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Maturing Out: Between- and Within-Persons Changes in Social-Network Drinking, Drinking Identity, and Hazardous Drinking Following College Graduation

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Abstract

Many college students reduce hazardous drinking (HD) following graduation without treatment. Identifying cognitive mechanisms facilitating this "natural" reduction in HD during this transition is crucial. We evaluated drinking identity as a potential mechanism and tested whether within-persons changes in one's social network's drinking were linked to within-persons changes in drinking identity and subsequent within-persons changes in HD. A sample of 422 undergraduates reporting HD was followed from 6 months before graduation until 2 years after graduation. Their drinking, drinking identity, and social networks were assessed online. Within-persons changes in drinking identity did not mediate the relationship between within-persons changes in social-network drinking and personal HD, although significant positive between-persons associations among all constructs were found. Instead, there was some evidence that within-persons changes in drinking identity followed changes in HD, which suggests that drinking identity may function as a marker versus mechanism of "natural" HD reduction during transition out of college.

Keywords

drinking identity, implicit drinking identity, college student drinking, social networks, self-concept, maturing out, preregistered

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College student hazardous drinking (HD; heavy alcohol consumption and experiencing alcohol-related problems) is risky and costly to students and to those around them (Grant et al., 2017; Hingson et al., 2017; Merrill & Carey, 2016; Schulenberg et al., 2020) and represents a significant public-health burden. The developmental period tied to college for the majority of students (i.e., young adulthood; ages 18–25) coincides with the period in which alcohol use is at its lifetime peak; young adults drink more frequently and also drink more per occasion than any other age group (Schulenberg et al., 2020). Although drinking during college can have social benefits, it is also associated with substantial negative consequences, such as experiencing physical fights, injuries, emergency department visits, and other legal problems (Grant et al., 2017; Hingson et al., 2009, 2017; Schulenberg et al., 2020). At the same time, for many students, HD is also a temporary phenomenon; most students "mature out" or make a "natural" transition out

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of HD following college graduation without receiving formal treatment (Chan et al., 2007; Dawson et al., 2004; Prince et al., 2019; Vergés et al., 2012). This natural reduction in HD raises important questions about what cognitive mechanisms help people to do so. This study evaluates one's level of identification with drinking, also referred to as *drinking identity*, as a potential cognitive mechanism that mediates the transition out of college and subsequent reductions in HD.

Developmental transitions have been identified as drivers of changes in drinking, and a key developmental transition—leaving college—is associated with decreases in HD. Role shifts that accompany leaving college, such as beginning full-time employment, getting married, and becoming a parent, are associated with declines in HD (Gotham et al., 1997; O'Malley, 2004). Likewise, changes in individuals' social contexts and social networks, such as moving away from friends, are also associated with leaving college and with reductions in HD (Arnett, 2000; Reed et al., 2007; Schulenberg & Maggs, 2002). When considering specific psychosocial factors that accompany these transitions, changes in personality (i.e., shifts in neuroticism or impulsivity: Littlefield et al., 2009, 2010) and changes in motives for consuming alcohol (Littlefield et al., 2010) have been identified as factors that accompany and, in some cases, mediate changes in HD. We propose that changes in drinking identity may also accompany and mediate changes in HD during the transition out of college.

Drinking Identity

Drinking identity refers to the extent to which one associates oneself with drinking and can be thought of as a facet of the broader self-concept. Drinking identity is influenced by individuals' direct experiences, their environment (including the behaviors and attitudes of their family and friends), and the larger cultural context (for a more extensive discussion, see Lindgren et al., 2017).

Basic personality and social psychology theories have emphasized the functions of the self-concept[1] as a central organizing system (Markus, 1977). Both theory and research indicate that self-concept is dynamic and that self-concept activation is context dependent (Joe is a drinker when he is with friends but a student when he is in class; see Brown, 1998), can change across the life span (Chantel does not identify as a drinker at age 5, strongly identifies as a drinker at age 20, and weakly identifies as a drinker at age 40; see Markus & Wurf, 1987), and may be more chronically versus temporarily activated (Yuichi frequently identifies as a drinker; Cheryl rarely identifies as a drinker; see Srull & Wyer, 1989). The dynamic nature of drinking identity, combined with its ability to predict drinking behaviors (Lindgren et al., 2019), may point to its role as a mechanism that could help account for changes in HD, such as the normative decline in drinking after college. This viewpoint is consistent with studies on recovery from alcohol dependence (Beckwith et al., 2015) and smoking cessation (Meijer et al., 2017, 2018; Vangeli & West, 2012) that have revealed substantial changes in substance-related identity among people in recovery and/or who quit using.

Aspects of the self-concept can be assessed in multiple ways, and measures have been developed that can assess them more directly (e.g., self-report questionnaires that ask about how one sees oneself in relation to drinking) and more indirectly (e.g., reaction-time tasks that measure how quickly one associates the self with categories such as being a drinker or nondrinker). We conceptualize both the more direct and indirect measures of drinking identity as reflecting individuals' current, overarching sense of themselves in relation to drinking (Lindgren, Ramirez, et al., 2018). We also note that the development of the indirect measures originally occurred in the context of cognitive models known as dual-process models (Greenwald & Banaji, 1995; Strack & Deutsch, 2004). Support for these models has waned (see Hommel & Wiers, 2017; Melnikoff & Bargh, 2018) in favor of more dynamic, interacting process models (Cunningham et al., 2007; Teachman et al., 2019), and there is considerable debate about how best to conceptualize the underlying cognitive processes and measures used to assess aspects of the self-concept indirectly. Here, we elect to retain the use of the term "implicit associations" and "implicit [drinking] identity" and define them as links between constructs in memory (e.g., the self and drinking) that are involuntarily activated and can influence subsequent cognitions, emotions, and behavior (Lindgren et al., 2019); we use the term "explicit [drinking] identity" to refer to the self-report measure of drinking and self-concept. In addition, in this article, we are agnostic with respect to the larger underlying cognitive model. We note that both dual-process models and more recent formulations related to alcohol/drinking conceptualize cognitive processes (including cognitions about identity or the self) as context dependent and dynamic (Cunningham et al., 2007; Lindgren et al., 2019; Teachman et al., 2019).

Findings from studies that assessed measures of implicit and explicit drinking identity indicate that both predict unique variance in college student HD, including alcohol consumption and problems, risk of alcohol use disorders (AUDs), and craving (Lindgren et al., 2013). Moreover, measures of implicit and explicit drinking identity predict college student HD cross-sectionally and over time (Lindgren et al., 2013, 2017; Lindgren, Neighbors, et al., 2016; Lindgren, Ramirez, et al., 2016). Furthermore, consistent with psychological theories about the self as a central organizing system, implicit drinking identity is consistently the strongest predictor of U.S. college student drinking outcomes compared with other well-validated implicit alcohol cognitions (Lindgren et al., 2013, 2017; Lindgren, Neighbors, et al., 2016; Lindgren, Ramirez, et al., 2016). Finally, recent findings among college students in their first and second years of college (a key developmental period for initiation of drinking and increases in HD) indicate that increases in implicit drinking identity lead to increases in consumption over time and vice versa (Lindgren, Baldwin, et al., 2018). Collectively, these findings point to the probability that changes in drinking identity may be an important cognitive factor that accompanies transitioning out of HD after college graduation. To our knowledge, the present study is the first to evaluate whether changes in implicit and/or explicit drinking identity are associated with transitioning out of HD after college. Furthermore, it is among the first (for an exception, see Shono et al., 2022) to disentangle drinking identity at the between- and within-persons level and test whether within-persons changes in drinking identity are associated with within-persons changes in HD. Isolating within-persons change allows for the evaluation of whether changes in an *individual's* drinking identity (vs. groups of individuals) are associated with subsequent changes in the *individual's* drinking (vs. groups of individuals). Within-persons change is conceptually the kind of change that is often invoked in our theories about how and why drinking reduces following college (e.g., if Joe's drinking identity is weaker than it was before, that change should then lead to Joe drinking less; for a similar discussion in adolescents, see Meisel et al., 2018).

Social Networks

When considering specific factors that may lead to within-persons change in drinking identity during the transition out of college, we suggest that within-persons change in social networks (e.g., friends, acquaintances, coworkers, families) may be precipitants. Peers play a large role in college student HD and drinking identity. For example, heavy drinkers associate with other heavy drinkers (Borsari & Carey, 2001). Identification with groups perceived as heavy drinkers is associated with one's own drinking (Neighbors et al., 2010; Reed et al., 2007). Perceptions of friends' drinking and approval have stronger associations with one's own drinking and alcohol-related problems than perceptions of peers' drinking and approval more generally (LaBrie et al., 2010; Lewis et al., 2010). Furthermore, lower drink-refusal self-efficacy in social situations (which we assume is partly a function of one's social network) is associated with stronger explicit drinking identity (Foster et al., 2014).

Prominent explanations for reductions in drinking following college emphasize role changes that are directly associated with changes in social networks (Arnett, 2000; Bachman, 2002; Schulenberg & Maggs, 2002). These may include changes in network members and/or the strength of association with members and, crucially, changes to the drinking behaviors within the network. Relocation and role changes following graduation may reduce the proximity of heavy-drinking friends and acquaintances, which results in the addition of members to the network who drink less or not at all. Longitudinal examinations of associations between individual drinking and social-network drinking from adolescents through adulthood have supported reciprocal pathways representing both influence and selection effects (Bullers et al., 2001; Haller et al., 2010; Read et al., 2005). That is, individuals are influenced by the drinking of their social-network members, and individuals also seek to affiliate with individuals who have similar drinking practices. Although the present research focuses on the influence pathway (social network → identity → HD), changes in drinking identity are also a plausible potential mediator of the association between changes in drinking and changes in social-network drinking (HD → identity → social network), and we also evaluate this reverse mediation relationship. In sum, we propose that these social-network changes—specifically, changes to the drinking behaviors of the network—will predict changes in one's drinking identity and, in turn, changes in actual drinking. Thus, we hypothesized that within-persons changes in drinking identity would mediate the longitudinal association between within-persons changes in social networks and within-persons changes in drinking that occur after individuals graduate from college.

Study Overview and Hypotheses

We recruited a large sample of students in their final 6 months of college who reported HD and evaluated their drinking identity, HD, and the composition and drinking of their social network (the 10 most important people with whom they regularly interact) at approximately 4-month intervals via online assessments. Hypotheses were as follows (the hypotheses and the analytic plan were initially preregistered, but the analytic plan changed because of helpful editor and reviewer feedback; for the hypotheses and original analysis plan, see https://osf.io/tqy5a, and for the original results, see https://osf.io/d27jp).

Hypothesis 1: Within-persons reductions in implicit/explicit drinking identity will predict within-persons reductions in HD.

Hypothesis 2: Within-persons reductions in HD within one's social network will predict within-persons reductions in one's own HD.

Hypothesis 3: Within-persons reductions in implicit/explicit drinking identity will mediate the association between within-persons social-network changes and within-persons reductions in one's own HD.

Method

Participants

We initially recruited 521 full-time undergraduate students from a large public university in the Pacific Northwest 6 months before their anticipated graduation. To be eligible for the study, individuals had to report expecting to graduate within the next 6 months, score 8 or higher on the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001), be 18 to 25 years old (M = 21.50, SD = 0.92), and be fluent in English. Because the study focused on the transition out of college, graduation status was later verified to confirm continued study eligibility and resulted in a final sample of 422 college graduates (58.8% female, 41.2% male; no participants self-identified as transgender or any other gender-diverse identity). The 99 participants deemed ineligible were then excluded from the study (the majority were ineligible because of a change in their expected graduation dates; a minority were dropped because of other disqualifying responses—e.g., completing the assessment multiple times with different responses). All statistics reported hereafter pertain to the 422 participants eligible for the complete study.

Participants reported their race as White (61.6%), Asian (20.9%), Black or African American (1.2%), American Indian/Alaska Native (1.2%), Native Hawaiian or Other Pacific Islander (0.9%), more than one race (12.8%), or unknown (0.7%); the remaining 0.7% declined to answer. A minority of participants (6.9%) identified as Hispanic or Latino. Follow-up assessment retention rates were 90.5% at Time [T] 2, 89.8% at T3, 86.7% at T4, 84.1% at T5, 81.0% at T6, 80.6% at T7, and 82.0% at T8.

Measures and materials

All measures were administered at all time points.

Social-network measure. Social networks were assessed using a version of the Important People Instrument (Longabaugh & Zywiak, 1999) that incorporated modifications by Barnett et al. (2014). Participants were asked to list the initials of the 10 most important people they interacted with in person at least once a week and provide the following information about each individual listed: their relationship to the participant, gender, approximate age, closeness, whether the participant has consumed alcohol with them, and which individuals within their network know one another. Participants were also asked to report on each network member's alcohol consumption (response options: 1 = *doesn't drink alcohol at all*, 2 = *light drinker*, 3 = *moderate drinker*, 4 = *heavy drinker*). Network members' drinking levels were averaged to represent social-network drinking at each time point (range = 1–4), and higher scores indicate greater levels of alcohol consumption among one's social network.

Drinking identity.

Explicit drinking identity. The Alcohol Self-Concept Scale (ASCS; Corte & Stein, 2007; Lindgren et al., 2013, adapted from Shadel & Mermelstein, 1996) was used to measure explicit drinking identity. Individuals are asked to rate, on a 7-point Likert-type scale ranging from −3 (*strongly disagree*) to +3 (*strongly agree*), the extent to which they agree or disagree with statements endorsing drinking as being a part of their identity (e.g., "Drinking is a part of my self-image"). Scores are averaged across the five items, and higher scores indicate stronger explicit drinking identity. Cronbach's αs at each time point ranged from .91 to .94.

Implicit drinking identity. The drinking identity Implicit Association Test (IAT; Lindgren et al., 2013, adapted from Greenwald et al., 1998) was used to evaluate implicit drinking identity. Target concepts ("me" and "not me") and attributes ("drinker" and "nondrinker") are paired on either side of the computer screen (e.g., "me" and "drinker" on the left side and "not me" and "nondrinker" on the right). Stimuli corresponding to each target concept (i.e., "me," "my," "mine," "self"; "they," "them," "their," "other") and attribute (i.e., "drinker," "partier," "drunk," "drink"; "nondrinker," "abstainer," "sober," "abstain") appear individually in the center of the screen in a randomized order. Respondents are asked to categorize stimuli into their corresponding target or attribute as quickly and accurately as possible, pressing "E" on the keyboard for stimuli corresponding to the target or attribute on the left side and "I" for the target or attribute on the right. If a stimulus is incorrectly categorized, a red "X" appears in the center of the screen, and respondents must correctly reclassify the stimulus before the next stimulus is presented.

The IAT comprises seven blocks. After completing practice blocks categorizing target stimuli (Block 1), attribute stimuli (Block 2), and the first target–attribute pairing (Block 3), a longer test block (Block 4) of the same pairing is presented. The position of the target categories is then reversed, and two practice blocks (Blocks 5 and 6) take place before a longer test block (Block 7) of the new target-attribute pairing. The order of pairings is counterbalanced across participants. Please see Figure 1 for example trials from combined target-attribute pairing blocks.

Response latencies from the time a stimulus is presented to the time it is correctly categorized are recorded. Faster accurate response times are expected when paired concepts are perceived to be more strongly associated. Mean latency differences between Blocks 3 and 6 and between Blocks 4 and 7 are calculated via the D1 scoring algorithm (see Greenwald et al., 2003). This algorithm—which is essentially a standardized difference in the average latencies time across the combined sets of categories—results in a final "D score" that ranges from –2 to 2. Scores were excluded when more than 10% of responses were faster than 300 ms (Greenwald et al., 2003). Higher D scores indicate stronger associations between "me" and "drinker" than between "me" and "nondrinker" (i.e., stronger implicit drinking identity). At each time point, 2% or less of scores met the exclusion criteria. Internal consistencies were calculated by calculating a D score for Blocks 3 and 6 and Blocks 4 and 7 and correlating them with one another (Greenwald et al., 2003). The correlations ranged from r = .52 to .60 across time points, consistent with those reported for the drinking-identity IAT in other samples (Lindgren et al., 2013; Lindgren, Neighbors, et al., 2016).

HD.

Alcohol consumption. The Daily Drinking Questionnaire (DDQ; Collins et al., 1985) assesses typical weekly alcohol consumption over the past 3 months. Respondents are asked how many alcoholic drinks they consume each day of a typical week. U.S. standard drink equivalencies are provided for reference. Daily counts are summed to create a weekly total.

Risk of AUD. The AUDIT (Babor et al., 2001) was used to measure the risk of AUD. The 10 items assess alcohol use (e.g., "How often do you have a drink containing alcohol?"), dependence (e.g., "How often during the last year have you found that you were not able to stop drinking once you had started?"), and problems (e.g., "Have you or someone else been injured as a result of your drinking?") over the past year. Responses are scored 0 to 4 and then summed to yield a total score. Higher scores indicate greater risk of an AUD (Babor et al., 2001). Psychometric studies of the AUDIT indicate that a cutoff score of 8 yields a sensitivity (correctly identifying positive cases) in the .90s for identifying problematic drinking and specificity (correctly identifying negative cases) of .80 for identifying nonhazardous drinking (Babor et al., 2001; Saunders et al., 1993). Thus, to capture the present study's target population of hazardous drinkers, participants had to meet or exceed this cutoff score of 8 at baseline to be eligible. Cronbach's αs were .58 at T1, slightly

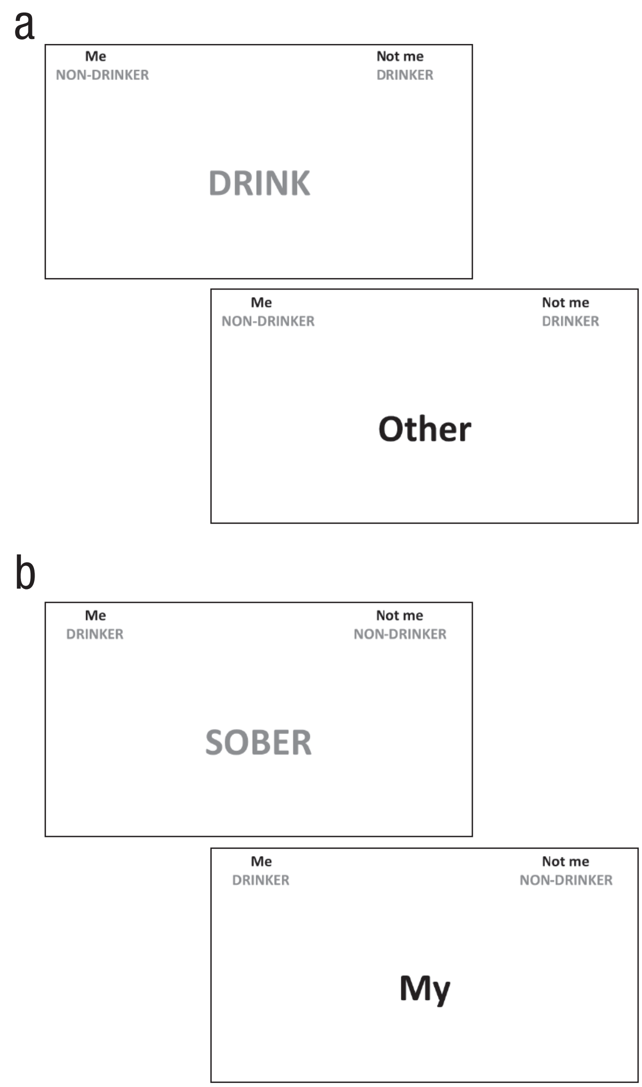

Fig. 1. Example trials from the drinking identity Implicit Association Test (IAT). Shown are (a) two Part A trials from blocks in which "me" + "non-drinker" (and "not me" + "drinker") were paired and (b) two Part B trials from blocks in which "me" + "drinker" (and "not me" + "non-drinker") are paired. Participants used the "I" and "E" keys to categorize stimuli presented in the middle of screen, and they had to correct errors before proceeding to the next trial. The drinking identity IAT is scored such that the average reaction time of Part A trials is subtracted from the average reaction time of Part B trials and divided by the standard deviation of all trials. Higher IAT scores reflect stronger associations (faster response times) with "me" + "drinker" and ("not me" + "non-drinker") than "me" + "non-drinker" ("not me" + "drinker").

below typical acceptable levels, and ranged from .71 to .77 following graduation (T2–T8).

Alcohol problems. The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) was used to assess alcohol-related problems. Respondents are asked how many times they experienced various negative consequences (e.g., "passed out or fainted suddenly") while drinking or because of their alcohol use during the past 4 months. RAPI assessment interval (originally published as "ever" or "the last three years") was adapted for the current study to match the study's 4-month assessment intervals. Response options ranged from 0 (*never*) to 4 (*more than 10 times*). Two additional items that assessed driving under the influence were added to the original 23-item measure. Given that the RAPI was created to assess adolescent and young-adult problem drinking, the first item ("not able to do your homework or study for a test") was modified after T2 (i.e., after participants graduated) to "not able to complete your job responsibilities or do your homework or study for a test." Responses were summed (range = 0–100). Higher scores indicate more alcohol-related problems. Cronbach's αs at each time point ranged from .87 to .92.

Heavy episodic drinking. To assess heavy episodic drinking (HED), we asked participants how many times in the past month they had consumed four or more drinks (females) or five or more drinks (males) on a single occasion (adapted from Collins et al., 1985). Response options ranged from *0* to *10 or more*.

Procedures

The university registrar's office provided researchers with contact information for a random sample of 18- to 25-year-old full-time undergraduate seniors. Potential participants were invited to the study via email. Emails included unique personal identification numbers that recipients could use to log in to the linked study web page to learn more about the study, complete informed consent procedures, or decline participation. Consenting individuals were asked to complete an eligibility screening consisting of demographics questions, the AUDIT, and one other measure selected randomly from the larger baseline assessment in an attempt to mask eligibility criteria. Individuals who were ineligible were thanked for their time and directed out of the study. Eligible individuals were invited to continue to the baseline assessment (T1) to complete the remaining measures.

Follow-up assessments (T2–T8) occurred every 4 months for 2 years after graduation. Measures were presented in a randomized order, except for the IAT and the social-network measure, which were administered near the beginning of assessments to help minimize the potential effects of participant fatigue. Three accuracy-check questions (e.g., "To answer this question correctly, you must answer 'Strongly disagree'") were interspersed throughout each assessment to evaluate whether participants were attentive and responding accurately. Attentiveness appeared quite high (84% of participants answered all accuracy-check questions correctly at T1, and 91% or more answered them all correctly at T2–T8). All assessments were web-based. They could be completed at the time and location of the participants' choosing but needed to be completed on a computer (i.e., not a mobile device).

Participants were compensated $25 for each completed assessment T1 through T4 and $30 for each T5 through T8. At the end of each assessment, completers were entered into a drawing to win one of four $25 Amazon electronic gift cards. Participants who completed all of the first four assessments received a $25 bonus at T4; another $25 bonus was paid at T8 to individuals who completed all of the last four assessments. All study procedures were approved by the university's institutional review board.

Data analysis

We used a random-intercept cross-lagged panel model (RI-CLPM) to evaluate our hypotheses[2] (Hamaker et al., 2015). The RI-CLPM is similar to a traditional cross-lagged model except that it includes a random intercept for each construct to isolate the between-persons variability in each construct (i.e., social network, identity, and HD) across the length of the study. Because the RI-CLPM includes the random intercepts, the remaining variability in each observation is within-persons variability—differences in time-specific deviations from participants' expected value over the course of the study (Hamaker et al., 2015, p. 104). The RI-CLPM can also be extended to estimate mediation paths.

Figure 2 is a simplified diagram of the RI-CLPM we used that includes only the within-persons regression paths. We estimated, but did not include in the diagram, the (a) random intercepts, (b) covariance among the random intercepts, and (c) covariances among the residual variances at each time point. We estimated models separately for the explicit and implicit identity constructs.

Social network and identity were included as observed variables. In contrast, we built a latent variable that included all four drinking variables (Mulder & Hamaker, 2021). We used a confirmatory factor analysis at each time point in which all four drinking variables, which were treated as count variables (Atkins et al., 2013), loaded on a single latent variable. We used a latent variable for three reasons. First, each measure was selected to assess an aspect of HD. Second, the

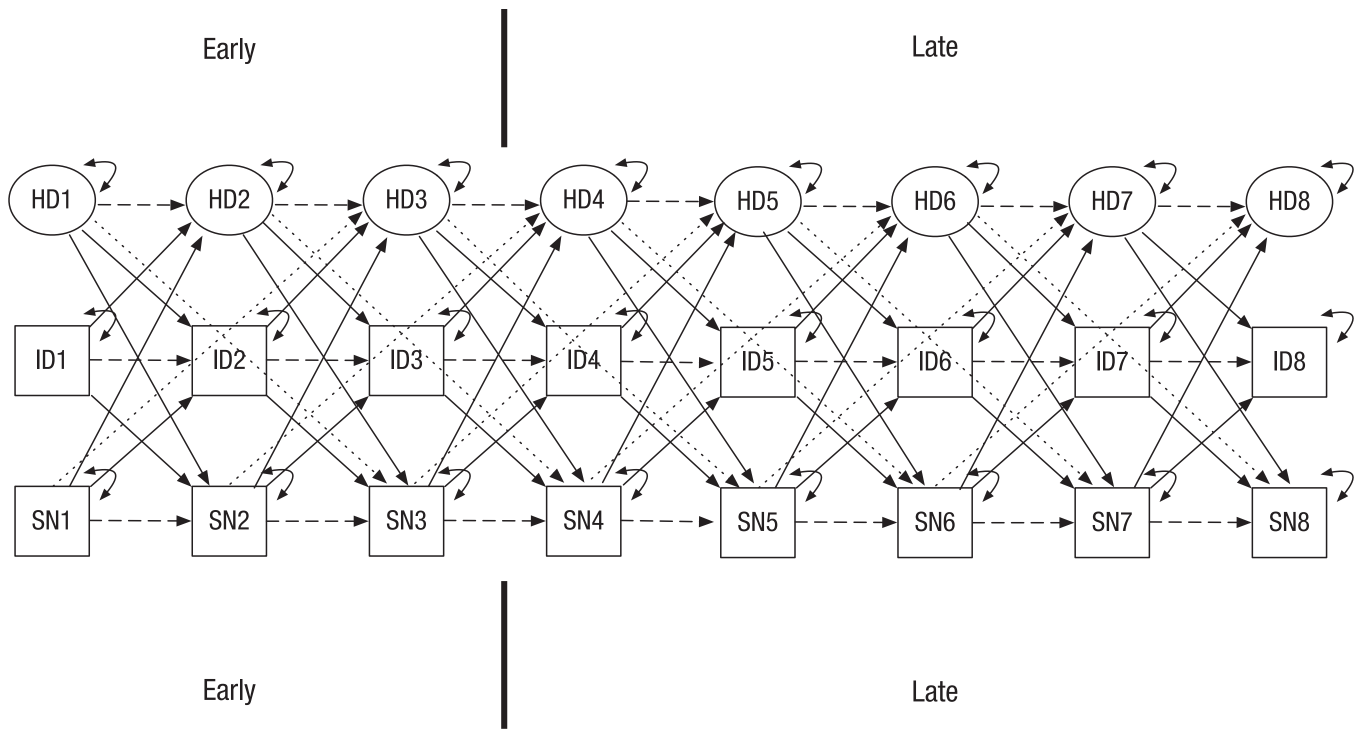

Fig. 2. Simplified path diagram for the random-intercept cross-lagged panel model. The model included but the diagram does not depict (a) the factor loadings for the latent hazardous drinking (HD) variable; (b) the variances and covariances for the random intercepts for social network (SN), identity (ID), and HD; (c) intercepts; and (d) covariances among the time-specific residuals. The dashed lines represent the autoregressive paths, the solid lines represent the cross-lagged paths for a 1-unit time lag, and the dotted lines represent the cross-lagged paths for a 2-unit time lag.

RI-CLPM involves many parameters (200+ with eight time points). Consequently, limiting the number of models we estimate is sensible. Third, the RI-CLPM, and any cross-lagged panel model, is possible only with continuous variables or categorical variables that can be represented continuously.[3] The drinking variables in this study are count variables. Unfortunately, the stability, cross-lag, and mediation paths of the RI-CLPM cannot be estimated with count variables. However, latent HD is a continuous variable and can more easily be included in the RI-CLPM.

Figure 2 shows that there are three types of regression paths in the RI-CLPM. First, the Lag 1 stability paths (dashed lines) represent the regression of a given construct at time i on the same construct at time $i - 1$. Second, the Lag 1 cross-lagged paths (solid lines) represent the regression of a given construct at time i on another construct at time $i - 1$. Third, the Lag 2 cross-lagged paths (dotted lines) represent the regression of a given construct at time i on another construct at time $i - 2$. We used the Lag 2 cross-lagged paths to obtain the direct effect of social network on HD and vice versa. All paths control for the other relationships in the model.

We computed indirect effects for the path from social network to HD via identity effect; the indirect effect was the product of the Lag 1 cross-lagged path from social network to identity and the Lag 1 cross-lagged path from identity to HD. We also computed indirect effects for the path from HD to social network via identity effect; the indirect effect was the product of the Lag 1 cross-lagged path from HD to identity and the Lag 1 cross-lagged path from identity to social network.

The RI-CLPM was estimated in Mplus (Version 8.6; L. K. Muthén & Muthén, 2017). Our models involve eight latent variables constructed from count variables, which made maximum likelihood estimation prohibitive. Consequently, we used Bayesian methods to obtain parameter and interval estimates. Because our primary reason for using Bayesian methods was computational, we used the default prior distributions in Mplus. We used four chains with 10,000 draws each. Convergence was established with trace plots, and we ensured that all parameters had a potential scale reduction value of less than 1.1. Traditional structural equation modeling fit indices (e.g., comparative fit index) and Bayesian fit indices (e.g., deviance information criterion) are not available in Mplus when using count data and the Bayesian sampler.

A fully unconstrained model in which all loadings, paths, variances, and covariances were freely estimated involved 217 parameters and would not converge.

Table 1. Descriptive Statistics and Unstandardized Correlations for Study Variables at Time 1

Variable	Mean	*SD*	1	2	3	4	5	6	7
1. Gender (59% F)	—	—	—						
2. Explicit identity	–1.61	1.20	–0.12*	—					
3. Implicit identity	0.26	0.43	–0.13**	0.24***	—				
4. Soc net drink	2.59	0.40	–0.10*	0.29***	0.20***	—			
5. AUDIT score	12.43	4.44	–0.16**	0.42***	0.19***	0.36***	—		
6. Consumption	14.98	10.54	–0.32***	0.40***	0.23***	0.43***	0.58***	—	
7. HED	4.09	2.71	–0.10*	0.32***	0.19***	0.42***	0.49***	0.65***	—
8. RAPI	10.31	8.48	0.004	0.40***	0.11*	0.20***	0.63***	0.40***	0.33***

Note: $N = 422$. Gender was coded as 0 = men, 1 = women. Explicit identity = scores on the Alcohol Self-Concept Scale (higher scores indicate stronger drinking identity; Corte & Stein, 2007; Lindgren et al., 2013, adapted from Shadel & Mermelstein, 1996); implicit identity = scores on the drinking identity Implicit Association Test (higher scores indicate stronger associations with "drinking" and "me" or stronger drinking identity; Lindgren et al., 2013, adapted from Greenwald et al., 1998); soc net drink = average level of drinking in participants' social networks (higher scores = higher levels of drinking); AUDIT = Alcohol Use Disorder Identification Test (higher scores = greater risk of alcohol use disorder; Babor et al., 2001); consumption = self-reported number of drinks consumed on a typical week assessed via the Daily Drinking Questionnaire (Collins et al., 1985); HED = heavy episodic drinking or number of self-reported heavy drinking episodes (four/five or more drinks per occasion for women/men) in the past month; RAPI = scores on the Rutgers Alcohol Problem Index (higher scores = more alcohol-related problems; White & Labouvie, 1989).
*$p < .05$. **$p < .01$. ***$p < .001$.

Consequently, we applied constraints to the model. First, we constrained the factor loadings and intercepts for the drinking variable to be equal across time.[4] This constraint substantially improved mixing of the chains. Second, within any category of regression paths (e.g., stability path), we constrained the paths to be equal from Time 1 to Time 3 and then from Time 4 to Time 8. We refer to these constraints as the "early" and "late" parameters in the results, including figures and tables. We chose these constraints because Times 1 to 3 overlapped with participants being in college (Time 1), completing college (Time 2), and their summer after graduation (Time 3); thus, participants were reporting about their social networks, drinking identity, and drinking behaviors during periods that included and were very proximal to their college experiences. In contrast, Times 4 through 8 spanned the fall following college graduation onward—a period that had increasing distance from their college experience and likely included beginning new jobs and/or graduate/professional school for the majority of participants.

Results

Sample characteristics

For illustrative purposes, Table 1 contains T1 means, standard deviations, and unstandardized correlations for study variables (complete data for all eight time points are available at https://osf.io/d27jp). Consistent with prior findings, we found that scores on implicit and explicit identity measures were positively, albeit weakly, correlated ($r = .24$). They were also positively correlated with HD variables (explicit HD correlations ranged from .32 to .42; implicit HD correlations ranged from .11 to .23). Social network drinking was also related to identity measures (explicit: .29, implicit: .20) and HD variables (correlations ranged from .20 to .42).

We also note that the sample, at baseline, reported behaviors consistent with HD: Participants' AUD risk, on average, exceeded the cutoff (i.e., score of 8) by 55%, and, on average, they reported consuming 15 drinks per week, having four heavy-drinking episodes per month, and experiencing more than 10 alcohol-related negative consequences. The overall trend for sample participants was a reduction in HD over time (see Fig. S1 in the Supplemental Material available online): For example, by the end of the study, 49.9% of participants fell below the AUDIT threshold (score ≥ 8); average weekly consumption decreased to about nine drinks, average number of negative alcohol-related consequences decreased to about five, and average number of heavy-drinking episodes dropped to about 2.7 (only 17% had one or less at baseline, and 43% had one or less at the end of the study).

We also fit a latent growth curve model to explore whether HD decreased over time. The random intercept and slope were estimated using the latent HD variables as the indicators (see Example 6.14 in Muthén & Muthén, 2017). This type of growth curve model requires constraining the loadings and intercepts to be equal across time (Muthén & Muthén, 2017, p. 139; see Data Analysis section above). The average linear rate of change was –0.121 (95% credible interval [CrI] = [–0.134, –0.108]), which indicates a reduction in HD across time. The random slope variance was 0.01 (95% CrI = [0.008, 0.013]), which indicates a small amount of variability in the person-specific rates of change.

Collectively, these patterns suggest that we successfully recruited a sample of students who were relatively high risk at the end of college and that HD declined, on average, following college, which confirms (partial) maturing out at a descriptive level.

Latent HD

For both the explicit and implicit identity models, we constructed a latent HD variable at each time point. To identify each latent variable, we constrained the loading for HED to 1. Likewise, as discussed in the Data Analysis section, factor loadings and item intercepts were constrained to be equal across time. Table 2 provides the loading and 95% CrIs for both the explicit and implicit identity models. All CrIs in Table 2 excluded 0. For both the explicit and implicit identity models, the AUDIT had the lowest loading, followed by the DDQ and the RAPI.

Table 2. Factor Loadings and Item Constants for Hazardous Drinking Latent Variable

Variable	Explicit identity	Implicit identity
Loading		
HED	1[a]	1[a]
AUDIT	0.615 [0.586, 0.647]	0.608 [0.578, 0.639]
DDQ	1.066 [1.021, 1.114]	1.062 [1.016, 1.109]
RAPI	1.173 [1.103, 1.247]	1.154 [1.083, 1.226]
Constant		
HED	1.373 [1.322, 1.426]	1.369 [1.316, 1.423]
AUDIT	2.450 [2.419, 2.483]	2.447 [2.416, 2.480]
DDQ	2.619 [2.568, 2.673]	2.615 [2.562, 2.670]
RAPI	2.104 [2.041, 2.170]	2.102 [2.038, 2.167]

Note: HED = heavy episodic drinking or number of self-reported heavy drinking episodes (four/five or more drinker per occasion for women/men) in the past month; AUDIT = scores on the Alcohol Use Disorder Identification Test (Babor et al., 2001); DDQ = Daily Drinking Questionnaire (Collins et al., 1985), self-reported number of drinks consumed on a typical week assessed; RAPI = scores on the Rutgers Alcohol Problem Index (White & Labouvie, 1989). Numbers in brackets are 95% Bayesian credible intervals. All variables were treated as count variables in the factor analysis. In addition, loadings and constants were constrained to be equal across time.
[a]Loading fixed to 1 for identification.

Mediation models

Table 3 provides the regression coefficients and 95% CrIs for the RI-CLPM. Results are presented separately for explicit identity (measured via the ASCS) and implicit identity (measured via the IAT). We also include the point and interval estimates for the indirect effects for both SN(t – 1) → ID(t) → HD(t + 1) and HD(t – 1) → ID(t) → SN(t + 1), in which t represents a given time point, SN represents social network, and ID represents identity. Although it is possible to compute additional indirect effects in our model, for example, SN(t – 1) → HD(t) → HD(t + 1), these indirect effects were not part of our primary aims and thus were excluded. The coefficients in Table 3 are within-persons coefficients, including the indirect effect. That is, the coefficients represent the relationship between time-specific deflections for the person-level averages (modeled via the random intercepts). Finally, for the time-specific, within-persons correlations between SN, ID, and HD, see Table S1 in the Supplemental Material. In brief, the correlations were nearly all positive (only three out of 48 were negative); SN-HD correlations were similar across models, but there was some decay over time; SN-ID correlations were larger in the explicit (vs. implicit) model and had less decay over time; ID-HD correlations were 2 to 3 times larger in magnitude in the explicit (vs. implicit) models and had little decay in the explicit model, whereas the implicit model had decay over time. For a more detailed discussion of those correlations, see the Supplemental Material.

The random intercepts in the models are the person-level portion of SN, ID, and HD. The correlations between the random intercepts thus provide the between-persons relationships among the constructs across the study period. In the explicit ID models, the SN and ID correlation was r = .258 (95% CrI = [.109, .396]), the SN and HD correlation was r = .474 (95% CrI = [.280, .609]), and the ID and HD correlations was r = .603 (95% CrI = [.442, .859]). In the implicit ID models, the SN and ID correlation was r = .247 (95% CrI = [.098, .384]), the SN and HD correlation was r = .488 (95% CrI = [.352, .604]), and the ID and HD correlations was r = .326 (95% CrI = [.153, .480]). Thus, there were positive relationships among all constructs in both sets of models at the between-persons level.

Explicit identity. Mediation was not observed for either the SN(t – 1) → ID(t) → HD(t + 1) or HD(t – 1) → ID(t) → SN(t + 1) pathway. Specifically, for SN(t – 1) → ID(t) → HD(t + 1), the indirect path between social-network drinking and HD via explicit identity was not significant in the early time point (ab = –0.001, 95% CrI = [–0.013, 0.008]; ab = –0.002, 95% CrI = [–0.014, 0.019])[5] or late time point (ab = 0.003, 95% CrI = [–0.005, 0.013]). The lack of mediation is a function of the small magnitude of the a and b paths—SN(t – 1) → ID(t) and ID(t) → HD(t + 1), respectively. Specifically, the early a path was 0.039 (95% CrI = [–0.157, 0.234]), and the late a path was –0.068 (95% CrI = [–0.218, 0.081]). Likewise, the early b path was –0.047 (95% CrI = [–0.084, –0.011]), and the late b path was –0.052 (95% CrI = [–0.088, –0.025]).

Table 3. Unstandardized Regression Coefficients and Indirect Effects for the Random Intercept Cross-Lagged Panel Model

Model	Explicit identity	Implicit identity
	Regression coefficients	
SN → SN (Lag 1)		
Early	0.266 [0.198, 0.338]	0.270 [0.202, 0.339]
Late	0.284 [0.231, 0.338]	0.287 [0.235, 0.341]
SN → ID (Lag 1)		
Early	0.039 [–0.157, 0.234]	0.012 [–0.073, 0.097]
Late	–0.068 [–0.218, 0.081]	–0.017 [–0.084, 0.050]
SN → HD (Lag 1)		
Early	–0.059 [–0.086, –0.032]	–0.034 [–0.053, –0.015]
Late	–0.036 [–0.069, –0.001]	–0.006 [–0.037, 0.025]
SN → HD (Lag 2)		
Early	–0.083 [–0.108, –0.058]	–0.090 [–0.113, –0.066]
Late	–0.060 [–0.097, –0.018]	–0.078 [–0.109, –0.048]
HD → HD (Lag 1)		
Early	0.888 [0.711, 1.148]	0.722 [0.614, 0.831]
Late	0.817 [0.711, 1.023]	0.715 [0.654, 0.780]
HD → ID (Lag 1)		
Early	0.400 [0.132, 0.701]	0.087 [0.002, 0.172]
Late	0.292 [0.130, 0.501]	0.051 [0.002, 0.103]
HD → SN (Lag 1)		
Early	0.087 [–0.016, 0.222]	0.060 [–0.013, 0.134]
Late	0.039 [–0.047, 0.149]	0.036 [–0.029, 0.098]
HD → SN (Lag 2)		
Early	0.069 [0.006, 0.133]	0.057 [–0.005, 0.120]
Late	0.056 [–0.003, 0.116]	0.041 [–0.017, 0.098]
ID → ID (Lag 1)		
Early	0.164 [0.093, 0.238]	0.006 [–0.062, 0.073]
Late	0.188 [0.129, 0.246]	0.077 [0.025, 0.127]
ID → SN (Lag 1)		
Early	0.001 [–0.023, 0.024]	0.033 [–0.016, 0.083]
Late	–0.001 [–0.020, 0.017]	–0.016 [–0.052, 0.017]
ID → HD (Lag 1)		
Early	–0.047 [–0.084, –0.011]	0.039 [–0.040, 0.116]
Late	–0.052 [–0.088, –0.025]	–0.100 [–0.157, –0.044]
	Indirect effects	
SN → ID → HD		
Early	–0.001 [–0.013, 0.008]	0.000 [–0.005, 0.006]
	–0.002 [–0.014, 0.009]	–0.001 [–0.011, 0.008]
Late	0.003 [–0.005, 0.013]	0.002 [–0.005, 0.009]
HD → ID → SN		
Early	0.000 [–0.012, 0.009]	0.002 [–0.002, 0.010]
	0.000 [–0.011, 0.007]	–0.001 [–0.006, 0.002]
Late	0.000 [–0.008, 0.005]	–0.001 [–0.004, 0.001]
	422	422

Note: Numbers in brackets are 95% Bayesian credible intervals. Several parameters are not included in this table: (a) the factor loadings for the latent hazardous drinking (HD) variable; (b) the variances and covariances for the random intercepts for social network (SN), identity (ID), and HD; (c) residual variances and dispersion for count variables; (d) intercepts; and (e) covariances among the time-specific residuals. Output is available at https://osf.io/d27jp. Early = Time 1–Time 3; late = Time 4–Time 8. The indirect effects have two “early” time points because there is one indirect effect that involves parameters that span Time 3 and Time 4.

For HD(t − 1) → ID(t) → SN(t + 1), the indirect path between HD and social-network drinking via explicit identity was not significant in the early time point (ab = 0.000, 95% CrI = [−0.012, 0.009]; ab = 0.000, 95% CrI = [−0.011, 0.007]) or late time point (ab = 0.000, 95% CrI = [−0.008, 0.005]). In contrast, the reverse path, the a paths in this direction—HD(t − 1) → ID(t)—were positive and significant. Specifically, the early a path was 0.400 (95% CrI = [0.132, 0.701]), and the late a path was 0.292 (95% CrI = [0.130, 0.501]). As before, the b paths—ID(t) → SN(t + 1)—were small and not significant; the early b path was 0.001 (95% CrI = [−0.023, 0.024]), and the late b path was −0.001 (95% CrI = [−0.020, 0.017]).

Implicit identity. As with explicit identity, mediation was not observed for either the SN(t − 1) → ID(t) → HD (t + 1) or HD(t − 1) → ID(t) → SN(t + 1) pathway. Specifically, for SN(t − 1) → ID(t) → HD(t + 1), the indirect path between social-network drinking and HD via implicit identity was not significant in the early time point (ab = 0.000, 95% CrI = [−0.005, 0.006]; ab = −0.001, 95% CrI = [−0.011, 0.008]) or late time point (ab = 0.002, 95% CrI = [−0.005, 0.009]). As with explicit identity, the lack of mediation is a function of the small and mostly not significant a and b paths—SN(t − 1) → ID(t) and ID(t) → HD(t + 1), respectively. Specifically, the early a path was 0.012 (95% CrI = [−0.073, 0.097]), and the late a path was −0.017 (95% CrI = [−0.084, 0.050]). Likewise, the early b path was 0.039 (95% CrI = [−0.040, 0.116]), and the late b path was −0.100 (95% CrI = [−0.157, −0.044]).

For HD(t − 1) → ID(t) → SN(t + 1), the indirect path between HD and social-network drinking via implicit identity was not significant in the early time point (ab = 0.002, 95% CrI = [−0.002, 0.010]; ab = −0.001, 95% CrI = [−0.006, 0.002]) or late time point (ab = −0.001, 95% CrI = [−0.004, 0.001]). In contrast, the reverse path, the a paths in this direction—HD(t − 1) → ID(t)—were positive and significant. Specifically, the early a path was 0.087 (95% CrI = [0.008, 0.172]), and the late a path was 0.051 (95% CrI = [0.002, 0.103]). As before, the b paths—ID(t) → SN(t + 1)—were small and not significant. The early b path was 0.033 (95% CrI = [−0.016, 0.083]), and the late b path was −0.016 (95% CrI = [−0.052, 0.017]).

Discussion

"Maturing out" or making the "natural" transition out of HD following leaving college is a well-known phenomenon, but the cognitive factors that accompany and potentially mediate that transition are not well understood. To our knowledge, this study is the first to evaluate drinking identity—a promising cognitive factor—and test whether reductions in drinking identity are linked to reduction of HD following college graduation. We tested whether within-persons reductions in drinking identity (assessed via explicit and implicit measures) were associated with subsequent within-persons reductions in a latent HD variable, hypothesizing that changes in individuals' social networks (specifically, their drinking levels) would lead to changes in identity and, in turn, to changes in drinking. Findings from our longitudinal study of college graduates indicated that despite evidence of the expected reductions in HD for the sample on average, the hypothesized mediation effects were not observed, and there was little evidence that within-persons changes in drinking identity (whether assessed implicitly or via self-report) or social-network drinking were associated with subsequent within-persons changes in HD.

Unexpectedly, there was some evidence that within-persons changes in HD were positively associated with subsequent changes in both implicit and explicit identity, which suggests the possibility that identity is a lagging versus leading indicator of HD change during the transition out of college. As in prior studies, there was evidence of small to moderate associations at the between-persons level among the identity measures, social-network drinking, and HD. Although there was not robust evidence of within-persons change over time, we note that the time-specific, within-persons correlations between identity and HD were all positive, which suggests that individuals with higher positive deviations from their predicted drinking identity scores also tended to have higher positive deviations in HD (for further discussion of this phenomenon, see Littlefield et al., 2021). Finally, we note the negative paths between SN to HD and from ID to HD were unexpected and are difficult to interpret. They are small in magnitude and may reflect noise. Furthermore, given the number of parameters in the model, it is not surprising that some paths are "significant" (we put "significant" in quotes to reflect the fact that statistical significance is not exactly what the Bayesian posterior provides).

Drinking-identity implications

A key contribution of this study is the disentangling of drinking identity at the within- and between-persons levels, something that has been largely overlooked in the literature (including in our own prior work). These findings support the importance of separating these effects, given that the between-persons-level associations with HD are larger than those at the within-persons level and within-persons changes in drinking identity appear to follow rather than precede within-persons changes in HD during the postcollege transition. Note that these findings overlap with recent work in our laboratory (Shono et al., 2022) that reevaluated a longitudinal sample of college students in their first and second years of college that included people along the full continuum of drinking (i.e., nondrinkers through heavy drinkers). Results from that study also indicated larger between- versus within-persons effects for implicit identity, although there were also some instances of within-persons changes in implicit and explicit identity predicting within-persons changes in drinking, which again suggests that drinking identity's role in relation to HD may vary depending on developmental period and "type" of drinker being evaluated.

These findings underscore the importance of continuing to clarify the role of self-concept in relation to drinking (and, we would argue, substance use more generally). Evidence continues to accumulate that drinking identity is an important, unique predictor of the transition into and escalation of drinking during adolescence (Lee et al., 2018) and the early years of adulthood (Lindgren, Neighbors, et al., 2016; Lindgren, Ramirez, et al., 2016). The current study adds to the evidence that between-persons differences in identity are associated with HD and adds the novel finding that within-persons changes in identity may "mark" the transition out of HD that occurs following college for many individuals. It is possible that change in drinking identity may be associated with relatively durable changes in HD compared with changes in HD that do not include corresponding drinking identity change, on the basis of the idea that the identity change will support more enduring low drinking levels across changing contexts (for a discussion of this possibility in the domain of changes in drinking and personality, see Littlefield et al., 2009). However, this possibility must be tested, and many open questions remain about whether and how drinking identity change supports the *maintenance* of reduced drinking during the post-college years. In addition, it will be crucial to continue to evaluate drinking identity's explanatory power relative to and in interaction with other established predictors of the transition out of HD following college (e.g., drinking motives, role changes, personality factors). In particular, we note that, to our knowledge, drinking identity and personality factors have yet to be evaluated in the same study, which leaves an important gap with respect to understanding their empirical relationship to one another and to changes in drinking.

We also note that measurement challenges related to drinking identity and the other variables may also have influenced the results. Specifically, implicit associations are challenging to measure reliably, especially when focusing on individual differences and within-persons changes rather than group differences. Furthermore, for both implicit and explicit measures, it can be particularly challenging in longitudinal studies to determine the right frequency of measurement and to disentangle differences tied to person-specific changing contexts versus person-specific changes in how one overall conceptualizes oneself in relation to drinking. For example, if drinking self-concept varies depending on whether the context is social or professional, one may need to measure implicit associations more frequently than every 3 to 4 months (for examples of such approaches with implicit associations about different substances, see Marhe et al., 2013; Waters & Li, 2008) and be specific about the context in which the measurement occurs. Consequently, more theoretical and experimental work is needed to better understand how and at what rate drinking self-concept changes.

Social-network implications

As noted above, within-persons changes in social-network drinking were not associated with within-persons change in HD, although these constructs were related at the between-persons levels. We note, too, that the social-network variable we used in our analyses did not isolate changes attributable to people moving in and out of the participant's social networks. It instead reflected the average amount of drinking among the 10 network members listed at each time point. Consequently, it is possible, in principle, that the variability on this variable could reflect a social network that remains composed of the same people but who reduce their drinking over time. Preliminary inspection of network members over time indicates there were changes in network membership, especially in the earlier time points (i.e., periods closest to college graduation). It will be important to determine the extent to which changes in social-network drinking are due to changes in drinking of the same people relative to differences in the drinking of new network members.

Strengths, limitations, and future directions

Limitations of the study include the reliance on measures of self-reported drinking and perceptions of one's network's drinking and data collected from a single university. We note that this sample (i.e., graduates from a 4-year college) is educationally privileged—and likely economically privileged. We note the relatively low internal consistency of the IAT, consistent with those observed in other samples (Lindgren et al., 2013; Lindgren, Neighbors, et al., 2016). As has been written about elsewhere (Greenwald et al., 2009; Lindgren, Neighbors, et al., 2016, supplemental materials; Nosek et al., 2007), IATs typically have lower reliabilities than explicit (self-report) measures but have higher reliabilities than other indirect reaction-time measures. We also note the lower reliability of the AUDIT at baseline. We suspect the lower reliability reflects the restricted range of scores at baseline that stemmed from the study eligibility criteria (i.e., AUDIT score ≥ 8) because we found similarly low reliability when we restricted the AUDIT scores to 8 or higher in other college student samples from our laboratory (e.g., Lindgren, Neighbors, et al., 2016) and because internal consistency improved at subsequent time points when there was more variability in scores. We also note that the context in which participants completed the study measures (the location of their choice) was inherently less controlled than a laboratory setting. Future research could evaluate the effect of context on measures of drinking identity by systematically manipulating assessment setting. These limitations are at least somewhat offset by study strengths, including the longitudinal design, the relatively large sample, and excellent study retention. Furthermore, we preregistered the hypotheses and original data-analytic plan (although, as described earlier, we benefitted from helpful suggestions to revise our analyses during the peer-review process).

The revised analyses included eight latent variables. Consequently, commonly used estimation methods, such as maximum likelihood, were computationally prohibitive. Bayesian methods provide a useful alternative to traditional estimation methods in such situations (Muthén & Asparouhov, 2012). A drawback to using the Bayesian methods in Mplus is that fit indices, both traditional structural equation modeling fit indices and Bayesian fit indices, are not available in Mplus when using count outcomes combined with the Bayesian sampler. Therefore, we were not able to assess model fit directly, and future research in this area should address this.

Moving forward, it will be important to evaluate whether findings generalize to same-age peers who are enrolled in different types of institutions and/or who are in the workforce. Future research should also consider evaluating other times and different transitions when there are substantial shifts in one's social networks (e.g., retirement, long-distance moves, graduation from professional/graduate schools) and the impact on drinking identity and drinking behaviors.

Conclusion

This study is the first that we know of to evaluate within-persons changes in drinking identity as a potential cognitive mechanism associated with the natural transition out of HD that most college students make after graduation—the well-known "maturing out" phenomenon. Study results indicated reductions in HD following graduation—to more moderate levels—and drinking identity, social-network drinking, and HD were positively associated at the between-persons level. Results did not support drinking identity as a mediator of changes in drinking. Instead, within-persons changes in drinking identity followed within-persons changes in HD. Drinking identity may function more as a marker (vs. mechanism) of HD change during postcollege transition.

Transparency

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Author Contributions

K. P. Lindgren and C. Neighbors developed the study concept. All of the authors contributed to the study design. Testing and data collection were performed by K. P. Peterson. K. P. Lindgren, S. A. Baldwin, and C. Neighbors designed and prepared the preregistration. S. A. Baldwin and C. Neighbors performed the data analysis and interpretation. K. P. Lindgren, S. A. Baldwin, K. P. Peterson, and C. Neighbors drafted the manuscript, and J. R. Ramirez, B. A. Teachman, E. Kross, and R. W. Wiers provided critical revisions. All of the authors approved the final manuscript for submission.

Declaration of Conflicting Interests

B. A. Teachman has a significant financial interest in Project Implicit, Inc., which provided data-collection services supporting this project under contract with the University of Washington. The author(s) declared that there were no other potential conflicts of interest with respect to the authorship or the publication of this article.

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Open Practices

The design and analysis plans for the experiments were preregistered at OSF an are available at https://osf.io/tqy5a. This article has received the badge for Preregistration. More information about the Open Practices badges can be found at https://www.psychologicalscience.org/publications/badges.

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Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/21677026221082957

Notes

1. Although we use the term "self-concept" in this article, we note that different literatures use different terms (e.g., the self, identity, self-schemas) to refer to roughly the same construct.
2. We initially used an alternate mediation model, which was preregistered. The details of that analysis, including results, are available on OSF (see https://osf.io/d27jp). In brief, that analysis found some support for changes in implicit (but not explicit) drinking identity (from T1 to T4–T6) mediating the relationship between changes in social-network drinking (from T1 to T2–T3) and personal drinking (from T1 to T7–T8). We changed our approach during peer review. The editor and reviewers noted, reasonably, that our original analysis did not sufficiently separate between-persons and within-persons relationships and suggested making use of as many of the time points as possible for all variables.
3. For example, Mplus (Muthén & Muthén, 2017) uses a latent formulation of categorical variables (sometimes referred to as y*), which makes it possible, along with some specific assumptions, to use categorical variables in a cross-lagged model. However, there is no latent formulation for count variables in Mplus or, as far as we are aware, in the methodological literature.
4. Typically, we would use a model comparison test, such as a likelihood ratio test, to compare the fit of a model with and without constraints. When using Bayesian modeling, these tests are not available within Mplus or any other structural equation modeling software available at this time.
5. The indirect effects have two "early" time points because there is one indirect effect that involves parameters that span T3 and T4.

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