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Self-control as a moderator of the relationship between drinking identity and alcohol use

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Abstract

This study evaluated self-control in the relationship between drinking identity and drinking. We expected those higher in drinking identity would drink more than those lower in drinking identity, particularly if low in self-control. Data were collected in 2012 via an online survey (N = 690 undergraduates, *M* age = 22.87, *SD* = 5.37, 82.50% female) at an urban university. An interaction emerged between self-control and drinking identity; self-control was negatively associated with drinking among individuals low in drinking identity, but positively associated with drinking among those high in drinking identity. Implications and future directions are discussed. This research was unfunded.

Keywords

drinking identity; restraint; theory of planned behavior

Introduction

College drinking

Decreasing college drinking is a primary health goal for the nation (U.S. Department of Health and Human Services, 2009). Although the majority of U.S. undergraduate students are younger than the legal drinking age of 21, periods of heavy drinking are often reported between the ages of 18–21 (Chen & Kandel, 1995). Recent work demonstrates that undergraduates report heavier drinking than non-college peers (Johnston, O'Malley, Bachman, & Schulenberg, 2012). According to "Monitoring the Future," approximately 80% of undergraduates consume alcohol (Johnston et al., 2006). Furthermore, an estimated 44% consumed more than five consecutive alcoholic beverages on one occasion within the previous two weeks and are thus classified as heavy drinkers (Substance Abuse and Mental Health Services Administration [SAMHSA], 2009; Wechsler, Lee, Kuo, & Lee, 2000; Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002; Wechsler, Lee, Nelson, & Kuo, 2000).

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College drinkers are more likely to experience undesired consequences including hangovers, problems with authorities, injuries, psychosocial problems, poor general health, depression, eating disorders, risky sexual behavior, and sexual assault (Dunn, Larimer, & Neighbors, 2002; Geisner, Hingson, 2010; Kaysen, Neighbors, Martell, Fossos, & Larimer, 2006; Wechsler, Kuo, Lee, & Dowdall, 2000). Moreover, although roughly 20% of college students meet criteria for alcohol abuse or dependence, fewer than 5% seek counseling or treatment for alcohol problems (NIAAA, 2007). Therefore, additional research is needed to better understand behavioral factors that may buffer against problematic drinking among at-risk college students.

Self-control

Reducing potential for harm associated with drinking requires better elucidated understanding of antecedents of alcohol use. Understanding the role self-control (SC) plays in drinking is important in order to better understand and prevent problematic alcohol use (Wills et al., 2002). SC can be operationalized as the ability to focus or monitor one's own behavior, understand consequences related to behaviors, and delay gratification (Baumeister & Vohs, 2003). SC is a complex phenomenon that incorporates the importance of one's personal standards or goals and the self-monitoring of one's behaviors. Adequate SC has been associated with consideration of longer term goals (Wills et al., 2006) and other characteristics that make injurious aspects of problematic alcohol use more salient and encourage anticipation of undesired consequences. SC equips individuals with the ability to better control their own behavior and avoid potential costs in order to maximize adaptive outcomes (Hustad et al., 2009).

Low SC is linked with appetitive drives and tendencies to respond without full consideration of undesired consequences (Wiers et al., 2007). This might include the pursuit of salient rewards, including alcohol use, in spite of associated risks. The literature suggests that deficits in general SC can lead to increased alcohol use (e.g., Carey, Neal, & Collins, 2004; Hustad, Carey, Carey, & Maisto, 2009; Neal & Carey, 2005, 2007). Previous research has further shown that SC and the severity of alcohol-related problems are negatively associated (Dvorak, Simons, & Wray, 2011). Thus, SC has consistently been shown to negatively relate to problematic drinking (Bogg, Finn, & Monsey, 2012; Huhtanen & Raitasalo, 2012; Pearson, Kite, & Henson, 2013). Additionally, SC has been linked to reduced alcohol-related problems through greater implementation of protective behavioral strategies such as limiting alcohol consumption and using a designated driver (Pearson et al., 2013). Therefore, evaluation of factors that may influence the relationship between SC and alcohol use is necessary.

Drinking identity

Drinking identity is the extent to which a person views alcohol use as a defining characteristic of their self-identity and is an important precursor to risky drinking behavior (Conner et al., 1999). The theory of planned behavior (TPB; Ajzen, 1991) is one of the most strongly supported theories associated with behavioral precursors to drinking (Collins & Carey, 2007; Conner, Warren, Close, & Sparks, 1999; Huchting, Lac, & LaBrie, 2008). The TPB proposes that subjective norms, attitudes, and perceived behavioral control conjointly

influence intentions, which in turn influence behavior (Ajzen, 1991). Past work indicates that the predictive validity of intent and behavior improves with the addition of the self-identity concept (e.g., Charng, Piliavin, & Callero, 1988; Fekadu & Kraft, 2001; Pierro et al., 2003; Smith et al., 2007), therefore including identity may strengthen predictions of drinking behavior. Because individuals tend to be motivated to maintain consistent self-views (Lalwani & Shavitt, 2009; Steele, 1988), engaging in behaviors that are in line with one's identity may facilitate maintenance of consistency. As such, alcohol identity may be a useful predictor of drinking behavior.

Drinking identity has been associated with alcohol use among undergraduate students (Casey & Dollinger, 2007; Dollinger, Rhodes, & Corcoran, 1993; Dollinger, 1996). Drinking identity research has evaluated implicit and explicit measures for identity. Implicit measures (e.g., the implicit association test; IAT; Greenwald, McGhee, & Schwartz, 1998) show that drinking identity more reliably predicts drinking relative to other alcohol-related implicit attitudes (Foster, Neighbors, & Young, 2014; Gray, Laplante, Bannon, Ambady, & Shaffer, 2011; Lindgren, Foster, Westgate, & Neighbors, 2013). Explicit alcohol identity, also termed self-reported drinking identity (SRDI), has also demonstrated links with increased drinking (e.g., Foster, Yeung, & Prokhorov, under review; Neighbors et al., 2010; Reed et al., 2007). Importantly, increased drinking is in turn linked with more alcohol-related problems (e.g., Lindgren et al., 2012). Implicit and explicit measures for drinking identity overlap greatly, and both measures are associated with alcohol consumption. The alcohol literature consistently shows that alcohol identity is positively associated with consumption (e.g., Foster, Yeung, & Neighbors, under review; Foster, Yeung, & Prokhorov, under review; Lindgren, Foster, Westgate, & Neighbors, 2013; Neighbors et al., 2010; Reed et al., 2007), which is in turn linked to increased problems (e.g., Lindgren et al., 2012). However, research has yet to examine the relationship between SC and SRDI in the prediction of drinking and problems.

Current study

The current study sought to address this gap in the literature by evaluating the influence of SC in the relationship between SRDI and drinking. As the literature indicates a negative relationship between SC and alcohol use, we expected SC to negatively predict drinking. Further, previous work shows that SRDI is associated with higher drinking levels, thus, we expected that SRDI would positively predict drinking. In line with the TPB, we further expected that SC would be differentially associated with drinking outcomes as a function of drinking identity, such that those with stronger drinking identities would drink more than those with weaker drinking identities, and that this would be particularly true among those with low SC.

Method

Participants and procedure

The current research included 690 participants (M age = 22.87, SD = 5.37, 82.50% female) from a large southern university (total student body N = 39,820 in 2011) who completed study materials as a part of a larger intervention. Data were evaluated at the baseline

assessment of the larger trial. Participants were recruited via announcements in classrooms and flyers. They received extra credit as compensation for participation. Participants self-reported the following races: 34% Caucasian, 19% Black/African American, 20.6% Asian/Pacific Islander, 6% Multi-Ethnic, 0.4% Native American/American Indian, and 20% Other. Additionally, 30% of participants reported as Hispanic/Latino.

Measures

Demographics—Participants reported demographic information including gender, age, racial background, ethnicity, and year in school.

Alcohol use—Alcohol consumption was measured using the *Quantity/Frequency Scale* (QF; Baer, 1993; Marlatt et al., 1995), which is a five-item measure that assesses the number of alcoholic beverages and the number of hours spent drinking on a peak drinking event within the past month. The QF further assesses the number of days out of the month that the individual consumed alcohol (0 = I do not drink at all, 1 = about once per month, 2 = two to three times a month, 3 = once or twice per week, 4 = three to four times per week, 5 = almost every day, or 6 = I drink once daily or more). Alcohol consumption was also measured using the *Daily Drinking Questionnaire* (Collins et al., 1985; Kivlahan et al., 1990), which measures the number of standard drinks consumed on each day of the week (Monday–Sunday) within the last three months. Scores represent the average number of drinks consumed over the course of each week during the previous month. Relative to other drinking indices, weekly drinking is a reliable index of problem drinking among undergraduates (Borsari, Neal, Collins, & Carey, 2001).

Alcohol-related problems—The *Rutgers Alcohol Problem Index* (White & Labouvie, 1989) is a 25-item measure that assesses alcohol-related negative consequences in the last month. Responses range from never (0) to 10 times or more (4). Items were rated based on how many times each problem occurred while drinking (e.g., “went to work or school high or drunk”). Total summed scores ranged from 0 to 100 (White & Labouvie, 1989). Cronbach’s alpha was .96.

Self-control—Self-control was assessed using the Self Control Scale (SCS; Tangney, Baumeister, & Boone, 2004). The SCS assesses the degree to which participants identify with 13 statements relating to self-control on a five-point Likert scale ranging from Not at all like me (5) to Very much like me (1). Cronbach’s alpha was .82.

Drinking Identity—Self-reported drinking identity (SRDI) was assessed using a five-item scale adapted from the Smoker Self-Concept Scale (Shadel & Mermelstein, 1996). The SRDI scale assesses the degree to which participants believe drinking is integrated with their own self-concept using a scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree* (Shadel & Mermelstein, 1996). Cronbach’s alpha was .94.

Results

Descriptives

Means, standard deviations, and correlations for all of the variables are presented in Table 1. SRDI was positively correlated with all drinking variables (peak drinks, drinking frequency, drinks per week, and alcohol-related problems) and negatively correlated with SC. SC was negatively correlated with all drinking variables. Drinking variables were positively associated with each other. Examinations of frequencies of drinking variables showed that 30.13% of participants reported not having consumed alcohol in the past month, 48.21% reported having consumed between one and five alcoholic beverages on one occasion in the past month, 18.07% reported consuming between six and ten drinks on one occasion in the past month, and 3.59% reported drinking more than ten drinks on one occasion in the past month.

Primary analyses

We conducted multiple hierarchical regressions to evaluate SRDI as a moderator of the effect of SC on drinking outcomes. All results are in Table 2. SRDI and SC were entered into the regression model as independent variables (IV's) and drinking variables (peak drinks, drinking frequency, drinks per week, alcohol-related problems) as dependent variables (DV's). SRDI and SC were mean centered prior to being entered in the regression model. Main effects were evaluated at Step 1. There were consistent main effects of SC on drinking outcomes such that SC negatively predicted both drinking and problems, with the exception of drinking frequency, where there was a marginal negative effect. There were consistent main effects for SRDI in predicting drinking and related problems such that SRDI positively predicted all drinking outcomes. Two-way product terms were evaluated at Step 2. SC and SRDI interacted in predicting drinking frequency (Figure 1), and drinks per week (Figure 2) such that SC was negatively associated with drinking among individuals low in SRDI, but positively associated with drinking among those high in SRDI.

More specifically, for peak drinks, the model at Level 1 accounted for 17% of the variance. SC ($\beta = -.11, p < .001$) and SRDI ($\beta = .38, p < .0001$) were both significant predictors. The model at Level 2 accounted for 17% of the variance, and the interaction between SRDI and SC was a marginal predictor ($\beta = .33, p < .1$). For drinking frequency, the model at Level 1 accounted for 13% of the variance. SC was a marginal predictor ($\beta = -.06, p < .1$) and SRDI a significant predictor ($\beta = .35, p < .0001$). The model at Level 2 accounted for 14% of the variance, and the interaction between SRDI and SC was a significant predictor ($\beta = .42, p < .05$). For drinks per week, the model at Level 1 accounted for 17% of the variance. Both SC ($\beta = -.07, p < .05$) and SRDI ($\beta = .40, p < .0001$) were significant predictors. The model at Level 2 accounted for 18% of the variance, and the interaction between SRDI and SC was a significant predictor ($\beta = .49, p < .001$). For alcohol-related problems, the model at Level 1 accounted for 24% of the variance. Both SC ($\beta = -.10, p < .05$) and SRDI ($\beta = .46, p < .0001$) were significant predictors. The model at Level 2 accounted for 23% of the variance, and the interaction between SRDI and SC was not a significant predictor. The interactions were graphed using SAS. Parameter estimates from the regression equation were used such

that low and high values were specified as one standard deviation below and above their respective means (Cohen, Cohen, West, & Aiken, 2003).

We replicated the above regression analyses among drinkers by removing abstainers from the model. Abstainers were determined as individuals who reported having consumed zero (0) drinks in the previous 30 days in response to an item from the Quantity/Frequency Scale (Baer, 1993; Marlatt et al., 1995). Roughly 30% of the sample (N=210 abstainers) met these criteria. Re-running these analyses among drinkers did not reveal significantly altered results in comparison to results yielded from the whole sample.

Discussion

The current study evaluated SC as a moderator of the relationship between drinking identity and alcohol use among college students. As predicted, we found that SC was negatively associated with alcohol use and related problems. These findings are consistent with literature which has found that increased SC protects against heavy alcohol use (Bogg et al., 2012; Carey et al., 2009; Dvorak, Simons, & Wray, 2011; Huhtanen & Raitasalo, 2012; Wiers et al., 2007). According to the TPB, individuals will enact behaviors that they feel they are able to carry out based on available resources (Ajzen, 1998, 1991; Conner et al., 2006). This perceived ability to perform such behaviors can be conceptualized as a form of SC, as SC allows one to consider negative consequences of one's behavior and therefore postpone gratification. A recent study found that protective behavioral strategies (e.g., limiting alcohol consumption, alternating between drinking alcohol and non-alcoholic beverages, using a designated driver, etc.; Martens, Pedersen, LaBrie, Ferrier, & Cimini, 2007) mediated the association between SC and drinking (Pearson et al., 2013). Therefore, it makes sense that general levels of self-control would protect against heavy drinking. This finding confirms what the previous literature suggests, that SC is protective against problem drinking because it enables individuals to better control their behavior, perhaps through the use of protective behavioral strategies to avoid potential negative consequences (Hustad et al., 2009).

Also consistent with expectations, SRDI was positively associated with drinking. This finding is consistent with recent literature showing that the more strongly one identifies with drinking, the more likely one is to drink heavily (Foster, Yeung, & Neighbors, under review; Foster, Yeung, & Prokhorov, under review; Lindgren, Foster, Westgate, & Neighbors, 2013; Neighbors et al., 2010; Reed et al., 2007). As identity and behavioral patterns such as habits are important determinants of behavior (Gardner, de Bruijn, & Lally, 2012), it is not surprising that we found that those with stronger drinking identities reported consuming more alcohol. Those who identify strongly with drinking might be more inclined to drink when presented with the opportunity because this behavior fits with their self-concept. Conversely, those who do not strongly identify with drinking are less likely to drink, as engaging in alcohol use does not fit well with their sense of identity. As drinking identity has consistently been associated with increased drinking and alcohol-related problems (Casey & Dollinger, 2007; Dollinger et al., 1993; Dollinger, 1996; Lindgren et al., 2012), future interventions should consider implementing methods to reduce drinking identity in at-risk individuals with high SRDI.

Additionally, we found that SRDI and SC were negatively correlated. Although previous research has not examined the relationship between SC and SRDI in predicting drinking, past research has shown that drinking identity is positively associated with drinking (Casey & Dollinger, 2007; Dollinger et al., 1993; Dollinger, 1996), and SC is negatively associated with drinking (Bogg et al., 2012; Carey et al., 2009; Dvorak, Simons, & Wray, 2011; Huhtanen & Raitasalo, 2012; Wiers et al., 2007). Therefore, it follows that SC and SRDI would be negatively associated with one another. Perhaps the more strongly one identifies with alcohol, the less SC he or she likely has and vice versa. For example, a college student who perceives alcohol to be an important part of her self-image might not feel that she can control her drinking. Similarly, an undergraduate who does not perceive alcohol to be part of his self-image may perceive greater control over his drinking. Additionally, individuals lower in SC might be less able to resist alcohol, therefore they consume more alcohol, which may lead to the development of a drinking identity. These individuals come to view drinking as an important part of their self-concepts after repeatedly engaging in alcohol use. These findings are important as they contribute added support for the literature evaluating cognitive processes that are important in the prevention of risky drinking.

Results further supported expectations, revealing a significant interaction between SC and SRDI in predicting drinking (drinking frequency and drinks per week). Our results revealed that SRDI was positively associated with drinking as expected, but contrary to expectations, this association was not especially stronger for those with lower SC. These findings suggest that individuals high in SRDI regardless of their level of SC are at greatest risk for problem drinking. A potential explanation for our findings is that SC may be protective against heavy drinking among those lower in SRDI because these individuals may not feel pressure to drink to maintain a consistent self-view (Lalwani & Shavitt, 2009; Steele, 1988). Conversely, as drinking is *not* an essential part of their identity, they may feel that it is important to their self-concept to choose *not* to drink. Therefore, they would exert greater SC in situations in which they were offered a drink in order to appear consistent with their self-concept. On the other hand, among those with stronger drinking identities SC did not appear to exert a protective effect on drinking. This appears counterintuitive; however, it might be the case that SC is protective only for those with weaker drinking identities because drinking identity might exert a stronger influence on drinking behavior than SC. In other words, individuals who do not view alcohol as part of their self-image might be more protected by having a high sense of self-control relative to individuals for whom alcohol is enmeshed with their sense of self. Among the latter, drinking might even reinforce their sense of self. An example of this occurring would be among members of Greek organizations. The drinking literature shows that students affiliated with sororities and fraternities drink significantly more than students who are not (e.g., Carter & Kahnweiler, 2000; Labrie, Hummer, Neighbors, & Pedersen, 2008), and thus, it is possible that, for example, a Greek member who views alcohol as part of their self-image (e.g., drinking fraternity parties) will consume high quantities of alcohol regardless of their level of self-control relative to other non-Greek members.

Another potential explanation for our findings is that perhaps those high in SC and high in SRDI do not feel as though they need to drink less because they feel that they are in control

of their behavior. Individuals high in both SRDI and SC might feel that they can resist drinking, but that feeling might not necessarily translate to their actual drinking behavior. For example, Sally might think she can resist drinking if she wants to, but she also strongly identifies with alcohol and drinks heavily. Sally may not view her alcohol use as problematic because she thinks that she can quit at any time, a pattern that maps onto denial. This false sense of self control regarding one's drinking combined with a strong drinking identity puts one at greater risk for problematic alcohol use. Compounded with these risk factors, college is a particularly vulnerable time for heavy drinking (e.g., keg parties, 21st birthday, event specific drinking, etc.; Chen & Kandel, 1995; Johnston et al., 2006). Therefore, it is especially important for behavioral scientists to consider factors such as SRDI and SC when devising intervention efforts to reduce problem drinking among college students.

It might also be the case that alcohol consumption and drinking identity may corrode levels of SC over time. Because our sample was relatively young and included many light drinkers, they might have perceived themselves to have high levels of SC, but as they continue to drink and experience negative alcohol-related consequences, their perceived SC may decrease. Our findings demonstrated a stronger positive correlation between alcohol-related problems and drinking identity compared to other drinking outcomes and a stronger negative association between problems and SC for all drinking outcomes except peak drinking. Perhaps repeated experiences of negative alcohol consequences can both lead to a stronger drinking identity and diminish perceived SC. Future research might consider evaluating SC and SRDI longitudinally to see how these factors influence one another and influence drinking behavior over time.

Although results largely supported our expectations, it is worth noting that an interaction between SC and SRDI did not emerge when predicting peak drinks or alcohol-related problems. One reason why may have been the case relates to the reliability of weekly drinking indices (e.g., drinks per week) relative to other drinking indices. Previous work shows that weekly drinking is a reliable index related to undesired consequences among undergraduates (Borsari et al., 2001). Weekly drinking, relative to other drinking indices, has also been shown to account for the most variance in the prediction of negative consequences associated with alcohol (Borsari, et al., 2001). Indices of quantity of alcohol consumption (e.g., peak drinks), are less sensitive to episodic drinking which is commonly encountered in the college environment. Weekly drinking is more reliable relative to peak consumption because it is an index of drinking over time (e.g., over the past four weeks), and it is within reason that findings from the present study show that the significant interaction emerged for these indices and not for peak drinks or problems.

Limitations and future directions

The contributions of the current study should be considered in light of its limitations. One such limitation is college students were recruited to participate, therefore the sample may not be generalizable to other populations. However, college students are an at-risk population for problem drinking (Chen & Kandel, 1995; Johnston et al., 2006), and our sample was racially diverse and maps onto US population characteristics. Another limitation

related to our sample is that participants were not screened based on drinking criteria. Thus, our study captured a variety of drinking behaviors, including abstaining from alcohol use. Moreover, there was relatively low incidence of drinking and low reports of SRDI in the sample. As the focus of the study was drinking, this is a limitation.

A further limitation relates to our measures. Although we did measure general levels of SC, the current study did not measure a related concept that focuses on control of one's drinking, namely drink refusal self-efficacy (DRSE; Young & Oei, 1996). Future research may include DRSE to examine potential differences between SC and DRSE in predicting drinking behavior. Another limitation of the present study is that we did not measure alcohol expectancies. As the TPB notes, the expected consequences of a behavior are an important factor to consider when predicting whether the behavior is more or less likely to occur (Ajzen, 1998, 1991; Conner et al., 2006). Individuals who expect consuming alcohol to produce positive outcomes are more likely to drink, drink more frequently, and drink more heavily than those with more negative alcohol expectancies (Fromme & D'Amico, 2000; Greenfield, Harford & Tam, 2009; Natvig Aas, Leigh, Anderssen & Jakobsen, 1998). Future research may include alcohol expectancies to examine whether they impact the moderating effect of SC on the relationship between SRDI and drinking.

Conclusion

The present study offers a more comprehensive look at the relationship between drinking identity and alcohol use by also factoring in SC. Taken together, these findings underscore the importance of considering factors such as SRDI and SC in the development of future alcohol interventions. Future interventions might benefit from focusing on strategies targeted at decreasing SRDI, as strong alcohol identity appears to strongly influence alcohol consumption in at-risk drinkers. One potential such intervention might be the use of an attentional retraining paradigm to encourage participants to de-identify with drinking in an attempt to reduce future problem drinking.

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References

- Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991; 50:179–211.
- Ajzen I. Models of human social behavior and their application to health psychology. *Psychology & Health*. 1998; 13:735–739.
- Baer, JS. Etiology and secondary prevention of alcohol problems with young adults. In: Baer, J.; Marlatt, G.; McMahon, R.; Baer, J.; Marlatt, G.; McMahon, R., editors. *Addictive behaviors across the life span: Prevention, treatment, and policy issues*. Thousand Oaks, CA: Sage Publications, Inc; 1993. p. 111-137.
- Baumeister, RF.; Vohs, KD. Willpower, choice, and self-control. In: Loewenstein, G.; Read, D., editors. *Time and decision: Economic and psychological perspectives on intertemporal choice*. New York: Russell Sage Foundation; 2003. p. 201-216.

- Bogg T, Finn PR, Monsey KE. A year in the college life: Evidence for the social investment hypothesis via trait self-control and alcohol consumption. *Journal of Research in Personality*. 2012; 46:694–699. [PubMed: 23329856]
- Borsari B, Neal DJ, Collins SE, Carey KB. Differential utility of three indexes of risky drinking for predicting alcohol problems in college students. *Psychology of Addictive Behaviors*. 2001; 15:321–324. [PubMed: 11767264]
- Carey KB, Neal DJ, Collins SE. A psychometric analysis of the self-regulation questionnaire. *Addictive Behaviors*. 2004; 29:253–260. [PubMed: 14732414]
- Carey KB, Scott-Sheldon LJ, Elliott JC, Bolles JR, Carey MP. Computer-delivered interventions to reduce college student drinking: A meta-analysis. *Addiction*. 2009; 104:1807–1819. [PubMed: 19744139]
- Carter C, Kahnweiler W. The efficacy of the social norms approach to substance abuse prevention applied to fraternity men. *Journal Of American College Health*. 2000; 49(2):66–71. [PubMed: 11016130]
- Casey PF, Dollinger SJ. College students' alcohol-related problems: An autophotographic approach. *Journal of Alcohol and Drug Education*. 2007; 51:8–25.
- Charng H, Piliavin JA, Callero PL. Role identity and reasoned action in the prediction of repeated behavior. *Social Psychology Quarterly*. 1988; 51:303–317.
- Chen K, Kandel DB. The natural history of drug use from adolescence to the mid-thirties in a general population sample. *American Journal of Public Health*. 1995; 85:41–47. [PubMed: 7832260]
- Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. *Applied multiple regression/correlation analysis for the behavioral sciences*. 3. Hillsdale, NJ: Erlbaum; 2003.
- Collins SE, Carey KB. The theory of planned behavior as a model of heavy episodic drinking among college students. *Psychology of Addictive Behaviors*. 2007; 21:498–507. [PubMed: 18072832]
- Collins R, Parks GA, Marlatt G. 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]
- Conner M, Sandberg T, McMillan B, Higgins A. Role of anticipated regret, intentions and intention stability in adolescent smoking initiation. *British Journal of Health Psychology*. 2006; 11:85–101. [PubMed: 16480557]
- Conner M, Warren R, Close S, Sparks P. Alcohol consumption and the theory of planned behaviour: An examination of the cognitive mediation of past behaviour. *Journal of Applied Social Psychology*. 1999; 29:1675–1703.
- Dollinger SJ. Autophotographic identities of young adults: With special reference to alcohol, athletics, achievement, religion, and work. *Journal of Personality Assessment*. 1996; 67:384–398. [PubMed: 8828194]
- Dollinger SJ, Rhodes KA, Corcoran KJ. Photographically portrayed identities, alcohol expectancies, and excessive drinking. *Journal of Personality Assessment*. 1993; 60:522–531. [PubMed: 8336267]
- Dunn EC, Larimer ME, Neighbors C. Alcohol and drug-related negative consequences in college students with bulimia nervosa and binge eating disorder. *International Journal of Eating Disorders*. 2002; 32:171–178. [PubMed: 12210659]
- Dvorak RD, Simons JS, Wray TB. Alcohol use and problem severity: Associations with dual systems of self-control. *Journal of Studies on Alcohol and Drugs*. 2011; 72:678–684. [PubMed: 21683050]
- Fekadu Z, Kraft P. Self-identity in planned behavior perspective: Past behavior and its moderating effects on self-identity–intention relations. *Social Behavior and Personality*. 2001; 29:671–685.
- 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. [PubMed: 24169372]
- Foster, DW.; Yeung, N.; Prokhorov, A. You are what you drink? Drinking identity, decisional balance, and alcohol-related problems. (under review)Manuscript submitted for publication
- Fromme K, D'amico EJ. Measuring adolescent alcohol outcome expectancies. *Psychology of Addictive Behaviors*. 2000; 14:206–212. [PubMed: 10860120]

- Gardner B, de Bruijn G, Lally P. Habit, identity, and repetitive action: A prospective study of binge-drinking in UK students. *British Journal of Health Psychology*. 2012; 17:565–581. [PubMed: 22107605]
- Geisner IM, Larimer ME, Neighbors C. The relationship among alcohol use, related problems, and symptoms of psychological distress: Gender as a moderator in a college sample. *Addictive Behaviors*. 2004; 29:843–848. [PubMed: 15219328]
- Gray HM, LaPlante DA, Bannon BL, Ambady N, Shaffer HJ. Development and validation of the alcohol identity implicit associations test (AI-IAT). *Addictive Behaviors*. 2011; 36:919–926. [PubMed: 21621924]
- Greenfield TK, Harford TC, Tam TW. Modeling cognitive influences on drinking and alcohol problems. *Journal of Studies on Alcohol and Drugs*. 2009; 70:78–86. [PubMed: 19118395]
- Greenwald AG, McGhee DE, Schwartz JLK. Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*. 1998; 74:1464–1480. [PubMed: 9654756]
- Hingson RW. Magnitude and prevention of college drinking and related problems. *Alcohol Research & Health*. 2010; 33:45–54. [PubMed: 23579935]
- Huchting K, Lac A, LaBrie JW. An application of the theory of planned behavior to sorority alcohol consumption. *Addictive Behaviors*. 2008; 33:538–551. [PubMed: 18055130]
- Huhtanen P, Raitasalo K. Ways of regulating one's drinking: A factor analysis of a Finnish general population sample. *Drug and Alcohol Review*. 2012; 31:847–853. [PubMed: 22882655]
- Hustad JTP, Carey KB, Carey MP, Maisto SA. Self-Regulation, alcohol consumption, and consequences in college student heavy drinkers: A simultaneous latent growth analysis. *Journal of Studies on Alcohol and Drugs*. 2009; 70:373–382. [PubMed: 19371488]
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. NIH Publication No 06-5884. Bethesda, MD: National Institute on Drug Abuse; 2006. Monitoring the Future national survey results on drug use, 1975–2005. Volume II: College students and adults ages 19–45.
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. NIH Publication No 12-5882. Bethesda, MD: National Institute on Drug Abuse; 2012. Monitoring the future national results on adolescent drug use: Overview of key findings, 2011.
- Kaysen D, Neighbors C, Martell J, Fossos N, Larimer ME. Incapacitated rape and alcohol use: A prospective analysis. *Addictive Behaviors*. 2006; 31:1820–1832. [PubMed: 16446044]
- Kivlahan DR, Marlatt GA, Fromme K, Coppel DB, Williams E. Secondary prevention with college drinkers: Evaluation of an alcohol skills training program. *Journal of Consulting and Clinical Psychology*. 1990; 58:805–810. [PubMed: 2292630]
- LABRIE J, HUMMER J, NEIGHBORS C, PEDERSEN E. Live Interactive Group-Specific Normative Feedback Reduces Misperceptions and Drinking in College Students: A Randomized Cluster Trial (English). *Psychology Of Addictive Behaviors*. 2008; 22(1):141–148. [PubMed: 18298241]
- 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; 97:88–102. [PubMed: 19586242]
- Lindgren KP, Foster DW, Westgate EC, Neighbors C. Implicit drinking identity: Drinker + me associations predict college student drinking consistently. *Addictive Behaviors*. 2013; 38:2163–2166. [PubMed: 23454880]
- Marlatt, G.; Baer, JS.; Larimer, M. Preventing alcohol abuse in college students: A harm-reduction approach. In: Boyd, GM.; Howard, J.; Zucker, RA., editors. *Alcohol problems among adolescents: Current directions in prevention research*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc; 1995. p. 147-172.
- Martens MP, Pedersen ER, LaBrie JW, Ferrier AG, Cimini MD, Ferrier AG. Measuring alcohol-related protective behavioral strategies among college students: Further examination of the Protective Behavioral Strategies Scale. *Psychology of Addictive Behaviors*. 2007; 21:307–315. [PubMed: 17874881]
- Natvig Aas H, Leigh BC, Anderssen N, Jakobsen R. Two-year longitudinal study of alcohol expectancies and drinking among Norwegian adolescent. *Addiction*. 1998; 93:373–384. [PubMed: 10328045]

- Neal DJ, Carey KB. A follow-up psychometric analysis of the Self-Regulation Questionnaire. *Psychology of Addictive Behaviors*. 2005; 19:414–422. [PubMed: 16366813]
- Neal DJ, Carey KB. Association between alcohol intoxication and alcohol-related problems: An event-level analysis. *Psychology of Addictive Behaviors*. 2007; 21:194–204. [PubMed: 17563139]
- Neighbors C, LaBrie JW, Hummer JF, Lewis MA, Lee CM, Desai S, Kilmer JR, Larimer ME. Group identification as a moderator of the relationship between social norms and alcohol consumption. *Psychology of Addictive Behaviors*. 2010; 24:522–528. [PubMed: 20853938]
- NIAAA. NIH publication no 07–5010. Bethesda, MD: National Institutes of Health, DHHS; 2007. What Colleges Need to Know Now: An Update on College Drinking Research.
- Pearson MR, Kite BA, Henson JM. Predictive effects of good self-control and poor regulation on alcohol-related outcomes: Do protective behavioral strategies mediate? *Psychology of Addictive Behaviors*. 2013; 27:81–89. [PubMed: 22663345]
- Pierro A, Mannetti L, Livi S. Self-identity and the theory of planned behavior in the prediction of health behavior and leisure activity. *Self and Identity*. 2003; 2:47–60.
- Reed MB, Wang R, Shillington AM, Clapp JD, Lange JE. The relationship between alcohol use and cigarette smoking in a sample of undergraduate college students. *Addictive Behaviors*. 2007; 32:449–464. [PubMed: 16844313]
- 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; 18:151–156. [PubMed: 24203766]
- Smith JR, Terry DJ, Manstead ASR, Louis WR, Kotterman D, Wolfs J. Interaction effects in the theory of planned behavior: The interplay of self-identity and past behavior. *Journal of Applied Social Psychology*. 2007; 37:2726–2750.
- Steele, CM. The psychology of self-affirmation: Sustaining the integrity of the self. In: Berkowitz, L., editor. *Advances in experimental social psychology*. Vol. 21. San Diego, CA: Academic Press; 1988. p. 261–302.
- Substance Abuse and Mental Health Services Administration (SAMSHA). Results from the 2008. U.S. Department of Health and Human Services; 2009. Retrieved from website: <http://oas.samhsa.gov/nsduh/2k8nsduh/2k8Results.cfm>
- Tangney JP, Baumeister RF, Boone AL. High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*. 2004; 72:271–322. [PubMed: 15016066]
- U.S. Department of Health and Human Services, National Institutes of Health, National Institute of Neurological Disorders and Stroke, Office of Communications and Public Liaison. NIH Publication No 09-1877. 2009. Autism Fact Sheet.
- Wechsler H, Kuo M, Lee H, Dowdall GW. Environmental correlates of underage alcohol use and related problems of college students. *American Journal of Preventive Medicine*. 2000; 19:24–29. [PubMed: 10865160]
- Wechsler H, Lee J, Kuo M, Lee H. College binge drinking in the 1990s: A continuing problem: Results of the Harvard School of Public Health 1999 College Alcohol Study. *Journal of American College Health*. 2000; 48:199–210. [PubMed: 10778020]
- Wechsler H, Lee JE, Kuo M, Seibring M, Nelson T, Lee H. Trends in college binge drinking during a period of increased prevention efforts: Findings from four Harvard School of Public Health College Alcohol Study Surveys 1993–2001. *The Journal of American College Health*. 2002; 50:203–22.
- 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*. 2000; 50:223–236. [PubMed: 11990980]
- White HR, Labouvie EW. Towards the assessment of adolescent problem drinking. *Journal of Studies on Alcohol*. 1989; 50:30–37. [PubMed: 2927120]
- Wiers RW, Bartholow BD, van den Wildenberg E, Thush C, Engels RE, Sher KJ, Stacy AW. Automatic and controlled processes and the development of addictive behaviors in adolescents: A review and a model. *Pharmacology, Biochemistry and Behavior*. 2007; 86:263–283.

- Wills T, Sandy JM, Yaeger AM. Moderators of the relation between substance use level and problems: Test of a self-regulation model in middle adolescence. *Journal of Abnormal Psychology*. 2002; 111:3–21. [PubMed: 11866177]
- Wills TA, Walker C, Mendoza D, Ainette MG. Behavioral and emotional self-control: Relations to substance use in samples of middle and high school students. *Psychology of Addictive Behaviors*. 2006; 20:265–278. [PubMed: 16938064]
- Young, RM.; Oei, TPS. Drinking expectancy profile: Test manual. Behaviour Research and Therapy Centre, University of Queensland; Australia: 1996.

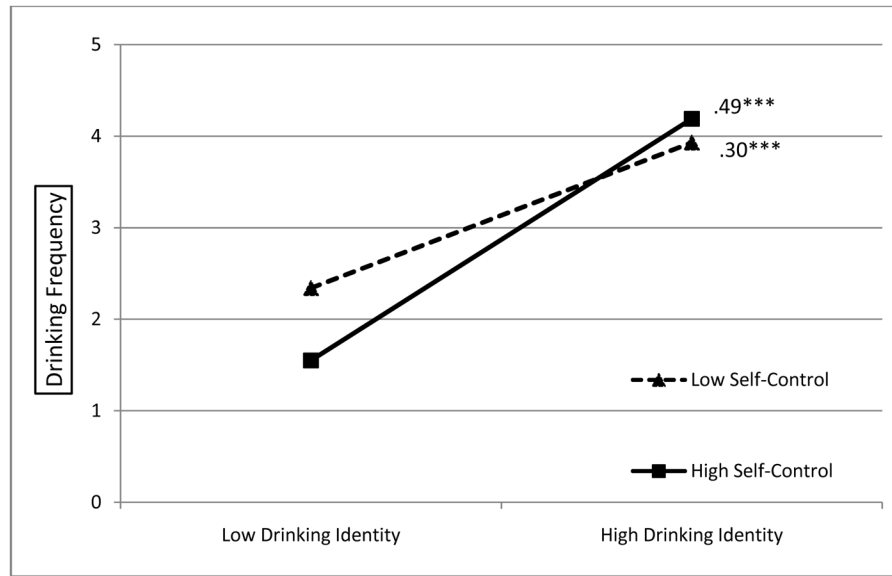


Figure 1. Interaction between self-control and drinking identity in predicting drinking frequency.

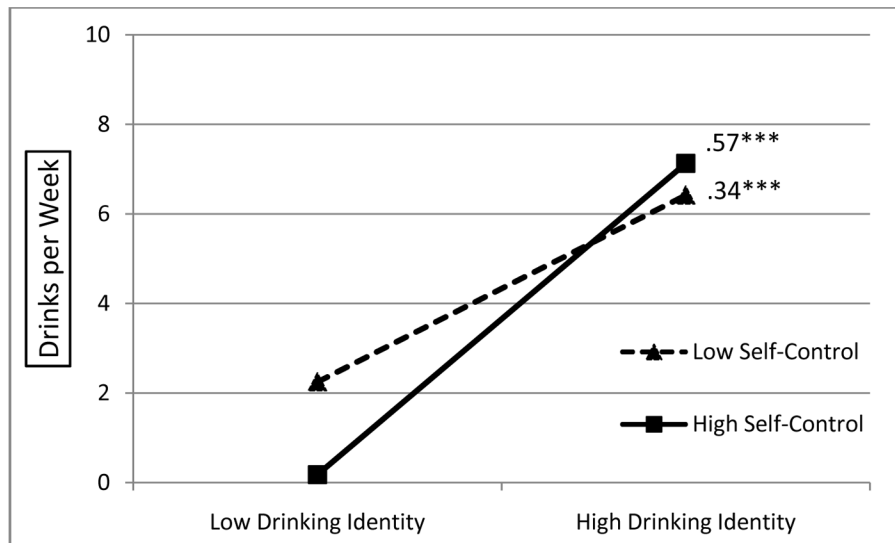


Figure 2. Interaction between self-control and drinking identity in predicting drinks per week.

Table 1

Means, Standard Deviations, and Correlations among Variables

	1.	2.	3.	4.	5.	6.
1. Drinking identity	--					
2. Self-Control	-0.21***	--				
3. Peak drinking	0.40***	-0.19***	--			
4. Drinking Frequency	0.36***	-0.14***	0.73***	--		
5. Drinks per Week	0.42***	-0.16***	0.72***	0.66***	--	
6. Alcohol Problems	0.48***	-0.19***	0.40***	0.35***	0.41***	--
Mean	0.49	42.11	3.21	2.95	3.85	29.21
Standard Deviation	1.04	8.90	3.59	2.66	6.12	8.63
Minimum	1.00	13.00	0.00	0.00	0.00	0.00
Maximum	7.00	65.00	21.00	11.00	58.00	100.00

Note. $N = 690$ ***
 $p < .001$,**
 $p < .01$,*
 $p < .05$.

Table 2
 Hierarchical regression analysis predicting alcohol consumption and problems from SRDI and DB

Criterion	Predictor	B	SEB	t	p	β	Adj R ²
Peak Drinks	Step 1 SC	-0.04	0.01	-2.97	0.003	-0.11**	0.17
	SRDI	1.32	0.12	10.76	<0.0001	0.38***	
	Step 2 SRDI * SC	0.03	0.02	1.89	0.06	0.33 [†]	0.17
	Step 1 SC	-0.02	0.01	-1.70	0.09	-0.06 [†]	0.13
Drinking Frequency	SRDI	0.90	0.09	9.68	<0.0001	0.35***	
	Step 2 SRDI * SC	0.03	0.01	2.40	0.02	0.42*	0.14
Drinks per Week	Step 1 SC	-0.05	0.02	-1.98	0.05	-0.07*	0.17
	SRDI	2.37	0.21	11.34	<0.0001	0.40***	
	Step 2 SRDI * SC	0.08	0.03	2.85	0.005	0.49**	0.18
	Step 1 SC	-0.09	0.03	-2.83	0.005	-0.10**	0.24
Alcohol-Related Problems	SRDI	3.81	0.28	3.43	<0.0001	0.46***	
	Step 2 SRDI * SC	0.001	0.04	0.04	0.96	0.007	0.23

Note. N = 690

*** p < .001.

** p < .01.

* p < .05.

[†] p < .10