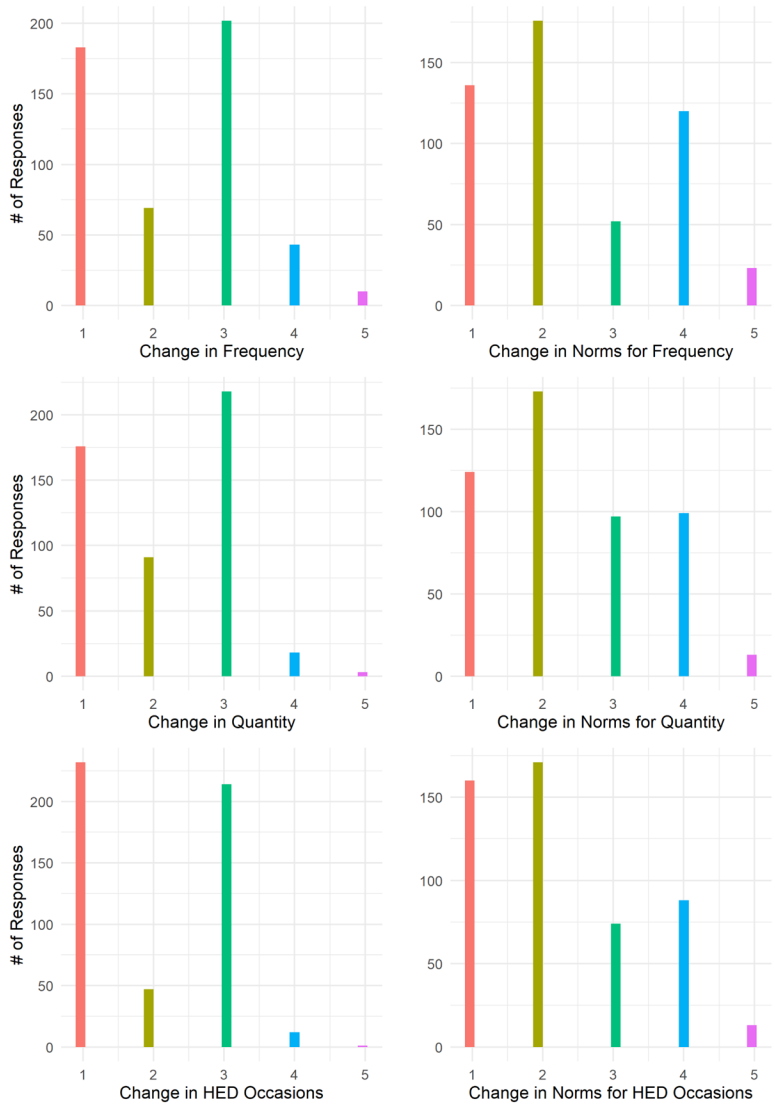

Figure 1.

Histograms displaying the frequencies of responses to changes in alcohol use and perceived changes in descriptive norms. HED = Heavy episodic drinking. 1 = *A lot less*, 2 = *Less*, 3 = *The same amount*, 4 = *More*, 5 = *A lot more*.

Table 1.

Bivariate correlations and descriptive statistics for variables (N = 507).

	1	2	3	4	5	6	7	8	9	10
1. Change in Alcohol Use Frequency										
2. Change in Number of Drinks per Occasion	.79**									
3. Change in Heavy Episodic Drinking Occasions	.70**	.80**								
4. Norms for Peers' Change in Alcohol Use Frequency	**.47** **	.38**	.36**							
5. Norms for Peers' Change in Number of Drinks per Occasion	.39**	**.42** **	.36**	.82**						
6. Norms for Peers' Change in Heavy Episodic Drinking Occasions	.34**	.34**	**.36** **	.81**	.83**					
7. Typical Number of Drinks in a Week (DDQ)	−.06	−.11**	−.16**	−.13**	−.11*	−.10*				
8. Age	.06	.03	−.01	.06	.05	.04	.08			
9. Birth Sex (M = 0; F = 1)	−.01	−.07	−.03	−.06	−.04	−.09*	−.08	−.02		
10. Living with Parents (No = 0; Yes = 1)	−.09*	−.06	−.04	−.11*	−.06	−.10*	−.18**	−.25**	−.01	
11. Greek Affiliation (No = 0; Yes = 1)	−.24**	−.24**	−.20**	−.20**	−.20**	−.15**	.28**	.11*	.07	−.05
Mean	2.27	2.17	2.02	2.44	2.42	2.25	3.20	18.90	-	-
SD	1.10	0.97	1.01	1.24	1.13	1.15	5.43	0.93	-	-
Range	1 – 5	1 – 5	1 – 5	1 – 5	1 – 5	1 – 5	0 – 34	18 – 23	-	-
Frequencies of Response Options (%)										
1. A lot less	183 (36.09)	176 (34.78)	232 (45.85)	136 (26.82)	124 (24.51)	160 (31.62)				
2. Less	69 (13.61)	91 (17.98)	47 (9.29)	176 (34.71)	173 (34.19)	171 (33.79)				
3. The same	202 (39.84)	218 (43.08)	214 (42.29)	52 (10.26)	97 (19.17)	74 (14.62)				
4. More	43 (8.48)	18 (3.56)	12 (2.47)	120 (23.67)	99 (19.57)	88 (17.39)				
5. A lot more	10 (1.97)	3 (0.59)	1 (0.20)	23 (4.54)	13 (2.57)	13 (2.57)				

Note: Bivariate associations among change in alcohol use and perceived change in drinking norms variables were calculated using Spearman's rank-order correlations, and associations between ranked change variables and other study variables were calculated using Kendall's rank correlation. Bolded cells shaded grey show correlations between individual change and norms for peers' change in corresponding alcohol use behaviors.

* $p < .05$.

** $p < .01$.

Table 2.

Multivariable generalized ordinal logistic regression models estimating associations between changes in alcohol use behaviors and perceived changes in peers' alcohol use behaviors (N = 507).

	Change in Alcohol Use Frequency				Change in Amount of Alcohol Use per Occasion				Change in Heavy Episodic Drinking Occasions			
Independent Variables	***β***	***SE***	***OR***	**95% CI**	***β***	***SE***	***OR***	**95% CI**	***β***	***SE***	***OR***	**95% CI**
Age	.03	.09	1.03	(0.86, 1.23)	.03	.09	1.03	(0.86, 1.24)	−.01	.09	0.99	(0.82, 1.19)
Birth Sex (M = 0, F = 1)	.05	.13	1.05	(0.82, 1.36)	−.05	.13	0.95	(0.73, 1.22)	.11	.13	1.12	(0.85, 1.44)
Living with Parents (No = 0, Yes = 1)	−.23	.18	0.79	(0.56, 1.13)	−.21	.18	0.81	(0.57, 1.16)	−.06	.18	0.95	(0.66, 1.36)
Greek Affiliation (No = 0; Yes = 1)	−.91***	.23	0.40	(0.26, 0.62)	−.86***	.22	0.42	(0.27, 0.65)	−.82***	.23	0.44	(0.28, 0.69)
Typical Number of Weekly Drinks (DDQ)	.02	.02	1.02	(0.98, 1.05)	.01	.02	1.01	(0.97, 1.04)	.01	.02	1.01	(0.98, 1.05)
Perceived Norm for Peers' Change in Drinking Behavior†	.72***	.08	2.06	(1.78, 2.40)	.69***	.08	1.99	(1.70, 2.34)	.62***	.08	1.86	(1.59, 2.17)
Threshold Coefficients (specified to be 'equidistan')												
First Threshold	1.02	1.75			0.82	1.78			0.62	1.84		
Spacing of Consecutive Thresholds	1.54	0.08			1.75	0.09			1.43	0.08		
Nagelkerke Pseudo-R^2	.29				.24				.17			

Note:

†The perceived norm variable in each model refers to perceptions of peers' changes for the behavior that is being predicted. ***β*** = Logistic regression coefficient. ***SE*** = Standard error. ***OR*** = Proportional odds ratio – for every one-unit increase in the independent variable, the odds of increasing one's alcohol use behavior is multiplied by the OR value, holding constant all other variables.

*$p < .05$.

**$p < .01$.

***$p < 0.001$.