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Implicit and explicit drinking identity predict latent classes that differ on the basis of college students' drinking behaviors

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Abstract

Background—The purpose of this study was to identify distinct classes of college students on the basis of recent and past drinking behaviors and evaluate how implicit and explicit measures of drinking identity predict membership in these classes.

Methods—US undergraduate students (N = 456) completed online implicit (Implicit Association Test) and explicit (self-report) measures of drinking identity and assessments of drinking behaviors, including past month drinking, at-risk drinking in the past year, and lifetime history of intoxication. Latent class analysis (LCA) was used to identify classes of college students based on their drinking behaviors.

Results—LCA identified five classes: (1) Lifetime Nondrinker, (2) Recent Nondrinker/Past Risk, (3) Light Drinker, (4) Moderate Drinker, and (5) Heavy Drinker. Overall, stronger implicit and explicit drinking identities were uniquely associated with greater odds of belonging to classes with greater alcohol consumption and related consequences relative to those classes characterized by lower alcohol consumption and consequences. Notably, explicit drinking identity was positively associated with odds of membership to the Recent Nondrinker/Past Risk class relative to the Lifetime Nondrinker and Light Drinker classes, and implicit and explicit drinking identities were positively associated with odds of membership to the Heavy Drinker class relative to all other classes.

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Contributors

JJR conceived the manuscript's primary aims, analyzed data, and drafted the manuscript. AMF analyzed data, assisted with interpretation of the results, and contributed to drafting the manuscript. CCO contributed to drafting the manuscript. KPL conceived the overall study design, oversaw data collection, and contributed to drafting of the manuscript. All authors read and approved the final manuscript.

Conflict of Interest

None.

Conclusions—Findings suggest that drinking identity is sensitive to risky drinking experiences in the past, is especially strong among the highest-risk group of college student drinkers, and may be an important cognitive factor to consider as a target for intervention.

Keywords

Alcohol use; Drinking identity; College student drinking; Implicit association test; Latent class analysis

1. Introduction

U.S. college students exhibit high rates of alcohol consumption and heavy episodic drinking (4+/5+ drinks per occasion for women/men; Substance Abuse and Mental Health Services Administration, 2014). Nearly 60% of college students in a national survey reported alcohol consumption in the past month, and of those, almost two-thirds reported heavy episodic drinking (SAMSHA, 2014). A number of cognitive factors, including factors related to identification with drinking, have been demonstrated as predictors of problematic drinking (Lindgren et al., 2016a). To date, most research uses variable-centered approaches to examine which factors are associated with alcohol consumption and consequences. However, person-centered approaches allow for evaluation of whether cognitive factors vary across classes of students that differ on the basis of their *patterns* of drinking behaviors. Person-centered approaches can, thus, evaluate whether cognitive factors differentiate between very dissimilar classes (e.g., nondrinkers vs. heavy drinkers) and seemingly similar classes (e.g., nondrinkers with and without past negative alcohol-related consequences). This study, therefore, takes a person-centered approach to evaluate whether drinking identity can distinguish between different classes of college students based on history of alcohol use.

Latent class analysis (LCA) is a person-centered statistical method that allows for the identification of classes of individuals with distinct patterns of responses on a set of measures, in this case behavioral measures of drinking. LCA is a valuable method for differentiating college students given the considerable heterogeneity in drinking behavior that exists in this population. Previous LCA studies that included both college student drinkers and non-drinkers have typically found four or five classes that range from no drinking or light drinking to heavy drinking (Cleveland et al., 2012; Fairlie et al., 2016; O'Connor and Colder, 2005). To date however, many LCA studies that classify college students on the basis of their drinking behaviors also include measures of other substance use behaviors (Chiauzzi et al., 2013; Cho et al., 2015) or exclude non-drinkers (Beseler et al., 2012; Ray et al., 2012). In the current study, we sought to identify classes of college students across a broad range of drinking behaviors (e.g., peak consumption, typical consumption, problems). We also included indicators across a range of timeframes (e.g., past month drinking vs. lifetime history of intoxication), to allow for possible latent classes to emerge on the basis of recent and past drinking behavior. By including a wider range of behaviors and timeframes associated with the drinking behaviors, we could better characterize the variability among college students, recognizing that some students may drink infrequently, consume smaller amounts of alcohol, or change behavior over time.

There has been relatively limited research examining psychological and cognitive factors as predictors of different classes of college student drinkers (for exceptions, see O'Connor and Colder, 2005; Fairlie et al., 2016). One promising cognitive factor that may differentiate such classes is *drinking identity*, or the extent to which individuals associate drinking with themselves. Drinking identity may be measured explicitly via self-report questionnaires (see Lindgren et al. 2013b), which are based on hierarchical models of the self that recognize many domains within the self that are available for introspection (Corte et al., 2016; Lindgren et al., 2016a). Identification as a drinker would represent one possible domain. Drinking identity is also measured implicitly by variants of the Implicit Association Test (IAT, Greenwald et al., 1998), which assess the relative strength of associations between constructs held in memory (i.e., associations with drinking and the self, see Lindgren et al., 2013b). Implicit measures are based on associative models of the self, and therefore assess the extent to which drinker is associated with, but not necessarily part of, the self. Implicit and explicit identity are uniquely, positively associated with college students' alcohol consumption, related problems, and craving in cross-sectional (Lindgren et al., 2013a, 2013b) and longitudinal studies (Lindgren et al., 2016b).

We know of only one study that has examined drinking identity using person-centered approaches; findings showed that college students' explicit drinking identities were positively associated with membership in classes with more versus less severe alcohol use disorders (Rinker and Neighbors, 2015). Although an important step forward, it remains unknown as to whether drinking identity can distinguish between classes that differ across a wide range of drinking behaviors. Thus, the primary aims of this study were to 1) identify latent classes of college students that differ based on recent and past alcohol use behavior, and 2) determine whether explicit and implicit measures of drinking identity differentially predict membership to these classes. In analyses, we controlled for sex, given well-documented differences in drinking behavior between college men and women (Johnston et al., 2016). We also controlled for Greek status (i.e., membership to a college fraternity or sorority), which has been demonstrated as a robust predictor of alcohol misuse among US college students (Capone et al., 2007). We made no predictions regarding the exact nature and number of classes, although we expected alcohol consumption and problem measures to coalesce, such that there would be a class of heavier drinkers likely to report related problems and a class of nondrinkers likely to report no problems. We hypothesized that both implicit and explicit drinking identity would uniquely predict class membership, such that stronger drinking identities would be associated with greater odds of belonging to classes that report heavier drinking and related problems.

2. Material and methods

2.1. Participants

The data in the current study come from the baseline assessment of a longitudinal study with 506 full-time first- or second-year students (ages 18–20 years) at a large public university in the Pacific Northwest (Lindgren et al., 2016b). Twenty-one participants did not complete all measures used as covariates and were excluded from analyses. Twenty-nine additional participants were excluded based on data screening criteria for IAT studies (Nosek et al.,

2007), leaving 456 participants (58% female, $M_{age} = 18.55$, $SD = .66$ years) for analyses. Twenty percent of these participants were members of the campus Greek system. Fifty-three percent identified as White, 30% as Asian, 11% as multiracial, and 6% as Black or African American, American Indian, unknown or declined to answer. Eight percent of participants identified as Hispanic or Latino.

2.2. Procedures

The university's registrar's office randomly selected and provided contact information for 1400 full-time, first- or second-year students (no stratification based on demographics). Students were recruited for the study via email; enrollment closed after reaching the target N of at least 500 students enrolled into the study. The goal for the study was to enroll participants who largely reflected the demographics of the campus as well as the proportion of drinkers and non-drinkers among first- and second-year students, and this goal was met. Eligible participants who completed informed consent procedures then completed the 50-minute online assessment. Participants received \$25 for completing the assessment. The university's Institutional Review Board approved all procedures.

2.3. Measures

2.3.1. Drinker status indicators—Past month alcohol consumption was assessed with the 5-item quantity/frequency scale (Baer, 1993; Marlatt et al., 1995). We recoded three items as categorical variables: peak alcohol consumption, typical weekend alcohol consumption, and frequency of alcohol consumption in the past month. Peak drinking (i.e., "Think of the occasion you drank the most this past month. How much did you drink?") was coded as 1 (*none*), 2 (*light: 1–3 standard drinks for women, 1–4 drinks for men*), 3 (*heavy: 4–7 drinks for women, 5–9 drinks for men*), and 4 (*high-intensity: 8+ drinks for women, 10+ drinks for men*; Patrick, 2016). Typical consumption on a weekend (i.e., "On a given weekend evening during the past month, how much alcohol did you typically drink?") was coded as 1 (*none*), 2 (*light: 1–3 drinks for women, 1–4 drinks for men*), and 3 (*heavy: 4+ drinks for women, 5+ drinks for men*); and frequency of consumption (i.e., "How many days of the week did you consume alcohol in the past month?") was coded as 1 (*none*), 2 (*less than weekly*), and 3 (*weekly or more*).

At-risk drinking and symptoms of dependence and consequences in the previous 12 months were assessed using the 10-item Alcohol Use Disorder Identification Test (AUDIT; Babor et al., 2001). Items were recoded into two categorical variables that reflect previous research demonstrating a two-factor structure among college students (DeMartini and Carey, 2012): First, at-risk drinking was represented by summing items 1–3 (AUDIT-C, $\alpha = .83$), which was then categorized as 1 (*no drinking: summary score = 0*), 2 (*low-risk drinking: summary score of 1–4 for women, 1–6 for men*), and 3 (*high-risk drinking: summary score 5 for women; 7 for men*, DeMartini and Carey, 2012). Second, a sum score of dependence and harmful consequences was calculated from items 4–10 ($\alpha = .78$), which was then dichotomized and coded as 1 (*no endorsement of dependence or harmful consequences, score = 0*) and 2 (*any endorsement of dependence or harmful consequence, score = 1*).

Lifetime history of intoxication was assessed with one item from the Brief Drinker Profile (Miller and Marlatt, 1984). Participants reported the age at which they were first intoxicated, including the option to report having never been intoxicated. This item was coded as 1 (*never been intoxicated*) or 2 (*have been intoxicated at least once*).

2.3.2. Predictors of latent classes—Four predictors of the latent classes were used in analyses, including sex, coded as 0 (*male*) and 1 (*female*), and Greek status coded as 0 (*not a member of fraternity/sorority*) and 1 (*member of fraternity/sorority*).

Implicit drinking identity was assessed using a variation of the IAT (Greenwald et al., 1998), a computerized reaction time measure that assesses the strength of participants' associations between sets of concepts, referred to as target and attribute categories. For the drinking identity IAT (Lindgren et al., 2013b), two target categories refer to identity ("me" and "not me") and two attribute categories refer to drinking ("drinker" and "nondrinker"). This IAT uses a traditional seven-block structure (Blocks 4 and 7 have 40 trials; the remaining blocks have 20 trials). In each trial, participants see a single stimulus at the center of the screen. They are required to classify the stimulus as quickly as possible according to the categories listed on the left or right side of the screen using two keys on the keyboard, "e" for left and "r" for right. The drinking identity IAT stimuli are words that represent those categories, including *drinker*: drinker, partier, drunk, drink; *nondrinker*: nondrinker, abstainer, sober, abstain; *me*: me, my, mine, self; and *not me*: they, them, theirs, other (category labels are italicized). Blocks 1, 2, and 5 are practice blocks, which require participants to classify stimuli representing two categories. Blocks 3, 4, 6, and 7 require participants to classify stimuli representing all four categories. For example, Blocks 3 and 4 might pair "me" and "drinker" on the left side of the screen and pair "not me" and "nondrinker" on the right side. In Blocks 6 and 7, the pairs would be reversed, requiring participants to classify "me" and "nondrinker" on the left side of the screen and "not me" and "drinker" on the right side. Faster responses to "me" and "drinker" (and "not me" and "nondrinker") compared to "me" and "nondrinker" (and "not me" and "drinker") indicate a stronger association between oneself and drinking, hence a stronger drinking identity.

IAT scores were calculated using the D score algorithm (Greenwald et al., 2003) and indicate the standardized difference in average response time across pairing conditions. Higher scores indicate stronger "me-drinker" associations (i.e., a stronger drinking identity). D-scores were standardized for the purposes of analyses. Order effects were accounted for by counterbalancing the order in which the target-attribute pairings (i.e., "me" and "drinker" vs. "me" and "nondrinker") were presented. Based on standard conventions (Greenwald et al., 2003), internal consistency for the IAT was calculated by correlating two D scores, one for blocks 3 and 6, and one for blocks 4 and 7. Internal consistencies for IATs typically range from .50 to .70 (Greenwald et al., 2003), $r = .58$ for the current study.

The 5-item Alcohol Self-Concept Scale (ASCS) evaluated explicit drinking identity (Lindgren et al., 2013b; adapted from Shadel and Mermelstein, 1996). The scale assesses participants' perceptions of the role of alcohol in their life and personality (e.g., "Drinking is part of 'who I am'"). Participants rated their agreement with each item using a 7-point scale ($-3 = \text{strongly disagree}$ and $3 = \text{strongly agree}$). Cronbach's alpha was .92. Due to

significant positive skew (see Figure 1 for full distribution), this variable was dichotomized consistent with previous studies (Lindgren et al., 2016c) as 0 (strong disagreement on all items as indicated by a mean score of -3) or 1 (anything other than strong disagreement as indicated by a mean score > -3).

2.4. Data Analysis Plan

Latent classes, formed on the basis of drinking behaviors, were identified using LCA (see Collins and Lanza, 2010). To determine the appropriate number of latent classes, we estimated LCA models with one to seven latent classes. All models were estimated using 1,000 random sets of starting values to assess model identification. Models were compared with regard to model fit indices (e.g., AIC, entropy), quality of class measurement (i.e., item-response probabilities falling closer to 1.0 or 0.0), and class separation (i.e., identification of unique and interpretable classes). To determine whether the best-fitting model violated the assumption of local independence, we assigned individuals to the class with the highest posterior probability and explored bivariate associations between indicators within each latent class. LCA with covariates was used to determine whether latent classes of drinking behaviors were associated with implicit drinking identity, explicit drinking identity, sex, and Greek status. Log-likelihood values from models with and without covariates were compared, and the chi-square distribution was used to test for significance after doubling the change in the log-likelihood values. We fit a series of models in which each latent class was used as the reference class to determine whether scores on the covariates differentiated odds of membership in the remaining four classes compared to the odds of membership in the reference class. Consequently, we obtained odds ratios and associated confidence intervals examining associations between class membership and covariates for each pairwise combination of latent classes. All LCA models were conducted using SAS PROC LCA (Version 1.3.2; University Park).

3. Results

3.1. Descriptive Results

Table 1 shows the observed proportions of students reporting each level of the drinking status indicators. The largest observed proportions often indicated no alcohol consumption, except low-risk drinking (.43) was reported more than no drinking (.34) in the past year, and having been intoxicated in one's lifetime (.55) was reported more than having never been intoxicated (.45).

3.2. LCA Model Selection

Table 2 shows model fit indices for models with one to seven latent classes. Bayesian Information Criteria and adjusted Bayesian Information Criteria fit indices suggested that a five-class solution provided the best fit. Class separation was strong with distinguishable and interpretable classes; and class measurement was generally strong (item-response probabilities were closer to 0.0 or 1.0). Further, there was greater within-class homogeneity in the five-class solution relative to the four-class solution. There was little evidence of conditional dependence between indicators within each of the five latent classes; more than

90% of the possible 75 correlations between indicators were not significant and four of the five significant correlations were $< .30$.

Students in the *Lifetime Nondrinker* class were likely to report having no history of drinking in their lifetime, including no drinking in the past month and year, no endorsement of dependence/harm consequences, and no history of intoxication (see Table 3).

Students in the *Recent Nondrinker/Past Risk* class also reported no drinking in the past month. However, they had higher probabilities of endorsing a dependence/harm consequence on the AUDIT, a history of intoxication, and low-risk drinking in the past year.

Students in the *Light Drinker* class were likely to report recent and past drinking. In the past month, they were likely to report light peak drinking (1–3 drinks for women, 1–4 drinks for men), drinking less often than weekly, and no alcohol use on a typical weekend. In the past year, students in this class were likely to report low-risk drinking with no endorsement of dependence/harm consequences on the AUDIT and no lifetime history of intoxication.

Students in the *Moderate Drinker* class were likely to report drinking less often than weekly, with light drinking (1–3 drinks for women, 1–4 drinks for men) on a typical weekend and heavy peak drinking (4–7 drinks for women, 5–9 drinks for men) in the past month. They were also more likely to endorse a dependence/harm consequence in the past year and a history of intoxication.

Students in the *Heavy Drinker* class were likely to report a peak of high-intensity drinking (8+ drinks for women, 10+ drinks for men), heavy drinking on a typical weekend (4+ drinks for women, 5+ drinks for men), and drinking weekly or more often in the past month. They were likely to report high-risk drinking and endorse a dependence/harm consequence in the past year, and endorse a history of intoxication.

3.3. Predictors of Class Membership

Next we evaluated the predictive utility of implicit and explicit drinking identity while controlling for sex and Greek status in a series of LCA models with covariates. Each model used a different class as the reference class (see Table 4), such that each unique pairwise comparison of classes could be evaluated. Explicit and implicit drinking identity and Greek status were significant predictors of overall class membership.

Relative to the *Lifetime Nondrinker* class, explicit identification with drinking was associated with greater odds of belonging to the *Recent Nondrinker/Past Risk*, *Moderate Drinker*, and *Heavy Drinker* classes. Stronger implicit drinking identities (i.e., each 1 *SD* increase) and identification as a fraternity/sorority member were associated with greater odds of belonging to the *Moderate Drinker* and *Heavy Drinker* classes relative to the *Lifetime Nondrinker* class.

Relative to the *Light Drinker* class, explicit identification with drinking was associated with greater odds of belonging to the *Recent Nondrinker/Past Risk*, *Moderate Drinker*, and *Heavy Drinker* classes. Stronger implicit drinking identities and identification as a fraternity/

sorority member were associated with greater odds of belonging to the Moderate Drinker and Heavy Drinker classes relative to the Light Drinker class.

Relative to the Recent Nondrinker/Past Risk class, explicit identification with drinking and stronger implicit drinking identities were associated with greater odds of belonging to the Heavy Drinker class. Identification as a fraternity/sorority member was associated with greater odds of belonging to the Moderate and Heavy Drinker classes relative to the Recent Nondrinker/Past Risk class.

Finally, explicit identification with drinking, stronger implicit drinking identities, and identification as a fraternity/sorority member were associated with greater odds of belonging to the Heavy Drinker class relative to the Moderate Drinker class.

4. Discussion

The current study identified classes of first- and second-year college students on the basis of drinking behavior and examined measures of drinking identity as predictors of class membership. LCA revealed five classes: Lifetime Nondrinker, Recent Nondrinker/Past Risk, Light Drinker, Moderate Drinker, and Heavy Drinker. Although the US college student experience is noted for high rates of heavy drinking (Merrill and Carey, 2016), the Lifetime Nondrinker class was the largest class (37.3%). This percentage is similar to that observed in national surveys (SAMSHA, 2014). However, in the current sample, nearly 20% belonged to the Heavy Drinker class and were likely to report high-intensity drinking in the past month and high-risk drinking (endorsement of dependence/harm consequence on the AUDIT). Moderate Drinker and Recent Nondrinker/Past Risk classes were also likely to endorse a dependence/harm consequence in the past year, demonstrating that alcohol-related consequences are reported among multiple classes of college students. Finally, members of the Light Drinker class were likely to report recent drinking, but unlikely to endorse any dependence/harm in the past year or lifetime history of intoxication, suggesting a history of low-risk drinking.

Both implicit and explicit drinking identity uniquely predicted membership to the latent classes. Stronger implicit drinking identity and anything other than strong disagreement with explicit drinking identity items were associated with increased odds of belonging to heavier drinking classes relative to lighter drinking or nondrinking classes. This pattern corroborates past research demonstrating that explicit and implicit drinking identity uniquely predict drinking outcomes (Lindgren et al., 2016a). It also extends previous work by showing that drinking identity predicts membership to classes that differ with regard to their pattern of drinking behaviors. Further, drinking identity measures were uniquely associated with class membership after controlling for Greek Status, suggesting that drinking identity is not merely a proxy for membership to a fraternity or sorority. Fraternity/sorority membership was associated with greater odds of belonging to heavier drinking classes, extending past research demonstrating associations between Greek involvement and alcohol misuse (Capone et al., 2007).

A central finding is that explicit and implicit drinking identities were positively associated with odds of belonging to the Heavy Drinker class relative to every other class. Given these findings, drinking identity represents a cognitive factor that could be targeted for college student drinking intervention strategies among high-risk drinkers. To date, college student interventions have not been developed to target drinking identity, however doing so could be fruitful. For example, students could be asked to reflect on aspects of their identity that compete with drinking, or to consider strengthening identification with social groups that do not engage in high-risk drinking. Note that current findings demonstrate differences in drinking identity between the highest-risk drinkers and those who also drink regularly but do not meet thresholds for hazardous drinking. Therefore, the development of a moderate or light drinker identity (vs. a nondrinker identity) may also be beneficial from a harm-reduction standpoint.

Another noteworthy finding is that neither explicit nor implicit drinking identity reliably differentiated the Lifetime Nondrinker and Light Drinker classes, suggesting that students who engage in drinking at low levels may not have drinking identities that are distinguishable from alcohol-abstinent students. In contrast, anything other than strong disagreement with explicit drinking identity items was associated with greater odds of membership to the Recent Nondrinker/Past Risk class relative to both the Lifetime Nondrinker and Light Drinker classes. Further, neither drinking identity measures differentiated the Recent Nondrinker/Past Risk class from the Moderate Drinker class. These findings suggest that drinking identity may be more strongly influenced by past events that were relatively risky rather than by recent drinking without intoxication or consequences. This pattern of findings is somewhat analogous to those from a study evaluating self-depressed associations, which indicated that having a previous episode of depression was positively correlated with self-depressed associations even after controlling for current depressive symptoms (Elgersma et al., 2013). Elgersma and colleagues (2013) described those self-depressed associations as “hidden scars,” and the current results suggest that previous risky drinking behaviors could also leave a “scar” via increased drinking identity.

There are several study limitations to discuss. First, the study is focused on college students, and it is unknown whether findings would generalize to non-student peers or other age groups. Second, the distribution for explicit drinking identity was considerably skewed and recoded as a binary variable. Future research may seek development of a self-report assessment of drinking identity that captures a more nuanced range of identification with drinking. Third, the response option scales for explicit and implicit drinking identity were different (i.e., explicit measure was coded as binary; implicit measure D-scores were standardized along a continuous scale), thereby preventing a direct comparison of the magnitude of the associated odds ratios. Finally, the current study is cross-sectional precluding inferences regarding drinking identity as a causal mechanism of alcohol misuse.

5. Conclusions

LCA revealed distinct classes of college students differing on the basis of recent and past drinking behavior. These classes fell along a continuum of no drinking to heavy levels of drinking with consequences. Implicit and explicit drinking identity were associated with

membership to these latent classes. Most importantly, stronger implicit and explicit drinking identity were associated with membership to the highest risk class of college student drinkers. The results suggest that drinking identity is an important construct to assess among college students and may represent an additional target for intervention.

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Highlights

- We identified latent classes of college students on the basis of drinking behavior.
- We examined implicit and explicit drinking identity as predictors of classes.
- Both drinking identity measures predicted overall class membership.
- Drinking identities are especially strong for high-risk college student drinkers.
- Drinking identities may be sensitive to past, risky drinking experiences.

Figure 1.

Distribution of Explicit Drinking Identity mean scores for participants included in analyses ($N = 456$). Participants rated their agreement with items using a 7-point scale (-3 to 3), with negative scores reflecting disagreement and positive scores reflecting agreement with drinking identification. Participant counts and the percentage of the sample are provided above each bin.

Table 1

Observed proportions of participants reporting each level of drinking status indicators

Drinking Status Indicators	Observed Proportions
<i>Past Month Peak Drinks^a</i>	
None	0.43
Light	0.17
Heavy	0.24
High-Intensity	0.16
<i>Past Month Typical Weekend Drinks^a</i>	
None	0.58
Light	0.22
Heavy	0.20
<i>Past Month Drinking Days^a</i>	
None	0.46
Less than weekly	0.30
Weekly or more	0.24
<i>Past Year At-Risk Drinking^b</i>	
No risk	0.34
Low risk	0.43
High risk	0.23
<i>Past Year Dependence or Harm^c</i>	
No endorsement	0.58
Any endorsement	0.42
<i>Lifetime History of Intoxication</i>	
No	0.45
Yes	0.55

Note. N = 456.

^a Measured via the quantity/frequency scale; *Light* drinking indicated by 1–3 standard drinks per occasion for women, 1–4 standard drinks for men; *Heavy* drinking indicated by 4–7 (peak) or 4+ (typical) standard drinks for women, and 5–9 (peak) or 5+ (typical) standard drinks for men, and *High-Intensity* drinking indicated by 8+ standard drinks for women, 10+ standard drinks for men.

^b Measured via the Alcohol Use Disorder Identification Test - Consumption (AUDIT-C; sum of first three items of the AUDIT); no risk indicated by score of 0, low risk indicated by score of 1–4 for women, 1–6 for men, and high risk indicated by score of 5+ for women, 7+ for men.

^c Measured via items 4–10 of the AUDIT with either no endorsement of any item or any endorsement of an item.

Table 2

Model fit indices for latent class analysis models with one to seven classes

No. of classes	AIC	BIC	CAIC	Adj. BIC	Entropy	df	% Seeds best model
1	2346.22	2391.62	2402.62	2356.71	1.00	420	100
2	733.86	828.78	851.78	755.78	0.97	408	100
3	395.99	540.43	575.43	429.35	0.94	396	100
4	275.30	469.26	516.26	320.10	0.91	384	100
5	222.14	465.62	524.62	278.38	0.91	372	99.8
6	218.50	511.51	582.51	286.17	0.88	360	25.6
7	227.02	569.55	652.55	306.13	0.89	348	49.2

Note. **Bold** row indicates class solution selected as best fitting model. AIC = Akaike Information Criterion; BIC = Bayesian Information Criteria; CAIC = Consistent Akaike Information Criterion; Adj. BIC = Adjusted Bayesian Information Criteria

Table 3

Item-response probabilities for the 5-class LCA model

Drinking Status Indicators	Drinker Status (Estimated Class Proportion)				
	Lifetime Nondrinker (37.3%)	Light Drinker (11.7%)	Recent Nondrinker/Past Risk (7.6%)	Moderate Drinker (23.4%)	Heavy Drinker (19.9%)
Past Month Peak Drinks ^a					
None	0.96	0.08	0.88	0.00	0.00
Light	0.04	0.76	0.12	0.23	0.00
Heavy	0.00	0.13	0.00	0.76	0.23
High-Intensity	0.00	0.04	0.00	0.01	0.77
Past Month Typical Weekend Drinks ^a					
None	1.00	0.69	1.00	0.16	0.08
Light	0.00	0.31	0.00	0.68	0.11
Heavy	0.00	0.00	0.00	0.16	0.81
Past Month Drinking Days ^a					
None	0.99	0.12	0.99	0.00	0.01
Less than weekly	0.01	0.86	0.01	0.72	0.16
Weekly or more	0.00	0.02	0.00	0.28	0.83
Past Year At-Risk Drinking ^b					
No risk	0.90	0.04	0.00	0.01	0.00
Low risk	0.10	0.96	0.97	0.82	0.08
High risk	0.00	0.00	0.03	0.17	0.92
Past Year Dependence or Harm ^c					
No endorsement	1.00	0.71	0.42	0.37	0.06
Any endorsement	0.00	0.29	0.58	0.63	0.94
Lifetime History of Intoxication					
No	0.93	0.76	0.18	0.00	0.00
Yes	0.07	0.24	0.82	1.00	1.00

Note. $N = 456$. Estimated class proportions are the probability of membership in each class. Item-response probabilities are the probabilities of reporting a specific response (e.g., High-Intensity) for a specific indicator (e.g., Past Month Peak Drinks) given membership in a class. **Bold** values indicate item-response probabilities of endorsement that are greater than chance.

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^bMeasured via the quantity/frequency scale; *Light* drinking indicated by 1–3 standard drinks for women, 1–4 standard drinks for men; *Heavy* drinking indicated by 4–7 (peak) or 4+ (typical) standard drinks for women, and 5–9 (peak) or 5+ (typical) standard drinks for men, and *High-Intensity* drinking indicated by 8+ standard drinks for women, 10+ standard drinks for men.

^bMeasured via the Alcohol Use Disorder Identification Test - Consumption (AUDIT-C; sum of first three items of the AUDIT); no risk indicated by score of 0, low risk indicated by score of 1–4 for women, 1–6 for men, and high risk indicated by score of 5+ for women, 7+ for men.

^cMeasured via items 4–10 of the AUDIT with either no endorsement of any item or any endorsement of an item

Latent class analysis models testing associations between predictors and class membership: Odds ratios [95% Confidence Intervals] for subgroup comparisons

Table 4

Predictor	Change in 2LL	Reference group: Lifetime Nondrinker			Reference group: Light Drinker			Reference group: Recent Nondrinker/Past Drinker			Reference group: Moderate Drinker	
		Light Drinker	Recent Nondrinker/Past Risk	Moderate Drinker	Heavy Drinker	Recent Nondrinker/Past Risk	Moderate Drinker	Heavy Drinker	Moderate Drinker	Heavy Drinker	Moderate Drinker	Heavy Drinker
Sex	5.31	1.29 [0.80, 2.07]	1.87 [1.04, 3.37]	1.22 [0.83, 1.79]	1.64 [1.02, 2.65]	1.45 [0.73, 2.90]	0.94 [0.55, 1.60]	1.27 [0.71, 2.29]	0.65 [0.36, 1.19]	0.88 [0.45, 1.69]	1.35 [0.85, 2.15]	
Greek Status	56.30***	0.97 [0.42, 2.25]	0.81 [0.30, 2.18]	2.25 [1.27, 3.99]	8.22 [4.61, 14.65]	0.83 [0.26, 2.65]	2.31 [1.01, 5.27]	8.44 [3.72, 19.2]	2.77 [1.06, 7.20]	10.13 [3.93, 26.1]	3.66 [2.25, 5.94]	
Explicit DI	89.96***	1.56 [0.76, 3.20]	4.14 [2.09, 8.20]	5.56 [3.39, 9.11]	14.15 [8.19, 24.44]	2.66 [1.16, 6.12]	3.57 [1.80, 7.09]	9.09 [4.45, 18.6]	1.34 [0.71, 2.53]	3.42 [1.75, 6.69]	2.54 [1.58, 4.09]	
Implicit DI	19.33***	1.21 [0.93, 1.56]	1.33 [0.99, 1.80]	1.64 [1.34, 2.02]	2.24 [1.74, 2.88]	1.10 [0.77, 1.58]	1.36 [1.03, 1.81]	1.85 [1.36, 2.53]	1.23 [0.91, 1.68]	1.68 [1.20, 2.35]	1.36 [1.07, 1.74]	

Note. $N = 456$. Odds ratios reflect the odds of class membership relative to a reference class given a one-unit change in the predictor. These units vary between predictors. Sex was dummy-coded (0 = men, 1 = women); Greek Status was dummy-coded (0 = no Greek affiliation, 1 = member of Greek organization); Explicit DI = Explicit Drinking identity measured via the Alcohol Self-Concept Scale and coded as a binary variable (0 = no drinking identity endorsed; 1 = any endorsement of a drinking identity); Implicit DI = Implicit drinking identity measured via the Drinking Identity Implicit Association Task and represented by continuous D-scores standardized for analyses (i.e., one unit = 1 *SD*). Odds ratios in **bold** indicate estimates for which the 95% confidence interval (CI) does not include 1.0. Log-likelihood values from models with and without predictors were compared. Chi-square distributions were used to test for significance after doubling the change in the log-likelihood (2LL). All change in 2LL tests were 4 *df*.