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Explicit Drinking Identity and Alcohol Problems: The Mediating Role of Drinking to Cope

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Abstract

Drinking identity, or the tendency to view one's self as a drinker, is a unique predictor of alcohol use and related consequences among young adults; yet the mechanism by which it leads to alcohol problems is poorly understood. Based on self-presentation and self-verification perspectives, we examined drinking to cope as a mediator of the association between explicit drinking identity and alcohol-related problems among two samples of young adults. Study data come from two large, longitudinal studies. Participants from Sample 1 and Sample 2 included undergraduates (55% and 59% female, respectively) who reported drinking in the previous three months. Tests of the indirect effects indicated that 3-month drinking to cope significantly mediated the positive association between baseline drinking identity and 6-month alcohol-related problems in both samples. In contrast, 3-month drinking identity did not mediate the association between baseline drinking to cope and 6-month alcohol-related problems. Findings indicate that individuals with a stronger drinking identity are more likely to use alcohol to cope and, subsequently, experience more problems. Thus, drinking identity may be an important intervention target for college students as it appears to temporally proceed drinking to cope in the prediction of alcohol-related problems.

Keywords

alcohol; drinking; college students; identity; drinking to cope

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1. Introduction

Heavy alcohol use is common among college students, with 35% reporting at least one heavy drinking episode (five or more drinks on an occasion) in the past two weeks and 43% reporting having been drunk at least once in the past month (Johnston et al., 2014). Heavy episodic drinking is associated with a variety of negative consequences and a host of health risk behaviors, including marijuana use, cigarette smoking, and risky sex (White & Hingson, 2014; Wechsler, Lee, Nelson, & Kuo, 2002). Given the extent of problems associated with this heavy drinking pattern (Perkins, 2002), research identifying potential mechanisms of problematic alcohol use among young adults is needed to inform prevention and intervention efforts. Using data collected from two independent samples, the current study aimed to establish and replicate findings pertaining to one such mechanism, drinking identity. Specifically, we sought to evaluate how drinking identity, drinking to cope, and alcohol-related problems were related to one another over a 6-month period. What follows is a test of two proposed mediation pathways as well as a replication using an independent sample.

1.1 Drinking Identity

Identity development, characterized as exploration of one's role and purpose in society, is a key feature of adolescence and young adulthood (Arnett, 2000; Erikson, 1956; Marcia, 1966). Theory suggests that young adults who explore and then commit to an identity will be more capable of withstanding stress and setting realistic goals than those who either fail to explore or fail to commit to an identity (Marcia, 1966). Alcohol and/or other drug use is a key element of this identity exploration for many young adults (Arnett, 2005), thus exposure to the alcohol is likely to result in some kind of self-concept related to alcohol.

Strong drinking identity – or viewing one's self as a drinker (which can include identifying with alcohol, drinking behaviors, and/or social groups who drink; Lindgren, Neighbors, Gasser, Ramirez & Cvencek, 2016a) – has been associated with drinking quantity and alcohol-related consequences in both cross-sectional and longitudinal research. Drinking identity has been measured explicitly via self-report and is thought to capture propositional statements about who a person is (“I am a drinker”; see Lindgren et al., 2016a; Lindgren, Ramirez, Olin, & Neighbors, 2016b). It has also been measured implicitly via reaction time measures and is thought to capture associations with the self and drinking that are thought to be more automatic, reflexive, and impulsive (see Lindgren, Foster, Westgate, & Neighbors, 2013a). In the current study, our focus is on explicit drinking identity, which we refer to as drinking identity for brevity.

Drinking identity is a unique predictor of concurrent alcohol use and related consequences among young adults (Foster, Neighbors, & Young, 2014; Lindgren, et al., 2013a; Lindgren et al., 2013b; Lindgren, Neighbors, Westgate, & Saleminck, 2014), and these patterns are maintained over time (Lindgren, Neighbors, Wiers, Gasser, & Teachman, 2015a; Lindgren, et al., 2016b). Even when compared directly to other, well-known predictors of alcohol use and consequences (e.g., descriptive and injunctive norms, expectancies, drinking motives), drinking identity remains a significant predictor of alcohol use and related problems (Lindgren et al., 2016b). Moreover, stronger drinking identity predicts increases in alcohol consumption and alcohol problems (Lindgren et al., 2016b; Lindgren et al., 2016c), and risk

of alcohol use disorders (Lindgren et al., 2016c). Drinking identity also predicts future problems after controlling for consumption, indicating that identity is not redundant with consumption (Lindgren et al., 2016b). While the research examining drinking identity as a predictor of alcohol use and problems is compelling, little work has examined the process by which drinking identity may impact alcohol-related outcomes over time.

The results of at least one study suggest that drinking identity may be associated with alcohol-related problems due in part to its influence on drinking to cope. Specifically, Moeller and Crocker (2009) found that a construct similar to identity which they term self-image goals, or the desire for others to view one in positive ways, was associated with alcohol-related problems in part because it was associated with an increased use of alcohol to cope with negative affect, or “drinking to cope.” Drinking to cope – or more specifically, endorsing drinking to cope as a reason or motive to drink – is a robust predictor of heavy alcohol use and alcohol-related consequences above and beyond the amount of alcohol consumed among young adults (Cooper, 1994; Cooper, Agocha, & Sheldon, 2000; Ham & Hope, 2003; Kunstshe, Knibbe, Gmel, & Engels, 2005; Merrill, Wardell, & Read, 2014), with associations lasting up to 10 years (Holahan, Moos, Holohan, Cronkite, & Randall, 2001). Unfortunately, drinking to cope may not decrease as students transition out of college (Perkins, 1999). The finding that drinking to cope may account, in part, for the impact of self-image on alcohol-related consequences is consistent with self-presentation and self-verification perspectives. Specifically, self-presentation (Lalwani & Shavitt, 2009) posits that individuals are motivated to convey information about themselves through their behavior, while self-verification (Swann, 2012) suggests that individuals want others to view them in accordance with the way they view themselves. Both of these models suggest that individuals are motivated to engage in behaviors that are consistent with their own self-views (Lalwani & Shavitt, 2009; Leary, 1993; Swann, 2012). Furthermore, from these perspectives, individuals who identify as drinkers may be more likely to use alcohol when experiencing negative affect, which may then lead to more alcohol-related problems. This may be due in part to individuals desire to convey information about themselves through drinking behavior (self-presentation) and a desire for others to have a view of their drinking that is consistent with their own (self-verification).

Alternatively, another study found a different relationship between drinking identity and drinking to cope, but it focused on implicit drinking identity. Specifically, Lindgren et al. 2015a found that implicit drinking identity mediated the association between drinking to cope and drinking quantity one week later (Lindgren et al., 2015a). These findings were promising but left several empirical questions unanswered. Specifically, are the processes associated with explicit drinking identity the same as those for implicit identity? Self-presentation and self-verification perspectives require self-knowledge and introspection, which is reflected more in explicit (vs. implicit) measures of drinking identity. Thus, one could expect different results depending on which type of drinking identity measure one uses. Second, Lindgren et al. did not test this association with alcohol-related problems and did not rule out alternative temporal orderings of these variables. Third, the associations were tested over a relatively short time period (i.e., 16 days). Given these unanswered questions and existing theory, there is good reason to believe that the temporal precedence of drinking identity and drinking to cope may be reversed. Thus, the current work aimed

integrate self-verification and self-presentation perspectives and to provide a more rigorous test via evaluating competing mediation models ([explicit] drinking identity → drinking to cope vs. drinking to cope → drinking identity) with alcohol problems as the outcome and assessing these relationship over a longer (i.e., 6 month) period.

In addition to testing competing models, we also included a second sample to test whether findings replicated. This decision stems from concerns about the reproducibility of findings in psychological science (Open Science Collaboration, 2015). We think it is important to evaluate the extent to which these findings replicate across these two samples given the concerns raised about reproducibility in general. We also think it is important for two reasons specific to the hypotheses and samples and questions. First, these data come from studies that were not originally designed to address these questions – they are secondary analyses. Second, based on existing social psychological perspectives we are proposing an alternative temporal ordering of these variables and thought it important to both present the alternative and verify the different findings across two samples.

1.2 Current Research

The current study, thus, examined drinking to cope as a mediator of the association between drinking identity and alcohol problems in two independent samples of young adults. Based on the work of Moeller and Crocker (2009) and self-presentation and self-verification theories, we hypothesized that drinking to cope at three months would mediate the association between drinking identity at baseline and alcohol problems at six months. However, given the finding that implicit drinking identity was a mediator of drinking to cope and alcohol use (Lindgren et al., 2015a), we also tested whether [explicit] drinking identity at three months mediated the association between drinking to cope at baseline and alcohol problems at six months. Results of this study are expected to inform interventions for heavy alcohol use among young adults by documenting temporal associations between drinking identity, drinking to cope, and alcohol-related consequences.

2. Materials and Method

2.1 Participants

Sample 1—Participants included 885 undergraduates (54.8% female; $M_{\text{age}} = 21.51$, $SD = 1.97$) between the ages of 18 and 26 years old who met criteria for heavy drinking (4/5 or more drinks on one occasion for women and men, respectively) in the last month. Students were recruited from a large public southern university. Participants reported the following racial backgrounds: 30.61% Hispanic, 27.15% White/Caucasian, 24.36% Asian, and 17.88% Black/African American.

Sample 2—Participants included 320 undergraduates (59.3% female; $M_{\text{age}} = 18.64$, $SD = .72$) between the ages of 18 and 20 years old who were a part of a larger study (Lindgren et al., 2016c). The current sample represents a subset of the larger sample and includes only those who reported having at least one drink in the last three months at the baseline assessment. Students were recruited from a large public northwestern university. Participants

reported the following racial backgrounds: 7.79% Hispanic, 58.15% White/Caucasian, 25.24% Asian, 1.28% Black/African American, and 15.34% other.

2.2 Procedures

Sample 1—Participants were recruited through the university registrar’s list to participate in a larger alcohol intervention study. Randomly selected students from the registrar’s list were invited via email to participate in the online screening survey. Eligibility criteria included being between 18 to 26 years old at the time of the baseline session and reporting at least one heavy drinking episode (4/5 drinks for women and men, respectively) in the past month. Upon completion of the screening survey, eligible participants were immediately routed to an online scheduler to choose a day and time for their in-lab baseline appointment. Participants provided informed consent and completed baseline questionnaires in the lab. They then completed follow-up assessments (at 3- and 6-months post-baseline) online from the location of their choosing. Intervention findings are reported elsewhere (blinded for review). Because controlling for intervention condition in statistical analyses did not substantively affect the results, models are reported without controlling for condition. Participants were paid \$25 for completing each of the baseline, three-month, and six-month follow-up assessments. All procedures were approved by the university’s Institutional Review Board.

Sample 2—Participants were recruited via email to participate in a two-year study evaluating cognitive factors and drinking behaviors among undergraduates in their first or second year of college. Individuals were assessed every three months for a total of eight assessments. The data described here come from the first three assessments (baseline, 3-month, and 6-month) of the larger study (blinded for review). Participants completed informed consent and study measures from remote locations using the study website. Participants were compensated \$25 for each of the three assessments. All procedures were approved by the university’s Institutional Review Board.

2.3 Measures (for Samples 1 and 2)

2.3.1 Alcohol consumption—Alcohol consumption was assessed with the Daily Drinking Questionnaire (DDQ; Collins et al., 1985). Participants were asked, “Consider a typical week during the last three months. How much alcohol, on average (measured in number of drinks), do you drink on each day of a typical week?” Participants provided estimates for the typical number of standard drinks they consumed on each day of the week. A standard drink was defined as 12 oz. beer, 5 oz. wine, or 1½ oz. of 80 proof liquor. Responses were summed to reflect the average number of drinks they had consumed per week in the past three months.

2.3.2 Drinking identity—Drinking identity was assessed using a 5-item measure adapted from the Smoker Self-Concept Scale (original: Shadel & Mermelstein, 1996; adapted: Lindgren et al., 2013b) that assesses the degree to which alcohol is integrated with one’s self-concept (e.g., “Drinking is a part of who I am”). Participants responded to statements using a 7-point scale (1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Slightly Disagree*; 4 = *Neutral*; 5 = *Slightly Agree*; 6 = *Agree*; 7 = *Strongly Agree*). Scores were calculated by

computing the mean of the 5 items. Alphas for Sample 1 ranged from .90 to .94 across the two time points, and alphas for Sample 2 ranged from .91 to .92 across the two time points.

2.3.3 Drinking motives—Drinking motives were assessed using the Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994). The DMQ-R is a self-report measure consisting of 20 items related to reasons for drinking alcohol. Participants responded to statements using a 5-point scale (1 = *Never/Almost never*, 2 = *Some of the time*, 3 = *Half the time*, 4 = *Most of the time*, and 5 = *Almost always/Always*). There are four subscales: Coping (e.g., “To forget about your problems”), Conformity (e.g., “To fit in with a group you like”), Social (e.g., “To be sociable”), and Enhancement (e.g., “Because it improves parties and celebrations”). In the current samples, drinking to cope (i.e., the coping motive subscale) was tested as the mediator/predictor of interest and the other three motives were controlled for. The coping subscale alphas for Sample 1 ranged from .81 to .89 across the two points, and alphas for Sample 2 ranged from .84 to .86. The baseline conformity subscale alpha was .84 for Sample 1 and .89 for Sample 2. The baseline social subscale alpha was .86 for Sample 1 and .96 for Sample 2. The baseline enhancement subscale alpha was .87 for Sample 1 and .93 for Sample 2.

2.3.4 Alcohol-related problems—A modified version of the Rutgers Alcohol Problems Index (RAPI; White & Labouvie, 1989) was used to assess how often participants experienced 23 alcohol-related problems over the previous three months. The RAPI was modified to include two additional items (e.g., “drove after having two drinks” and “drove after having four drinks”). Participants responded to the statements using a 5-point scale (0 = *never*, 1 = *1 to 2 times*, 2 = *3 to 5 times*, 3 = *6 to 10 times*, 4 = *more than 10 times*). Scores were calculated by summing the 25 items. Alpha for Sample 1 was .94 and alpha for Sample 2 was .98.

3. Results

3.1 Preliminary Analyses and Analysis Plan

We used the PROCESS macro for SAS 9.4, model 7 (Hayes, 2013) to test mediation models. PROCESS is a statistical procedure that computes the indirect path following the *ab* product term approach (MacKinnon et al., 2002) as well as the bootstrapped 95% asymmetric confidence intervals around the indirect effect (Hayes, 2013; MacKinnon et al., 2002). This bootstrapping procedure is less sensitive to violations of the assumptions inferential statistics (Hayes et al., 2011; Preacher et al., 2007). First, we examined 3-month drinking to cope as a mediator of the association between baseline drinking identity and 6-month alcohol-related problems, controlling for gender, age, baseline drinks per week, baseline levels of drinking to cope, and baseline alcohol problems. Then, to test an alternative temporal ordering of the variables (based on Lindgren et al., 2015a), we examined drinking identity as a mediator of the association between drinking to cope and alcohol-related problems, controlling for gender, age, baseline drinks per week, baseline levels of drinking identity, and baseline alcohol problems. While not central to the current hypothesis, we conducted additional exploratory analyses to determine the mediation effects were present when controlling for baseline indicators of the other three drinking motives (conformity, enhancement, and

social). We tested the models in Sample 1 first and then used Sample 2 to evaluate whether or not our findings would replicate.

3.2 Descriptive Information and Correlations

Descriptive statistics and zero-order correlations among all variables for Samples 1 and 2 are presented in Tables 1 and 2. In both samples, baseline drinks per week and baseline drinking identity were positively correlated with all other drinking variable variables ($ps < .001$). Three-month drinking to cope and 6-month alcohol-related problems were also positively correlated with all other study variables except gender ($ps < .01$). T-tests of potential differences between samples suggest there were no differences in baseline drinking, baseline drinking identity, baseline coping motives, 3-month drinker identity, 3-month coping motives, and finally 6-month alcohol related problems (all $ps > .27$). However, the samples did differ with respect to the age of participants such that those in Sample 1 were older, $t(1,1036) = 34.87, p < .001$. This finding was not surprising as the inclusion criteria with respect to age were different across the two samples (Sample 1 had an inclusion criteria of being 18–26; Sample 2 had an inclusion criteria of being 18–20).

3.3 Mediation Models

Drinking to cope as a mediator of the association between drinking identity and alcohol problems—Using data from Sample 1, we examined 3-month drinking to cope as a mediator of the association between baseline drinking identity and 6-month alcohol-related problems, controlling for gender, age, baseline drinks per week, baseline levels of drinking to cope, and baseline alcohol problems (see Figure 1). Furthermore, tests of the indirect effects indicated that 3-month drinking to cope significantly mediated the association between baseline drinking identity and 6-month alcohol-related problems, $ab = .10$, $Boot_{SE} = .06$, [95% CI: .02, .27]. See Table 3 for full results. We ran an identical model using data from Sample 2 (see Figure 2). Again, tests of the indirect effect indicated that 3-month drinking to cope significantly mediated the association between baseline drinking identity and 6-month alcohol-related problems, $ab = .36$, $Boot_{SE} = .10$, [95% CI: .01, .32]. See Table 3 for full results. While the indirect effect was smaller in magnitude, these mediation findings held for both samples when controlling for baseline indicators of the other drinking motives (conformity, enhancement, and social motives).

Drinking identity as a mediator of the association between drinking to cope and alcohol problems—Using data from Sample 1, we evaluated drinking identity as a mediator of the association between drinking to cope and alcohol-related problems, controlling for gender, age, baseline drinks per week, baseline levels of drinking identity, and baseline alcohol problems. Three-month drinking identity did not mediate the association between baseline drinking to cope and 6-month alcohol-related problems, $ab = .02$, $Boot_{SE} = .04$, [95% CI: $-.02$, .13]. We ran an identical model using data from Sample 2. Consistent with the results using the Sample 1 data, tests of the indirect effects indicated that 3-month drinking identity did not mediate the association between baseline drinking to cope and 6-month alcohol-related problems, $ab = .01$, $Boot_{SE} = .02$, [95% CI: $-.01$, .05].

4. Discussion

This study examined drinking to cope as a mediator of the association between drinking identity and alcohol problems in two independent samples of young adults. Consistent with previous work on self-image goals, we found support for our hypotheses derived from self-presentation and self-verification theories: drinking to cope mediated the association between explicit drinking identity and alcohol-related problems. Alternatively, and in contrast to previous work on implicit drinking identity (Lindgren et al., 2015a), we did not find support for drinking identity as a mediator of the association between drinking to cope and alcohol-related problems. Findings from testing both models are important because they highlight the temporal ordering of these variables. Specifically, these data suggest drinking identity precedes drinking to cope in the prediction of alcohol related problems. This has important intervention implications as targeting drinking identity may help to reduce an individual's use of alcohol to cope and subsequent experience of alcohol-related problems.

This study extended previous work in important ways. First, we evaluated the proposed temporal associations over a 6-month period, with 3-month intervals between the baseline predictor, mediator, and outcome variables. Second, we controlled for baseline drinking because drinking to cope is more strongly linked to alcohol-related problems than consumption (Kuntsche et al., 2005). Doing so, allowed us to examine the strength of this mediation process over and above actual drinking behavior. Third, and perhaps most importantly, the study evaluated these models with two independent samples that were collected in two different regions in the U.S. and includes individuals of different age ranges and academic years as well as different ranges of drinking behavior (note that sample 2 had less restrictive drinking eligibility criteria). Given the current debates and concerns regarding the reproducibility of findings in psychological science (Open Science Collaboration, 2015), we think it is critical to test the extent to which these findings are reproducible, especially because these data come from studies that were not originally designed to address these questions and because a previous study (Lindgren et al., 2015a) demonstrated the opposite pattern. The fact that the same pattern of findings was found in both samples gives us more confidence about the reliability of the observed temporal pattern.

4.1 Clinical Implications

These results suggest that drinking identity and coping strategies are important in the contexts of clinical assessment, prevention, and intervention. While drinking identity in the current samples was relatively low, individuals who identified as drinkers experienced a greater number of alcohol-related problems, even after controlling for baseline consumption; therefore, drinking identity may be one point of clinical intervention. Specifically, explicitly identity as a drinker may temporally precede the using alcohol to cope. Thus, targeting explicit drinking identity may help to ameliorate the use of alcohol to cope with different problems. This could be done through expanding one's focus of the "self" to include other important aspects of their identity that may be inconsistent with heavy drinking behavior. Doing so may help to reduce drinking to cope and subsequent problems. For example, research has shown that self-affirmation theory can be used as a tool to reduce engaging in negative health behavior through expanding one's focus on other aspects of the self and

reducing defensive responding when receiving such feedback about negative health behaviors (DiBello, Neighbors, & Ammar, 2015). Interventions may also benefit from content that targets drinking to cope as a maladaptive affect regulation strategy. General coping strategies are rarely targeted directly or examined as mediators of intervention effect on college student drinking (Miller et al., 2013; Reid & Carey, 2015), although interventions incorporating motives-related feedback show promise (Blevins & Stephens, 2016). Future interventions may benefit from provision of other, more effective coping strategies that individuals can implement in their everyday lives.

4.2 Limitations and Future Directions

Although the samples used are independent, come from longitudinal studies, and support the proposed model, strong causal inferences require experimental methods. Such methods are a logical future direction. It is worth noting that few students endorsed strong drinking identities and few identified drinking to cope as a strong motivation for drinking. Moreover, it would be worth considering whether these broader underlying traits distinguish those who have strong drinking identities from those who do not have strong drinking identities. Additionally, while the current study indicates consistent findings across two samples, it is important to note that both these samples are college student samples, which may limit generalizability to other populations. Finally, while we found support for drinking to cope as a mediator of the drinking identity – alcohol problems association, we did not measure additional coping strategies. Future work should also control for and examine alternative coping strategies.

4.3 Conclusions

Stronger drinking identity may be a precursor to more drinking to cope and a greater number of alcohol-related problems. Because stronger drinking identity has been associated with heavy alcohol use and greater experience of alcohol-related problems, it is important to understand the mechanisms through which drinking identity prospectively leads to alcohol-related problems. Results from two independent, longitudinal samples revealed that drinking to cope may be one such mechanism. Given these findings, it may be beneficial to target drinking identity in future interventions.

References

- Arnett JJ. Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*. 2000; 55:469–480. DOI: 10.1037/0003-066X.55.5.469 [PubMed: 10842426]
- Arnett JJ. The developmental context of substance use in emerging adulthood. *Journal of Drug Issues*. 2005; 35:235–254. DOI: 10.1177/002204260503500202
- Blevins CE, Stephens RS. The impact of motives-related feedback on drinking to cope among college students. *Addictive Behaviors*. 2016; 58:68–73. DOI: 10.1016/j.addbeh.2016.02.024 [PubMed: 26914263]
- Collins RL, Parks GA, Marlatt GA. Social determinants of alcohol consumption: The effects of social interaction and model status on the self administration of alcohol. *Journal of Consulting and Clinical Psychology*. 1985; 53:189–200. [PubMed: 3998247]
- Cooper ML. Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*. 1994; 6:117–128.

- Cooper ML, Agocha VB, Sheldon MS. A motivational perspective on risky behaviors: The role of personality and affect regulatory processes. *Journal of Personality*. 2000; 68(6):1058–1088.
- DiBello AM, Neighbors C, Ammar J. Self-affirmation theory and cigarette smoking warning images. *Addictive Behaviors*. 2015; 41:87–96. DOI: 10.1016/j.addbeh.2014.09.026 [PubMed: 25452050]
- Erikson EH. The problem of ego identity. *Journal of the American Psychoanalytic Association*. 1956; 4:56–121. DOI: 10.1177/000306515600400104 [PubMed: 13286157]
- Foster DW, Neighbors C, Young C. Drink refusal self-efficacy and implicit drinking identity: An evaluation of moderators of the relationship between self-awareness and drinking behavior. *Addictive Behaviors*. 2014; 39:196–204. <http://dx.doi.org/10.1016/j.addbeh.2013.09.024>. [PubMed: 24169372]
- Ham LS, Hope DA. College students and problematic drinking: A review of the literature. *Clinical Psychology Review*. 2003; 23:719–759. DOI: 10.1016/S0272-7358(03)00071-0 [PubMed: 12971907]
- Hayes, AF. Introduction to mediation, moderation, and conditional process analysis. New York: The Guilford Press; 2013.
- Hayes, AF., Preacher, KJ., Myers, TA. Mediation and the estimation of indirect effects in political communication research. In: Bucy, EP., Lance Holbert, R., editors. *Sourcebook for political communication research: Methods, measures, and analytical techniques*. New York: Routledge; 2011. p. 434-465.
- Holahan CJ, Moos RH, Holahan CK, Cronkite RC, Randall PK. Drinking to cope, emotional distress, and alcohol use and abuse: A ten-year model. *Journal of Studies on Alcohol*. 2001; 62:190–198. [PubMed: 11327185]
- Johnston, LD., O'Malley, PM., Bachman, JG., Schulenberg, JE., Miech, RA. Monitoring the Future national survey results on drug use, 1975–2013: Volume II, college students and adults ages 19–55. Ann Arbor: Institute for Social Research, The University of Michigan; 2014. p. 424-30.
- Kuntsche E, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. *Clinical psychology review*. 2005; 25(7):841–861. [PubMed: 16095785]
- Lalwani AK, Shavitt S. The “me” I claim to be: Cultural self-construal elicits self-presentational goal pursuit. *Journal of Personality and Social Psychology*. 2009; 97(1):88–102. [PubMed: 19586242]
- Leary, MR. The interplay of private self-processes and interpersonal factors in self-presentation. In: Suls, JM., editor. *The self in social perspective*. Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.; 1993. p. 127-155.
- Lindgren KP, Foster DW, Westgate EC, Neighbors C. Implicit drinking identity: Drinker+me associations predict college student drinking consistently. *Addictive Behaviors*. 2013a; 38(5): 2163–2166. DOI: 10.1016/j.addbeh.2013.01.026 [PubMed: 23454880]
- Lindgren KP, Neighbors C, Gasser ML, Ramirez JJ, Cvencek D. A review of implicit and explicit substance self-concept as a predictor of alcohol and tobacco use and misuse. *The American Journal of Drug and Alcohol Abuse*. 2016a; ePUB ahead of print. doi: 10.1080/00952990.2016.1229324
- Lindgren KP, Neighbors C, Teachman BA, Baldwin SA, Norris J, Kaysen D, Gasser ML, Wiers RW. Implicit Alcohol Associations, Especially Drinking Identity, Predict Drinking Over Time. *Health Psychology*. 2016c; 35(8):908–918. DOI: 10.1037/hea0000396 [PubMed: 27505215]
- Lindgren KP, Neighbors C, Teachman BA, Wiers RW, Westgate E, Greenwald AG. I drink therefore I am: Validating alcohol-related implicit association tests. *Psychology Of Addictive Behaviors*. 2013b; 27(1):1–13. DOI: 10.1037/a0027640 [PubMed: 22428863]
- Lindgren KP, Neighbors C, Westgate E, Salemink E. Self-control and implicit drinking identity as predictors of alcohol consumption, problems, and cravings. *Journal Of Studies On Alcohol And Drugs*. 2014; 75(2):290–298. [PubMed: 24650823]
- Lindgren KP, Neighbors C, Wiers RW, Gasser ML, Teachman BA. Evaluating implicit drinking identity as a mediator of drinking motives and alcohol consumption and craving. *Addictive Behaviors*. 2015a; 43:33–38. DOI: 10.1016/j.addbeh.2014.12.004 [PubMed: 25544353]
- Lindgren KP, Ramirez JJ, Olin CC, Neighbors C. Not the same old thing: Establishing the unique contribution of drinking identity as a predictor of alcohol consumption and problems over time. *Psychology of Addictive Behavior*. 2016b; 30:659–71. DOI: 10.1037/adb0000195

- Lindgren KP, Wiers RW, Teachman BA, Gasser ML, Westgate EC, Cousijn J, Enkema MC, Neighbors C. Attempted training of alcohol approach and drinking identity associations in US undergraduate drinkers: Null results from two studies. *PLoS ONE*. 2015b; 10:1–21. DOI: 10.1371/journal.pone.0134642
- MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*. 2002; 7:83–104. [PubMed: 11928892]
- Marcia JE. Development and validation of ego-identity status. *Journal of Personality and Social Psychology*. 1966; 3:551–558. DOI: 10.1037/h0023281 [PubMed: 5939604]
- Merrill JE, Wardell JD, Read JP. Drinking motives in the prospective prediction of unique alcohol-related consequences in college students. *Journal of Studies on Alcohol and Drugs*. 2014; 75:93–102. DOI: 10.15288/jsad.2014.75.93 [PubMed: 24411801]
- Miller MB, Leffingwell TR, Claborn KR, Meier E, Walters ST, Neighbors C. Personalized feedback interventions for college alcohol misuse: An update of Walters & Neighbors (2005). *Psychology of Addictive Behaviors*. 2013; 27:909–920. DOI: 10.1037/a0031174 [PubMed: 23276309]
- Moeller SJ, Crocker J. Drinking and desired self-images: Path models of self-image goals, coping motives, heavy-episodic drinking, and alcohol problems. *Psychology Of Addictive Behaviors*. 2009; 23(2):334–340. DOI: 10.1037/a0015913 [PubMed: 19586150]
- Open Science Collaboration. Estimating the reproducibility of psychological science. *Science*. 2015; 349(6251):aac4716.doi: 10.1126/science.aac4716 [PubMed: 26315443]
- Perkins. Stress-motivated drinking in collegiate and postcollegiate young adulthood: Life course and gender patterns. *Journal of Studies on Alcohol*. 1999; 60:219–227. DOI: 10.15288/jsa.1999.60.219 [PubMed: 10091960]
- Perkins H. Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *Journal of Studies on Alcohol and Drugs*. 2002; (14):91–139.
- Preacher KJ, Rucker DD, Hayes AF. Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*. 2007; 42(1):185–227. DOI: 10.1080/00273170701341316 [PubMed: 26821081]
- Reid AE, Carey KB. Interventions to reduce college student drinking: State of the evidence for mechanisms of behavior change. *Clinical Psychology Review*. 2015; 40:213–224. DOI: 10.1016/j.cpr.2015.06.006 [PubMed: 26164065]
- Shadel WG, Mermelstein R. Individual differences in self-concept among smokers attempting to quit: Validation and predictive utility of measures of the smoker self-concept and abstainer self-concept. *Annals of Behavioral Medicine*. 1996; 18(3):151–156. [PubMed: 24203766]
- Swann, WJ. Self-verification theory. In: Van Lange, PM.Kruglanski, AW.Higgins, ET.Van Lange, PM.Kruglanski, AW., Higgins, ET., editors. *Handbook of theories of social psychology*. Vol. 2. Thousand Oaks, CA: Sage Publications Ltd; 2012. p. 23–42.
- Wechsler H, Lee JE, Nelson TF, Kuo M. Underage college students' drinking behavior, access to alcohol, and the influence of deterrence policies. Findings from the Harvard School of Public Health College Alcohol Study. *Journal of American College Health*. 2002; 50(5):223–236. [PubMed: 11990980]
- White A, Hingson R. New research findings since the 2007 Surgeon General's Call to Action to Prevent and Reduce Underage Drinking: a review. *J Stud Alcohol Drugs*. 2014; 75(1):158–169. [PubMed: 24411808]
- White HR, Labouvie EW. Towards the assessment of adolescent problem drinking. *Journal of Studies on Alcohol*. 1989; 50:30–37. [PubMed: 2927120]

Highlights

- Drinking identity is associated with drinking to cope
- Drinking identity is associated with alcohol problems via coping
- Drinking identity is associated with problems over time

Figure 1.

Results from Model 1 of Sample 1. Path coefficients for mediation analysis examining 3-month drinking to cope as a mediator of the effect of baseline drinking identity on 6-month alcohol-related problems, controlling for gender, age, baseline drinks per week, baseline levels of drinking to cope, and baseline alcohol problems. a = Effect of X on M; b = effect of M on Y; c' = direct effect of X on Y controlling for M; $a*b$ = indirect effect of X on Y through M; c = total effect of X on Y

Figure 2.

Results from Model 1 of Sample 2. Path coefficients for mediation analysis examining 3-month drinking to cope as a mediator of the effect of baseline drinking identity on 6-month alcohol-related problems, controlling for gender, age, baseline drinks per week, baseline levels of drinking to cope, and baseline alcohol problems. a = Effect of X on M; b = effect of M on Y; c' = direct effect of X on Y controlling for M; $a*b$ = indirect effect of X on Y through M; c = total effect of X on Y

Table 1

Sample 1 Descriptive Statistics and Correlations.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Gender	–											
2. Age	–.06	–										
3. BL drinks per week	.18***	.05	–									
4. BL drinking identity	.14***	.10**	.42***	–								
5. BL coping motives	.01	.04	.19***	.35***	–							
6. BL enhancement motives	.07*	–.08*	.28***	.37***	.44***	–						
7. BL conformity motives	.10**	–.01	–.02	.21***	.35***	.19***	–					
8. BL social motives	.06	.06	.17***	.30***	.46***	.61***	.35***	–				
9. BL alcohol-related problems	.04	.06	.48***	.43***	.39***	.33***	.20***	.29***	–			
10. 3M drinking identity	.11**	.11**	.31***	.56***	.26***	.25***	.18***	.21***	.36***	–		
11. 3M coping motives	.00	.06	.18***	.35***	.67***	.35***	.26***	.36***	.36***	.37***	–	
12. 6M alcohol-related problems	.05	.01	.27***	.22**	.23***	.18***	.10**	.19***	.47***	.28***	.27***	–
Mean	–	21.49	8.52	1.70	10.42	13.60	7.97	16.61	7.16	1.63	9.78	4.95
SD	–	2.01	8.43	1.14	4.63	5.35	3.79	5.06	7.84	1.14	4.45	8.22

Note. $N = 885$. Gender was coded such that 0 = female, 1 = male; BL = baseline, 3M = 3-month, 6M = 6-month.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2

Sample 2 Descriptive Statistics and Correlations.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Gender	–											
2. Age	.00	–										
3. BL drinks per week	–.04	.18**	–									
4. BL drinking identity	–.04	.27***	.51***	–								
5. BL coping motives	.13*	.16**	.30***	.38***	–							
6. BL enhancement motives	.04	.15**	.37***	.42***	.57***	–						
7. BL conformity motives	.00	.16**	.13*	.38***	.49***	.35***	–					
8. BL social motives	.03	.23***	.42***	.38***	.56***	.80***	.43***	–				
9. BL alcohol-related problems	.01	.21***	.55***	.52***	.46***	.40***	.38***	.43***	–			
10. 3M drinking identity	–.08	.21***	.52***	.71***	.39***	.38***	.30***	.40***	.53***	–		
11. 3M coping motives	–.01	.14*	.21***	.34***	.67***	.51***	.39***	.43***	.41***	.36***	–	
12. 6M alcohol-related problems	–.01	.14*	.41***	.40***	.29***	.35***	.27***	.35***	.62***	.44***	.28***	–
Mean	–	18.63	7.84	1.60	9.16	13.99	8.68	15.72	4.88	1.55	8.91	3.48
SD	–	.72	9.44	1.05	4.34	5.72	4.36	5.81	7.37	.86	3.98	6.24

Note. $N = 320$. Gender was coded such that 0 = female, 1 = male; BL = baseline, 3M = 3-month, 6M = 6-month.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Full Model 1 Results for Samples 1 and 2.

Sample 1 – Model 1						
Criterion	Predictor	b	se	t	p	95% CI
3M Coping motives	Gender	-.31	.26	-1.19	.23	[-.83, .20]
	Age	.04	.07	.62	.54	[-.09, .17]
	BL drinks per week	-.03	.02	-1.71	.08	[-.07, .01]
	BL drinking identity	.49	.14	3.53	<.001	[.22, .76]
	BL coping motives	.58	.03	19.36	<.001	[.52, .64]
	BL alcohol-related problems	.07	.02	3.07	<.01	[.03, .12]
6M Alcohol-related problems	Gender	.67	.57	1.17	.24	[-.45, 1.80]
	Age	-.20	.15	-1.37	.17	[-.50, .09]
	BL drinks per week	-.02	.04	-.47	.64	[-.10, .06]
	BL drinking identity	-.05	.30	-.16	.88	[-.64, .55]
	BL coping motives	.02	.08	.26	.79	[-.14, .18]
	BL alcohol-related problems	.55	.05	10.61	<.001	[.45, .66]
	3M coping motives	.21	.09	2.50	<.01	[.05, .38]
Sample 2 – Model 1						
Criterion	Predictor	b	se	t	p	95% CI
3M Coping motives	Gender	-.48	0.29	-1.66	0.10	[-1.03, .09]
	Age	0.00	0.22	-0.01	0.99	[-.43, .45]
	BL drinks per week	0.02	0.02	1.02	0.30	[-.01, .06]
	BL drinking identity	0.63	0.20	3.08	<.001	[.22, 1.03]
	BL coping motives	0.55	0.05	12.14	<.001	[.46, .64]
	BL alcohol-related problems	0.06	0.04	1.51	0.13	[-.02, .13]
6M Alcohol-related problems	Gender	-.30	.41	-.72	.47	[1.11, .52]
	Age	.13	.32	.41	.68	[-.50, .77]
	BL drinks per week	.05	.03	1.46	.15	[-.02, .11]
	BL drinking identity	.49	.31	1.59	.11	[-.12, 1.09]
	BL coping motives	.03	.08	.40	.69	[-.12, .18]

Sample 1 – Model 1						
Criterion	Predictor	b	se	t	p	95% CI
	BL alcohol-related problems	.52	.05	9.66	<.001	[.42,.63]
	3M coping motives	.21	.08	2.54	.01	[.05,.36]