

10-1-2014

Propensity, Social Ties, Friend Behavior, and Heavy Drinking Among College Students

Samantha S. Clinkinbeard

University of Nebraska at Omaha, sclinkinbeard@unomaha.edu

Trisha Rhodes

University of Nebraska at Omaha, trhodes@unomaha.edu

Follow this and additional works at: <https://digitalcommons.unomaha.edu/criminaljusticefacpub>

 Part of the [Criminology Commons](#)

Please take our feedback survey at: https://unomaha.az1.qualtrics.com/jfe/form/SV_8cchtFmpDyGfBLE

Recommended Citation

Clinkinbeard, S.S. & Rhodes, T.N. (2014). Propensity, social ties, friend behavior, and heavy drinking among college students. *Journal of Child & Adolescents Substance Abuse*, 23(6), 362-374. <https://doi.org/10.1080/1067828X.2012.732547>

This Article is brought to you for free and open access by the School of Criminology and Criminal Justice at DigitalCommons@UNO. It has been accepted for inclusion in Criminology and Criminal Justice Faculty Publications by an authorized administrator of DigitalCommons@UNO. For more information, please contact unodigitalcommons@unomaha.edu.

Propensity, Social Ties, Friend Behavior, and Heavy Drinking Among College Students

Samantha S. Clinkinbeard and Trisha N. Rhodes

University of Nebraska at Omaha, Omaha, NE, USA

To cite this article: Samantha S. Clinkinbeard & Trisha N. Rhodes (2014) Propensity, Social Ties, Friend Behavior, and Heavy Drinking Among College Students, *Journal of Child & Adolescent Substance Abuse*, 23:6, 362-374, DOI: <https://doi.org/10.1080/1067828X.2012.732547>

The current research explores self-control, early-onset alcohol propensity, and social ties as they relate to heavy drinking on a college campus. The study draws on a survey of alcohol-related attitudes and behaviors administered to a cluster sample of 149 residential students (*M* age = 19.9; 51% female) at a medium-sized Midwestern university. A series of ordinary least squares regressions were conducted to explore independent and interactive effects of propensity and social ties on drinking. Propensity and anti-social ties consistently and independently predicted measures of heavy drinking and related consequences. Prosocial ties were less consistent, though they were associated with alcohol-related consequences. Propensity amplified the effects of antisocial ties on drinking and related consequences. Early-onset drinking and low self-control represented unique indicators of propensity for heavy drinking behavior in college. The strongest, most consistent finding across all models was the positive association between close friend substance behavior and participant drinking outcomes. This research indicates that although propensity (i.e., low self-control and early drinking behavior) may put individuals at risk of heavy drinking, these effects can be conditioned by dynamic social ties and thus prevention efforts should focus on these ties. Specifically, prevention campaigns and future research should target “students and their friends” as heavy drinking appears to be heavily influenced by close friendships and perceived norms.

Keywords:

alcohol, binge drinking, college students, friends, self-control, social ties

We would like to thank the UNO residence assistants and personnel for their assistance with data collection. Address correspondence to Samantha S. Clinkinbeard, PhD, Assistant Professor, School of Criminology & Criminal Justice, University of Nebraska at Omaha, 6001 Dodge Street, Omaha, NE 68182-0149, USA. E-mail: sclinkinbeard@unomaha.edu

INTRODUCTION

Popular media and culture would have us believe that heavy drinking and college participation are inseparable, at least in American society. Fraternity and sorority parties with heavy drinking are portrayed in popular movies, drinking episodes gone wrong are highlighted in the news, and *The Princeton Review* even ranks the top “party schools” annually. Although the perceived norms may overestimate the actual prevalence of drinking on college campuses, high levels of drinking are an area of public health concern. Though estimates vary, research generally indicates that approximately half of college students participate in heavy episodic drinking and that at least two in five students have participated in binge drinking in the past two weeks (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2002; Wechsler et al., 2002). Binge drinking is typically defined as the consumption of four or more drinks in a row for women or five or more in a row for men (NIAAA, 2002; Wechsler et al., 2002). Unfortunately, many students suffer negative consequences as a result of their own or others’ drinking. Heavy drinking on college campuses has been linked to suicidal ideation and attempts, involvement with police, unplanned sexual activity, academic problems, and even heightened risk of injury or death (Hingston, Heeren, & Zakocs, 2002; Schaffer, Jeglic, & Stanley, 2008; Wechsler et al., 2002). These consequences are not inevitable, of course, and though many students experiment with alcohol in college and go on to be socially responsible drinkers, others may find themselves battling addiction and dependence later in adulthood (Jennison, 2004).

While alcohol and substance use have generated a field of research separate from criminology, there is good reason to explore such behavior through the lens of criminology. There has long been recognition that criminal or delinquent behaviors frequently co-occur with the consumption of alcohol and other drugs (Elliott, Huizinga, & Menard, 1989; Krebs, Lattimore, Cowell, & Graham, 2010). Furthermore, the empirical literature often finds overlap in the predictors of a range of both licit and illicit risk behaviors such as alcohol use, drug use, and delinquent or criminal behavior. Gottfredson and Hirschi (1990) even go so far as to suggest that the overlap is because all of these behaviors are manifestations of the same underlying tendency to pursue short-term, immediate pleasure. Finally, because experimentation with tobacco and alcohol sometimes precedes participation in delinquent behavior (Barnes, Welte, & Hoffman, 2002; Newcomb Michael & McGee, 1989; Wagner, 1996), the study of substance abuse may be as important to criminological theory as theory is to the study of these behaviors, as

recognized by the many already doing work in this area (e.g., Durkin, Wolfe, & Clark, 1999, 2005; Durkin, Wolfe, & May, 2007; Gibson, Schreck, & Miller, 2004; Piquero, Gibson, & Tibbetts, 2002; Sun & Longazel, 2008; Wolfe & Higgins, 2008).

Although there are many approaches to the study of crime and delinquency and also a number of ways to categorize these approaches (e.g., theories on why we commit crime versus why we don't commit crime), many have begun to focus on the interactions between stable, individual propensities and more malleable ties to the social environment (Doherty, 2006; Ousey & Wilcox, 2007; Wright, Caspi, Moffitt, & Silva, 2001). Propensity perspectives generally suggest that individuals have a stable predisposition (e.g., self-control; Wright et al., 2001) towards involvement in delinquency and other risky behavior. The stability associated with this model does not necessarily suggest that crime is inevitable, but that the risk is always there. That is, someone with low self-control (i.e., propensity) has a stable baseline *risk* of delinquency that is higher than someone with high self-control. Social ties perspectives vary to the extent to which they predict the prevention or augmentation of delinquent behavior, but they are generally more malleable in nature than propensity perspectives. Although there may be consistency in the predictions associated with certain types of social ties, they are malleable in the sense that social ties can come and go. Turning points research, for example, hinges on malleability as change in behavior is expected to follow the establishment of previously absent social connections (Laub & Sampson, 1993; Sampson & Laub, 1993). Though both propensity and social ties often stand alone, such perspectives may be more informative when combined to explore their simultaneous and/or conditional effects on behavior.

The purpose of the current research is to take an interactive criminological approach to exploring heavy drinking on one Midwestern college campus. We expect that both propensity and social ties will have important and independent effects on binge-drinking and other problematic drinking behavior. Furthermore, we expect that both prosocial ties to institutions or important others and antisocial ties (e.g., norms conducive to risky behavior and friend substance use) will be most influential, or have their strongest effects, among those most prone to heavy drinking and its consequences (Wright et al., 2001).

LITERATURE REVIEW

Propensity, Low Self-Control, and Risk Behaviors

The hallmark of propensity perspectives in criminology is Gottfredson and Hirschi's (1990) general theory of crime, also known as self-control theory. The general theory of crime is based in the classic tradition in which human behavior is considered to be driven by the desire to gain pleasure and avoid pain. Following the classic tradition, Gottfredson and Hirschi suggest that crime is one result of the human pursuit of self-interest. Persons who commit crime, then, are self-interested and tend to share a variety of characteristics such as the inability to defer gratification, a lack of tenacity, an adventurous nature, and minimal tolerance for frustration, among others. These shared elements are said to reflect low self-control, or "relatively stable differences across individuals in the propensity to commit criminal (or equivalent) acts" (Gottfredson & Hirschi, 1990, p. 137).

Self-control (either low or high) is hypothesized to develop early in life and to crystallize by ages 10 to 12 with relatively little change throughout the remainder of life (Beaver, Wright, DeLisi, & Vaughn, 2008; Piquero, Jennings, & Farrington, 2010). From this perspective, persons are predisposed to crime early in life (i.e., via poor or ineffective parenting) and any attempts to counter this predisposition through improving upon self-control later are likely to be futile (Gottfredson & Hirschi, 1990; Mitchell & MacKenzie, 2006). Self-control, as a propensity perspective, has received a great deal of attention in the past two decades and the existence of an empirical link between low self-control and delinquent or criminal behavior has received fairly consistent support (Piquero et al., 2010; Pratt & Cullen, 2000). More recent research is even adding support to Gottfredson and Hirschi's (1990) claim that self-control may represent a propensity to other risk behavior beyond crime. Relevant to the current study, recent research provides support for links between low self-control and binge-drinking and heavy-drinking episodes, alcohol-related problem behaviors (e.g., trouble with police, missing school or work commitments, etc.), and driving under the influence of alcohol (Benda, 2005; Costello, Anderson, & Stein, 2006; Gibson et al., 2004; Keane, Maxim, & Teevan, 1993; Piquero et al., 2002).

While self-control is theorized to be a general propensity towards behavior of self-interest such as crime and alcohol use, the substance abuse literature also recognizes the existence of propensities or predispositions that may be more specific to alcohol use and other potentially addictive substances or behaviors. There are a couple ways in which a person might become predisposed to substance abuse or other addictive behavior. Family history of alcohol problems, for example, has been recognized by many "to be among the most salient and consistent risk factors for the development of both alcohol abuse and dependence" (Conway, Swendsen, & Merikangas,

2003, p. 824). The link between family history and alcohol and substance dependence and problem behavior holds up across a number of studies utilizing varying methodologies, including twin and adoption studies (Beseler, Aharonovich, Keyes, & Hasin, 2008; Cadoret, Yates, Troughton, & Woodworth, 1995; Conway et al., 2003; Heath et al., 1997; Jackson, O'Neill, & Sher, 2006; King et al., 2009; LaBrie, Migliuri, Kenney, & Lac, 2010; Merikangas et al., 1998; Nurnberger et al., 2004). Though the research does differ to some degree regarding the route of transmission (e.g., socialization, genetics, moderation of other important variables such as attitudes or expectancies), it is clear that family history of alcohol or substance abuse represents a heightened propensity toward substance problems in adulthood.

Age of onset and early drinking behavior may represent another propensity to alcohol-related problems in adulthood. Early drinking behavior is a bit different from self-control and family history in that it is not established as early in life and may actually be more preventable; however, once established, it is a stable predictor of later drinking habits and problems (see Pitkänen, Kokko, Lyyra, & Pulkkinen, 2008, for a review). As with family history, the presumed mechanisms of effect may vary from one study to the next but the findings consistently suggest that individuals who start drinking earlier are at greater risk for problems down the road (Buchmann et al., 2009; Dawson, Goldstein, Chou, Ruan, & Grant, 2008; DeWit, Adlaf, Offord, & Ogborne, 2000; LaBrie, Rodrigues, Schiffman, & Tawalbeh, 2007; Thombs, O'Mara, Tobler, Wagenaar, & Clapp, 2009). Some suggest that early drinking may interfere with important developmental processes which ultimately lead to problematic behavior in adulthood (DeWit et al., 2000), others suggest it may have something to do with habituation (Dawson et al., 2008), and still others point to recent brain research which suggests adolescent brains in transition are especially vulnerable to neural changes underlying addiction (Chambers, Taylor, & Potenza, 2003).

Social Ties and Their Relationship to Propensity and Risk Behaviors

From a practical standpoint, propensity approaches to crime or adolescent substance abuse are troublesome, especially as stability is a core element of such perspectives. Although the empirical evidence on relationships between propensity and risk is revealing, it is not very informative in terms of figuring out ways in which to prevent problem behavior once the propensities have been established. That being said, it is important to explore factors which help to attenuate the negative effects associated with predispositions such as early drinking

behavior, family history of substance use, or low self-control. Social ties are an attractive outlet to consider in such research as they are diametrically opposed to propensity perspectives in the sense that they are much more dynamic (Clinkinbeard, 2014; Ousey & Wilcox, 2007).

Social ties have a long history in criminology, whether they are viewed as the mechanisms that keep people from committing crime in the first place, as the mechanisms that pull people into crime, or as mechanisms that help people *turn* from a life of crime (Becker, 1963; Hirschi, 1969; Sampson & Laub, 1993; Sutherland, 1947). Recently Wright and colleagues (2001) have suggested that social ties may play an important role in conditioning the effects of criminal propensities (such as self-control) on crime. Specifically, they articulated a life-course interdependence hypothesis in which they suggest that social ties, both positive and negative, are stronger in their effects for those with high levels of propensity. Their findings indicated a social protection effect in which those most deterred by pro- social ties were those with low self-control and an amplification effect in which the influence of antisocial ties on behavior was again strongest among those with low self-control (high propensity). Follow-up studies have questioned the amount of support that exists on the social protection side of the hypothesis (Doherty, 2006; Ousey & Wilcox, 2007). Ousey and Wilcox (2007), however, did find support for a conditioning effect in which friends' antisocial behavior is amplified among those with high levels of propensity. These studies illustrate that the findings thus far are mixed with regard to the actual relationship between social ties and propensity, suggesting that there are still a number of questions to be answered. Although social ties also have a history in research on substance abuse, interactive effects such as those proposed by Wright and colleagues (2001) have yet to receive attention in the alcohol literature.

Purpose and Hypotheses

Propensity perspectives, both criminological and alcohol-specific, have gathered a great deal of empirical support for self-control, family history of abuse, and early onset of behavior as predictors of alcohol problems in early to middle adulthood. Furthermore, criminological research has begun to combine dynamic social ties with at least one propensity perspective (i.e., self-control) with promising results in the areas of delinquency and alcohol research (Baker, 2010; Clinkinbeard, 2014; Gibson et al., 2004; Wright et al., 2001); however, further attention is warranted. Thus far, "propensity" has been operationalized as low self- control or difficulty

regulating impulses. The current study represents an important extension to the work in this area in that we use an alcohol-specific measure of propensity in addition to the traditional measure of low self-control. The primary goal of this study is to explore the relationships among propensity, social ties, and problematic drinking behavior among college students.

We use a small sample of college students from a medium-sized Midwestern university to explore the extent to which certain ties to the social environment might be conditioned by the relationship between propensity and problem drinking behavior. Much like Wright and colleagues (2001), we are interested in exploring both protection and amplification effects of propensity on social ties. Specifically, we hypothesize the following: (1) We hypothesize that low self-control and early-onset drinking will have independent effects on drinking behavior. Specifically, we expect students with lower levels of self-control and earlier reported onset to also report heavier drinking outcomes. (2) We expect to find an interaction between prosocial ties (social support, conventional expectations) and propensity (both low self-control and early onset) on drinking behaviors such that prosocial ties provide greater constraints on behavior for those with high propensity. (3) We hypothesize a similar interaction between antisocial ties (normative beliefs and friend substance behavior) and propensity (low self-control and early onset), though in this case we expect propensity to amplify the effects of antisocial ties on behavior. In other words, having strong antisocial ties will strengthen the effect of low self-control and early onset on drinking outcomes. Finally, we are interested in exploring and comparing the relative size of the independent effects of the two types of propensity (i.e., criminal=self-control & alcohol-specific=early onset) on drinking behavior.

METHODS

Sample

The sample includes 149 students, of which just over half (51%) were female with ages ranging from 18 to 25 ($M = 19.85$, $SD = 1.23$). The majority of respondents were under the legal drinking age of 21 (72%). Respondents were predominantly White=Caucasian (87%) with 13% of students reporting they were Black=African-American, Native American, Native Hawaiian or Pacific Islander, Asian, Alaska Native, or other race. Approximately 8% of the students reported they were of Hispanic or Latino ethnicity. The majority of the students were first- (38%) and second-year (30%) under- graduates. With the exception of being younger (i.e., on-campus

residents are disproportionately freshman and sophomores), on average, the demographics of the sample were very similar to the demographics of the larger student population, both locally and nationally. We compared our survey sample to the undergraduate campus population from which they were drawn, a state binge-drinking survey of 19- to 25-year-olds (*Nebraska Young Adult Alcohol Opinion Survey*, 2012) and national enrollments at degree-granting institutions, as reported by the National Center for Education Statistics (2011). Our sample was similar to the other sources with regard to gender (% female: sample = 51%, campus population = 49%, state survey = 57%, national = 57%), and although our sample had a higher percentage of White students (87% White) than national estimates (62%), it was in line with the college (75%) and state populations from which it was drawn (94%).

Procedure

The data were initially collected for the purposes of a contract evaluation related to the prevention=reduction of binge drinking on campus. However, many of the measures were conducive to research, such as the current study, unrelated to that evaluation. The sampling frame was developed from residential listings of four dormitories at a medium-sized Midwestern university. A random sampling method was used to draw a cluster sample of 126 suites (including 4 students each), or approximately 498 students. The sampling frame was stratified by gender to ensure that male and female students were equally represented, and as a result, there were 63 female and 63 male suites included in the sample. Packets of four surveys, including a pre-labeled envelope and survey description sheet, were prepared for the students in each suite and then distributed in early April 2011 by a group of student volunteers and resident assistants. Volunteers were instructed to briefly explain the purpose of the survey, tell residents that the survey was voluntary and confidential, and explain how to return the survey to the proctor or through university mail. The volunteers visited each suite up to four times until as many surveys were collected as possible. Ultimately 458 surveys were delivered, and 152 were returned either directly to the proctor or through the mail, resulting in a response rate of 33.19%. Although 458 were delivered, some students would have self-excluded because they were not yet 19 (the age of legal majority in this particular state), though the ages of the students in each suite were not available and thus it is not possible to estimate how many did not participate for this particular reason.

Measures

Propensity

As introduced earlier, we are using two separate measures of propensity in the current study. First, because our primary outcome variable of interest is alcohol use we have developed an alcohol propensity variable from a number of early indicators that have been specifically linked to long-term alcohol abuse. The final variable (discussed next) was based on age of onset and drinking prevalence in high school and from here on will be referred to as *early onset*. We are also using a measure of self-control as a general propensity measure. Although our outcome variable, alcohol use, is different from that used by Wright and colleagues (2001) and others, the general theory of crime suggests that self-control influences a wide variety of antisocial behaviors (Gottfredson & Hirschi, 1990), including alcohol and substance abuse.

Early onset. Numerous studies highlight the significance of family history of alcohol abuse and early onset of drinking as factors that put youths at risk for later alcohol and substance dependency (Beseler et al., 2008; Buchmann et al., 2009; Cadoret et al., 1995; Conway et al., 2003; Dawson et al., 2008; DeWit et al., 2000; Heath et al., 1997; Jackson et al., 2006; King et al., 2009; LaBrie et al., 2010; LaBrie et al., 2007; Merikangas et al., 1998; Nurnberger et al., 2004; Thombs et al., 2009). Consequently, we first created an index of alcohol-specific propensity factors that included indicators of family history and students' early drinking behavior. Exploratory analysis revealed that the measure of family history was not a robust contributor to this index and thus it was dropped. The final early-onset index was a sum of scores on the following items: "How old were you when you had your first alcoholic beverage?" (0 = never drank or started age 21 or after, 1 = started drinking after 15 but before 21, 2 = started drinking age 15 or earlier); "Please think back to your senior year in high school. How often would you estimate that you drank alcoholic beverages?" (0 = no drinking in high school, 1 = bottom 50% of drinkers in high school, 2 = top 50% of drinkers in high school). Early onset scores ranged from 0 to 4 ($M = 1.85$, $SD = 1.34$) with higher scores representing greater propensity.

Self-control. One of the primary controversies in the self-control literature is wide-ranging disagreement about how to measure the construct (Cretacci, 2008; Hirschi & Gottfredson, 1993; Marcus, 2004; Meldrum, Young, & Weerman, 2009; Piquero & Goode, 2008; Ward,

Gibson, Boman, & Leite, 2010; Williams, Fletcher, & Ronan, 2007). We are using a modified version of the scale developed by Grasmick and colleagues (Grasmick, Tittle, Bursik, & Arneklev, 1993). Higgins (2007) developed a shortened version of the original Grasmick scale by removing items that did not perform well in his validity investigation. The final scale, and the one we use here, consisted of 16 items from the original 24-item scale. Participants were asked to rate their agreement (1 = strongly disagree to 4 = strongly agree) with 16 statements covering the range of self-control-related components (i.e., impulsivity, preference for simple tasks, risk seeking, preference for physical activities, self-centeredness, and volatile temper) identified by Gottfredson and Hirschi (1990). Example items include “I often act on the spur of the moment without stopping to think”; “Sometimes I will take a risk for the fun of it”; and “I lose my temper pretty easily.” Scores ranged from 16 to 64 ($M = 34.60$, $SD = 7.66$) with higher scores representing lower levels of self-control ($\alpha = .88$).

Social Ties

Similar to the approach taken by Wright and colleagues (2001), we include composite measures of prosocial and antisocial ties based on those measures available in the data (social support, conventional expectations, perceived norms, and the behavior of close friends). Notably, the elements of support and expectations that represent prosocial ties closely resemble attachment and commitment as described in Hirschi's (1969) social control theory, while antisocial items draw from Sutherland's (1947) theory of differential association. We would also like to stress that the term *antisocial* is not intended to confer a negative connotation. The term is used loosely to allow us to differentiate associations that promote or hinder alcohol use and risk behaviors.

Prosocial ties. After exploring the available pro- social indicators in the survey, we created a two-item summative measure of prosocial ties, or social support. Items assessed the level of agreement with the statement “My parents=friends care about me.” Scores ranged from 2 to 8 ($M= 7.63$, $SD = .84$) with higher scores indicative of stronger prosocial ties or support ($\alpha= .67$).

Antisocial ties. Measures of antisocial ties consisted of perceptions of norms surrounding the approval of student drinking in addition to close friend alcohol and other drug behaviors. Close friends’ behavior is a well-established predictor in the delinquency literature (Pratt et al., 2010) with support also specific to binge drinking (Gibson et al., 2004). As for perceived norms, they are the crux of social norms prevention campaigns happening on college campuses everywhere (Haines, 1996; Perkins, 2002). Measures of antisocial ties assessed students’ perceptions of general drinking norms (“In your opinion, to what extent do students at your school approve of: consuming four or more drinks at a party, consuming four or more drinks on a date, driving after consuming several drinks, and frequently coming home drunk?”) as well as the behaviors of close friends (“How many of your four closest friends: use alcohol at least once per week, use marijuana at least occasionally, use tobacco products, drink five or more drinks on a night out?”). A scale was created from the sum of z-scores for each variable. Scores ranged from -11.58 to 16.56 ($M = .0068$, $SD = 5.03$), and higher scores represent stronger antisocial ties (i.e., heavy drinking is more normative; $\alpha = .78$).

Outcome Variables

Alcohol use. The primary outcome we are interested in is student alcohol use, which we assessed through two separate measures: the frequency of binge drinking in the past 30 days and the number of drinks consumed in the past 10 days. Though there is some controversy surrounding the measure of bingeing, we applied a definition that has been generally supported (Wechsler & Kuo, 2000). Binge drinking was defined as consuming four or more alcoholic drinks in a row (i.e., within a couple of hours) for females and consuming five or more alcoholic drinks in a row for males. The variable for frequency of bingeing derived from two separate items: “During the past 30 days, on how many days did you have [4=5] or more alcoholic beverages in a row, that is, within a couple of hours?” Respondents were given seven options ranging from zero days to daily. The final variable was coded as 0 days (0), 1 day (1), 2–4 days (2), and

5p days (3) ($M = 0.78$, $SD = 1.02$). These items were then combined for men and women, so that binge drinking would comport with respondents' gender status. A second count variable provided an additional measure of drinking that was not necessarily bingeing: "How many alcoholic drinks would you estimate you consumed in the past 10 days?" ($M = 4.71$, $SD = 10.19$).

Negative consequences associated with drinking (or risk behaviors). Much of the alcohol use literature has linked heavy drinking with negative consequences such as self-harm, involvement with the police, unplanned sexual activity, poor academic standing, and greater chance of injury or death (Hingston et al., 2002; Schaffer et al., 2008; Wechsler et al., 2002). Individuals with low self-control are also predicted to engage in risky behavior (Gottfredson & Hirschi, 1990). As a result, we include a second outcome to evaluate the negative consequences associated with alcohol use. Participants were asked, "Within the past 12 months, how often did you experience the following after consuming alcoholic beverages?" A summative scale was created from the following risk behaviors: "did something you later regretted, forgot where you were or what you did, got in trouble with the police, engaged in violent behaviors, caused property damage, had unprotected sex, physically injured yourself, physically injured another person, felt depressed" (0 = never to 3 = 5 or more times). Final scores ranged between 0 and 27 ($M = 1.91$, $SD = 3.61$) with higher scores indicating more negative experiences as a consequence of drinking ($\alpha = .84$).

TABLE 1
Effects of Self-Control and Alcohol Propensity on Heavy Drinking Outcomes

	<i>Negative</i>	<i>Results Drinking</i>	<i>Drinks Past 10 Days</i>	<i>Binge Past 30 Days</i>
Low self-control	.224**	(5.27, .437)	.580* (5.03, .443)	.036** (2.85, .255)
Early onset	.862**	(3.77, .314)	1.45* (2.42, .210)	.291** (4.20, .373)
Female	-.160	(-.289, -.022)	-1.28 (-.869, -.071)	.034 (.198, .016)
Over 21	.569	(.932, .072)	3.95* (2.42, .202)	-.078 (-.425, -.035)
Adj R ²	.365		.284	.261

Note. Numbers in the table represent the unstandardized regression coefficients followed by the *t* value and the standardized coefficient in parentheses.

* $p < .05$. ** $p < .01$.

TABLE 2
Main Effects and Interactions Between Social Ties and Low Self-Control

<i>Independent Variables</i>	<i>Main Effects</i>	<i>Social Protection</i>	<i>Social Amplification</i>
<i>Negative Results of Heavy Drinking</i>			
Low self-control	.097** (.036)	.092** (.032)	.058* (.034)
Prosocial ties	-1.34** (.297)	-.139 (.339)	-.948** (.289)
Antisocial ties	.409** (.054) ^{ab}	.375** (.049)	.359** (.052) ^{ab}
Control x Prosocial		-.094** (.017)	
Control x Antisocial			.015** (.003) ^{cd}
Adj R ²	.577	.665	.636
<i>Drinks Consumed Past 10 Days</i>			
Low self-control	.357** (.113)	.339** (.113)	.348** (.111)
Prosocial ties	-2.05** (.921)	-.935 (1.17)	-.754 (1.06)
Antisocial ties	.626** (.171) ^b	.580** (.173)	.584** (.169) ^b
Control x Prosocial		-.088 (.057)	
Control x Antisocial			.032* (.014) ^c
Adj R ²	.354	.361	.377
<i>Binge Past 30 Days</i>			
Low self-control	.027* (.014)	.026 ^b (.014)	.028* (.014)
Prosocial ties	-.423** (.115)	-.222 (.149)	-.437** (.123)
Antisocial ties	.100** (.022) ^b	.094** (.021)	.102** (.022) ^b
Control x Prosocial		-.015* (.007)	
Control x Antisocial			-.000 (.001)
Adj R ²	.405	.422	.401

Note. The regressions presented in this table control for gender and legal drinking status. Numbers in the table represent the unstandardized coefficients followed by the standard errors in parentheses.

^aNorms significant when disaggregated; ^bfriend behavior significant when disaggregated; ^cnorms interaction term significant; ^dfriend behavior interaction term significant.

* $p < .05$. ** $p < .01$.

TABLE 3
Main Effects and Interactions Between Social Ties and Early Onset

<i>Independent Variables</i>	<i>Main Effects</i>	<i>Social Protection</i>	<i>Social Amplification</i>
<i>Negative Results of Heavy Drinking</i>			
Early onset	.563** (.212)	.766** (.200)	.514** (.195)
Prosocial ties	-1.04** (.310)	.345 (.409)	-.748** (.290)
Antisocial ties	.415** (.059) ^{ab}	.366** (.055)	.297** (.059) ^{ab}
Onset x Prosocial		-.896** (.190)	
Onset x Antisocial			.136** (.028) ^{cd}
Adj R ²	.514	.589	.592
<i>Drinks Consumed Past 10 Days</i>			
Early onset	1.30 ^b (.742)	1.36 ^b (.762)	1.32 ^b (.733)
Prosocial ties	-1.44 (1.04)	-1.05 (1.52)	-.791 (1.08)
Antisocial ties	.966** (.209) ^b	.949** (.215)	.815** (.219) ^b
Onset x Prosocial		.253 (.715)	
Onset x Antisocial			.229* (.114)
Adj R ²	.296	.291	.314
<i>Binge Past 30 Days</i>			
Early onset	.221** (.078)	.236** (.080)	.219** (.079)
Prosocial ties	-.379** (.111)	-.274 ^b (.163)	-.363** (.114)
Antisocial ties	.102** (.022) ^b	.098** (.022)	.096** (.024) ^b
Onset x Prosocial		-.067 (.076)	
Onset x Antisocial			.007 (.011)
Adj R ²	.429	.428	.426

Note. The regressions presented in this table control for gender and legal drinking status. Numbers in the table represent the unstandardized coefficients followed by the standard errors in parentheses.

^aNorms significant when disaggregated; ^bfriend behavior significant when disaggregated; ^cnorms interaction term significant; ^dfriend behavior interaction term significant. ^b $p < .10$. * $p < .05$. ** $p < .01$.

TABLE 4
The Effects of Social Ties on Negative Drinking Consequences by Levels of Self-Control

	<i>Very Low Self-Control (90th Percentile)</i>	<i>Low Self-Control (75th Percentile)</i>	<i>Median Self-Control</i>	<i>High Self-Control (25th Percentile)</i>	<i>Very High Self-Control (10th Percentile)</i>
Prosocial ties	-.928, <i>p</i> ¼.001	-.459, <i>p</i> ¼.138	-.083, <i>p</i> ¼.810	.292, <i>p</i> ¼.458	.667, <i>p</i> ¼.135
Antisocial ties	.486, <i>p</i> ¼.000	.411, <i>p</i> ¼.000	.350, <i>p</i> ¼.000	.290, <i>p</i> ¼.000	.229, <i>p</i> ¼.002

Note. Numbers represent unstandardized regression coefficients followed by *p* values. All equations control for gender and legal drinking status.

Analyses

A series of ordinary least squares (OLS) regression models were estimated, including main effects and inter- action models. First, the independent effects of propensity (self-control and early onset) on the three outcome variables of interest (negative consequences of drinking, number of drinks consumed in the past 10 days, and the frequency of binge drinking in the past 30 days) are presented in Table 1. Tables 2 and 3 show the main effects of propensity and social ties in addition to the social protection (prosocial ties x propensity) and social amplification (antisocial x propensity) interaction effects on the three drinking outcomes. Table 2 shows the results for self-control as propensity and Table 3 replicates these results using the early onset propensity variable. Finally, Table 4 illustrates the interaction effects by presenting the regression coefficients of social ties on negative consequences at varying levels of self-control. OLS models are presented here to improve interpretability of interactions and comparability to previous research (Tittle, Antonaccio, Botchkovar, & Kranidioti, 2010; Wright et al., 2001). Though not displayed here, we also conducted negative binomial regressions to help account for the skewed=count nature of our outcome variables and to stand as an additional test of robustness.¹

RESULTS

Before diving into conditional effects, we first explore the relative contribution of the different types of propensity (i.e., self-control, family history, and early onset) on heavy drinking. Exploratory analysis suggested that although the relationship between family history and the outcome variables of interest was in the expected direction, it was not a robust contributor to the alcohol- specific propensity measure (i.e., early onset) and thus it was dropped from the measure for all subsequent analysis. As shown in Table 1, low self-control and early onset were both significant predictors of alcohol use in the past 10 days, frequency of binge drinking in the past 30 days, and negative results of drinking in the past 12 months. That is, college students who reported lower

levels of self-control and earlier onset of drinking also reported consuming more alcohol, more often, and suffering more negative consequences. Examination of the standardized coefficients (second number in parentheses in Table 1) suggests that self-control has a slightly stronger effect on negative consequences and drinks in the past 10 days while early onset has a slightly stronger effect on the frequency of binge drinking. These models account for a moderate amount of variance, ranging from 26% (binge drinking) to 36% (negative consequences). Gender was not a significant predictor for any of the three outcome variables and legal drinking status was only significant for alcohol consumed in the past 10 days (i.e., those of legal drinking age reported consuming more alcoholic drinks).

The remainder of the analysis focused on the exploration of the relationship between propensity (both self-control and early onset) and social ties (prosocial and antisocial) with regard to heavy drinking outcomes. Tables 2 and 3 show the main effects, social protection (prosocial x propensity), and amplification (antisocial x propensity) models for all three outcomes (frequency of binge past 30, number of drinks past 10, negative consequences of drinking past 12 months). The results for negative consequences of drinking in the past 12 months most closely followed the interdependence hypothesis (i.e., social ties especially important among those who are criminally prone, or in this case prone to heavy drinking) (Wright et al., 2001). Table 2 indicates that those with stronger prosocial ties reported fewer drinking-related consequences while those with stronger antisocial ties reported more drinking-related consequences (main effects model). Furthermore, the negative interaction term (social protection model) suggests that prosocial ties were more protective among those with low self-control.² Antisocial ties, on the other hand, had a positive interaction term, suggesting antisocial ties strengthened the relationship between propensity and negative consequences (social amplification model). This was true for both low self-control (Table 2) and greater early onset propensity (Table 3).

Table 4 illustrates the interactions through the presentation of the effects of both prosocial and antisocial ties on negative drinking consequences at different levels of self-control. The table indicates that both prosocial and antisocial ties have stronger influence among those at lower levels of self-control. For example, a one-unit increase in prosocial ties for those with very low self-control results in a significant decrease in negative consequences of .928 while the same change for those at high levels of control does not have a significant effect on consequences. Furthermore, antisocial ties are significant at all levels of self-control though the strength of the association is

stronger for those with very low self-control (.486 increase in consequences) compared to those with very high self-control (.229 increase in consequences). In other words, although both are likely affected, students with very low self-control are likely to experience greater influence of antisocial ties and see more negative consequences than are students with high self-control.

When looking at the number of drinks consumed in the past 10 days, there is less support for the protection model hypothesis (middle section, Tables 2 and 3). Pro-social ties was not a consistent predictor in these models. Early onset, self-control, and antisocial ties all significantly predicted drinks in the past 10 days and the amplification models suggested that antisocial ties effects were strongest among those with higher levels of propensity. Finally, with regard to binge drinking, a popular indicator of heavy drinking on college campuses, prosocial ties, antisocial ties, self-control, and early onset were all significant predictors of the frequency of binge drinking. The prosocial ties by self-control interaction was significant, suggesting that these ties were more influential among those with low self-control. All models explained at least a moderate amount of variance though the strongest models were those explaining the negative consequences of drinking (adj R^2 ranging from .291 to .636).

We followed the direction of Wright and colleagues in combining social ties indicators to create composite, multi-item measures of prosocial and antisocial ties. However, because the antisocial ties measure was the most robust predictor across all models we wanted to further explore whether it was being driven by friend substance behaviors, perceived norms, or both, and so we conducted follow-up analysis with the disaggregated measures. The full analyses are not presented; however, Tables 2 and 3 indicate which of the disaggregated variables were significant for each model. Superscript letters (see table for specifics) indicate under which circumstances social norms and friend substance behavior significantly predicted heavy drinking outcomes. These findings suggest that while both indicators are related to drinking outcomes, friend substance behavior is the more robust of the two. Friend substance behavior significantly predicted binge drinking, drinking in the past 10 days, and negative consequences associated with drinking. Furthermore, friend substance behavior amplified the effects of early onset on negative consequences and the effects of low self-control on binge drinking and negative consequences.

DISCUSSION

We took an interactive approach to exploring the impact of propensity and social ties on heavy drinking outcomes among college students. In the present study, both social ties and propensity received support in the prediction of heavy drinking, though the findings varied according to the specific outcome variable. When looking at binge drinking, a widely used indicator of heavy drinking and a popular target of prevention= intervention campaigns, reports of close friends' behavior was the most important predictor. Propensity and antisocial ties significantly predicted the number of drinks consumed by students in the past 10 days, and the effects of antisocial ties were amplified for those with greater propensity. Again, prosocial ties did not significantly predict this type of drinking behavior in our sample. Negative consequences associated with drinking most closely followed previous research by Wright and colleagues (2001). We found that propensity and social ties, particularly antisocial ties, variables were significant and consistent predictors of negative consequences. Furthermore, the influence of antisocial ties was amplified at higher levels of propensity. These findings point to areas of future research which may have a number of implications for theory and practice.

Propensity

The baseline propensity models (Table 1) indicated that both low self-control and early onset had independent and significant contributions to heavy drinking out- comes for students in our sample. These findings are in line with previous research on the relationship between early onset=use and later alcohol use (Buchmann et al., 2009; Kypri et al., 2009; LaBrie et al., 2007; Rothman, DeJong, Palfai, & Saitz, 2008) as well as low self-control and alcohol use (Costello et al., 2006; Gibson et al., 2004; Higgins & Marcum, 2005; Piquero et al., 2002; Sun & Longazel, 2008; Wolfe & Higgins, 2008); though this is the first time they have been considered together in one study. Furthermore, both indicators of propensity consistently predicted drinking outcomes after controlling for social ties variables (Tables 2 & 3), something not generally controlled for in previous research. One might argue that early onset behaviors (e.g., trying alcohol before age 15 and drinking heavily in high school) are simply early indicators or expressions of low self-control; however, the findings presented here do suggest that early onset has its own unique contribution. Future research should further explore the distinctions between low self-control and early onset as indicators of propensity.

Social Ties

The first finding of note with regard to social ties is the inconsistent contribution of prosocial ties to the prediction of heavy drinking behavior. Students reporting greater levels of prosocial ties did not necessarily report consuming fewer drinks in the past 10 days; however, they did report less bingeing in the past month and fewer negative consequences associated with their drinking. Furthermore, the protective effect of positive social ties on propensity (operationalized as low self-control) was only protective in the case of negative consequences. It should also be noted that even this finding was not consistent across estimation techniques (i.e., significant in OLS but not negative binomial regression). Though we were limited by our measure of prosocial ties, these findings may suggest that while social ties may not always prevent drinking, they might sometimes act as a buffer against negative consequences of that drinking. One possibility is that having a commitment to prosocial people and institutions (Hirschi, 1969) does not prevent drinking altogether but it does help to provide the restraint necessary to avoid getting completely out of control. Another possibility is that those students with strong social ties are more likely to have people looking out for them when they are participating in drinking activity. In other words, they may be more likely to have someone around them that says "it's time to go home" when they've had enough to drink or they are about to participate in behavior they might otherwise regret, thus reducing the extent to which they suffer negative consequences from their drinking. Future research might explore these possibilities. Either way, these findings fall in line with earlier reports of mixed results with regard to prosocial bonds and drinking among college students (Durkin et al., 2007; Durkin et al., 1999).

Another result of note is the robust findings associated with antisocial ties in general, and close friend sub-stance behavior (Durkin et al., 2005) in particular. The current findings are supportive of differential association (Sutherland, 1947) and other learning theories (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979; Bandura, 1977). Perceptions about typical student acceptance of heavy drinking (perceived norms) were related to more consequences in the past 12 months while close friends' alcohol, tobacco, and drug use was predictive of every heavy drinking outcome. This supports earlier research which suggested that although general norms are important, the norms of close friends are even more influential (Cho, 2006). The standard prevention practice on college campuses usually involves social norms campaigns with the understanding that local norms data (i.e., specific college norms) are more powerful than broader regional or

national stats in combating faulty perceptions (Larimer et al., 2011; Lewis & Neighbors, 2006). Our findings indicate that prevention campaigns might need to go even one step further. Instead of just targeting individuals' perceptions of campus norms it might be worthwhile to have students also explore the beliefs of their own friends and/or design prevention interventions that target the individual and his or her friends as a unit (Larimer et al., 2011). One approach may be to target student perceptions as soon as they begin college. For example, many universities offer a minimum of a half-day orientation to learn what to expect when they first attend college. Other universities offer an orientation seminar over several weeks or include a health class as part of standard requirements for graduation. Prevention efforts could address student perceptions of alcohol use during this orientation phase.

Limitations and Future Research

There are a number of limitations with the current study that must be noted, many of which are prime areas for future research. The sample was fairly small though the main issue there is that it reduces statistical power for detecting effects and we found moderate effects, despite this problem. The study was a cross-sectional representation with all measures collected simultaneously through self-report. There is always that possibility that the effects are in the opposite direction of that assumed here. For example, it is possible that drinking habits are established and then friendship groups are formed based on shared behaviors leading to favorable norms surrounding heavy drinking. In reality, this is likely a dynamic relationship in which the influence goes in both directions (Akers, 1991). Future research would benefit from adding a longitudinal component which could include drinking diaries to capture a more accurate picture of student drinking.

Because the data were initially collected for a different purpose, our access to measures was restricted. The measures of prosocial ties were especially limited, including only a few indicators of general social support and a couple questions about future expectations. Future research should utilize more complete measures of prosocial ties. Though the potential indicators of prosocial ties are numerous, future research should at least hit on all components of Hirschi's (1969) social bonds (i.e., attachment, commitment, acceptance, involvement). Future research might also consider the possibility that the failure for some prosocial ties measures (e.g., involvement) to predict drinking could be directly related to perceived norms. When the social

norms (or perceived norms) promote drinking as acceptable behavior, participating in such activity could actually be seen as an indicator of involvement in conventional society, or in this case, conventional college society. Family history represents another measure that could be improved upon in future research. Despite previous research supporting its strength, family history (measured as having an immediate family member with drug/alcohol problem), was not a strong contributor and was ultimately dropped from the propensity measure. A more complete measure of family history would have likely had stronger effects. Furthermore, a larger sample size with more power to detect effects might also result in stronger findings with regard to family history.

The strong relationship between close friend substance behavior and participant drinking behavior is something that deserves further study. Though this is not the first investigation to find a strong association between friends and drinking behavior, it is one of just a few focused specifically on the college campus (Durkin et al., 2005). Friendships on college campuses, especially for residential students, are a special type of influence. Short of military bases, there are not many places or times in one's life when proximity and access to friends is as pervasive as is the situation in college. Friend groups represent a potentially vital source of influence in college and future research should acknowledge and attempt to understand this realm of influence. Future research might benefit from employing social networking techniques and/or studying students both at the individual and "friend group" levels of analysis. As mentioned earlier, this is also an important area to consider for prevention. Although it may not be possible to change an individual's level of propensity, or even who they choose as friends, there may be ways to work on what friends do together or accept as normative.

CONCLUSION

Our study furthers the existing discussion of the interaction between stable propensities and malleable social ties by extending it to the context of alcohol-related behavior on college campuses. Furthermore, we contribute to the work on propensity by including early-onset drinking behavior as an indicator, in addition to the old standby, low self-control. With regard to life-course interdependence (Wright et al., 2001), our findings are supportive of the amplification side of the hypothesis, though more research is still needed (Ousey & Wilcox, 2007). Specifically, we found that antisocial ties, particularly close friendships with persons involved in alcohol or substance use, were consistent predictors of heavy drinking behaviors and consequences,

and in many cases amplified the effects of low self-control and early-onset drinking. In fact, the relationship between friend behavior and drinking outcomes was our strongest and most consistent finding and thus we suggest that this should be further investigated with a larger, more representative sample, of college students. Our analysis provided less support for the relationship between prosocial ties, propensity, and behavior though future research should focus on improved measures of prosocial ties. These findings highlight areas for future research and suggest that prevention campaigns might benefit from considering “students and their friends” as a focus of analysis and intervention.

FUNDING

Partial funding for this research was provided by the LiveWise Coalition and the Strategic Prevention Framework State Incentive Grant.

NOTES

1. Major deviations are noted in the Results section and full analyses are available upon request.
2. Neither prosocial ties nor the protective interaction effect were significant in the negative binomial analysis.

REFERENCES

- Akers, R. L. (1991). Self-control as a general theory of crime. *Journal of Quantitative Criminology*, 7(2), 201–211.
- Akers, R. L., Krohn, M. D., Lanza-Kaduce, L., & Radosevich, M. (1979). Social learning and deviant behavior: A specific test of a general theory. *American Sociological Review*, 44(4), 636–655.
- Baker, J. O. (2010). The expression of low self-control as problematic drinking in adolescents: An integrated control perspective. *Journal of Criminal Justice*, 38(3), 237–244.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
- Barnes, G. M., Welte, J. W., & Hoffman, J. H. (2002). Relationship of alcohol use to delinquency and illicit drug use in adolescents: Gender, age, and racial=ethnic differences. *Journal of Drug Issues*, 32(1), 153–178.
- Beaver, K. M., Wright, J. P., DeLisi, M., & Vaughn, M. G. (2008). Genetic influences on the

- stability of low self-control: Results from a longitudinal sample of twins. *Journal of Criminal Justice*, 36(6), 478–485.
- Becker, H. (1963). *Outsiders: Studies in the sociology of deviance*. New York, NY: The Free Press.
- Benda, B. B. (2005). The robustness of self-control in relation to form of delinquency. *Youth & Society*, 36(4), 418–444.
- Beseler, C. L., Aharonovich, E., Keyes, K. M., & Hasin, D. S. (2008). Adult transition from at-risk drinking to alcohol dependence: The relationship of family history and drinking motives. *Alcoholism: Clinical and Experimental Research*, 32(4), 607–616.
- Buchmann, A. F., Schmid, B., Blomeyer, D., Becker, K., Treutlein, J., Zimmermann, U. S., . . . Laucht, M. (2009). Impact of age at first drink on vulnerability to alcohol-related problems: Testing the marker hypothesis in a prospective study of young adults. *Journal of Psychiatric Research*, 43(15), 1205–1212.
- Cadore, R. J., Yates, W. R., Troughton, E., & Woodworth, G. (1995). Adoption study demonstrating two genetic pathways to drug abuse. *Archives of General Psychiatry*, 52(1), 42–52.
- Chambers, R. A., Taylor, J. R., & Potenza, M. N. (2003). Developmental neurocircuitry of motivation in adolescence: A critical period of addiction vulnerability. *American Journal of Psychiatry*, 160(6), 1041.
- Cho, H. (2006). Influences of norm proximity and norm types on binge and non-binge drinkers: Examining the under-examined aspects of social norms interventions on college campuses. *Journal of Substance Use*, 11(6), 417–429.
- Clinkinbeard, S. S. (2014). What lies ahead. An examination of future orientation, self-control, and delinquency. *Criminal Justice Review*, 39(1), 19–36.
- Conway, K. P., Swendsen, J. D., & Merikangas, K. R. (2003). Alcohol expectancies, alcohol consumption, and problem drinking: The moderating role of family history. *Addictive Behaviors*, 28(5), 823–836.
- Costello, B. J., Anderson, B. J., & Stein, M. D. (2006). Heavy episodic drinking among adolescents: A test of hypotheses derived from control theory. *Journal of Alcohol & Drug Education*, 50(1), 35–55.
- Cretacci, M. A. (2008). A general test of self-control theory: Has its importance been exaggerated? *International Journal of Offender Therapy and Comparative Criminology*,

52(5), 538–553.

- Dawson, D. A., Goldstein, R. B., Chou, S. P., Ruan, W. J., & Grant, B. F. (2008). Age at first drink and the first incidence of adult-onset *DSM-IV* alcohol use disorders. *Alcoholism: Clinical and Experimental Research*, 32(12), 2149–2160.
- DeWit, D. J., Adlaf, E. M., Offord, D. R., & Ogborne, A. C. (2000). Age at first alcohol use: A risk factor for the development of alcohol disorders. *The American Journal of Psychiatry*, 157(5), 745–750.
- Doherty, E. E. (2006). Self-control, social bonds, and desistance: A test of life-course interdependence. *Criminology*, 44(4), 807–833.
- Durkin, K. F., Wolfe, S. E., & May, R. W. (2007). Social bond theory and drunk driving in a sample of college students. *College Student Journal*, 41(3), 734–744.
- Durkin, K. F., Wolfe, T. W., & Clark, G. (1999). Social bond theory and binge drinking among college students: A multivariate analysis. *College Student Journal*, 33(3), 450.
- Durkin, K. F., Wolfe, T. W., & Clark, G. A. (2005). College students and binge drinking: An evaluation of social learning theory. *Sociological Spectrum*, 25(3), 255–272.
- Elliott, D. S., Huizinga, D., & Menard, S. (1989). *Multiple problem youth: Delinquency, substance use, and mental health problems*. New York, NY: Springer-Verlag Publishing.
- Gibson, C., Schreck, C. J., & Miller, J. M. (2004). Binge drinking and negative alcohol-related behaviors: A test of self-control theory. *Journal of Criminal Justice*, 32(5), 411–420.
- Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Grasmick, H. G., Tittle, C. R., Bursik, R. J. J., & Arneklev, B. J. (1993). Testing the core empirical implications of Gottfredson and Hirschi's general theory of crime. *Journal of Research in Crime and Delinquency*, 30(1), 5–29.
- Haines, M. P. (1996). *A social norms approach to preventing binge drinking at colleges and universities*. Newtown, MA: The Higher Education Center for Alcohol and Other Drug Prevention.
- Heath, A. C., Bucholz, K. K., Madden, P. A. F., Dinwiddie, S. H., Slutske, W. S., Bierut, L. J., ... Martin, N. G. (1997). Genetic and environmental contributions to alcohol dependence risk in a national twin sample: Consistency of findings in women and men. *Psychological*

- Medicine: A Journal of Research in Psychiatry and the Allied Sciences*, 27(6), 1381–1396.
- Higgins, G. E. (2007). Examining the original Grasmick scale: A Rasch model approach. *Criminal Justice and Behavior*, 34(2), 157–178.
- Higgins, G. E., & Marcum, C. D. (2005). Can the theory of planned behavior mediate the effects of low self-control on alcohol use? *College Student Journal*, 39(1), 90–103.
- Hingston, R. W., Heeren, T., & Zakocs, R. C. (2002). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24. *Journal of Studies on Alcohol*, 63(2), 136–144.
- Hirschi, T. (1969). *Causes of delinquency*. Berkeley, CA: University of California Press.
- Hirschi, T., & Gottfredson, M. (1993). Commentary: Testing the general theory of crime. *Journal of Research in Crime and Delinquency*, 30(1), 47–54.
- Jackson, K. M., O'Neill, S. E., & Sher, K. J. (2006). Characterizing alcohol dependence: Transitions during young and middle adulthood. *Experimental and Clinical Psychopharmacology*, 14(2), 228–244.
- Jennison, K. M. (2004). The short-term effects and unintended long-term consequences of binge drinking in college: A 10-year follow-up study. *American Journal of Drug & Alcohol Abuse*, 30(3), 659–684.
- Keane, C., Maxim, P. S., & Teevan, J. J. (1993). Drinking and driving, self-control, and gender: Testing a general theory of crime. *Journal of Research in Crime and Delinquency*, 30(1), 30–46.
- King, S. M., Keyes, M., Malone, S. M., Elkins, I., Legrand, L. N., Iacono, W. G., & McGue, M. (2009). Parental alcohol dependence and the transmission of adolescent behavioral disinhibition: A study of adoptive and non-adoptive families. *Addiction*, 104(4), 578–586.
- Krebs, C. P., Lattimore, P. K., Cowell, A. J., & Graham, P. (2010). Evaluating the juvenile breaking the cycle program's impact on recidivism. *Journal of Criminal Justice*, 38(2), 109–117.
- Kypri, K., Paschall, M. J., Langley, J., Baxter, J., Cashell-Smith, M., & Bourdeau, B. (2009). Drinking and alcohol-related harm among New Zealand university students: Findings from a national Web-based survey. *Alcoholism: Clinical & Experimental Research*,

33(2), 307–314.

LaBrie, J. W., Migliuri, S., Kenney, S. R., & Lac, A. (2010). Family history of alcohol abuse associated with problematic drinking among college students. *Addictive Behaviors, 35*(7), 721–725.

LaBrie, J. W., Rodrigues, A., Schiffman, J., & Tawalbeh, S. (2007). Early alcohol initiation increases risk related to drinking among college students. *Journal of Child & Adolescent Substance Abuse, 17*(2), 125–141.

Larimer, M. E., Neighbors, C., LaBrie, J. W., Atkins, D. C., Lewis, M. A., Lee, C. M., . . . Walter, T. (2011). Descriptive drinking norms: For whom does reference group matter? *Journal of Studies on Alcohol & Drugs, 72*(5), 833–843.

Laub, J. H., & Sampson, R. J. (1993). Turning points in the life course: Why change matters to the study of crime. *Criminology, 31*(3), 301–325.

Lewis, M. A., & Neighbors, C. (2006). Who is the typical college student? Implications for personalized normative feedback interventions. *Addictive Behaviors, 31*(11), 2120–2126.

Marcus, B. (2004). Self-control in the general theory of crime: Theoretical implications of a measurement problem. *Theoretical Criminology, 8*(1), 33–55.

Meldrum, R. C., Young, J. T. N., & Weerman, F. M. (2009). Reconsidering the effect of self-control and delinquent peers: Implications of measurement for theoretical significance. *Journal of Research in Crime & Delinquency, 46*(3), 353–376.

Merikangas, K. R., Stolar, M., Stevens, D. E., Goulet, J., Preisig, M. A., Fenton, B., . . . Rounsaville, B. J. (1998). Familial transmission of substance use disorders. *Archives of General Psychiatry, 55*(11), 973–979. Mitchell, O., & MacKenzie, D. L. (2006). The stability and resiliency of self-control in a sample of incarcerated offenders. *Crime & Delinquency, 52*(3), 432–449.

National Center for Education Statistics. (2011). *Digest of education statistics*. Washington, DC: U.S. Department of Education. Retrieved from <http://nces.ed.gov/programs/digest/>

National Institute on Alcohol Abuse and Alcoholism (NIAAA). (2002). *A call to action: Changing the culture of drinking at U.S. colleges*. Bethesda, MD: National Institutes of Health.

Nebraska Young Adult Alcohol Opinion Survey, 2010–2012 State Summary Report.

- (2012). Lincoln, NE: Nebraska Office of Highway Safety.
- Newcomb Michael, D., & McGee, L. (1989). Adolescent alcohol use and other delinquent behaviors: A one-year longitudinal analysis controlling for sensation seeking. *Criminal Justice & Behavior*, 16(3), 345–369.
- Nurnberger, J. I., Jr., Wiegand, R., Bucholz, K., O'Connor, S., Meyer, E. T., Reich, T., . . . Porjesz, B. (2004). A family study of alcohol dependence: Coaggregation of multiple disorders in relatives of alcohol-dependent probands. *Archives of General Psychiatry*, 61(12), 1246–1256.
- Ousey, G. C., & Wilcox, P. (2007). The interaction of antisocial propensity and life-course varying predictors of delinquent behavior: Differences by method of estimation and implications for theory. *Criminology*, 45(2), 313–354.
- Perkins, H. W. (2002). Social norms and the prevention of alcohol misuse in collegiate contexts. *Journal of Studies on Alcohol, Suppl(63)*, 164.
- Piquero, A. R., Gibson, C. L., & Tibbetts, S. G. (2002). Does self-control account for the relationship between binge drinking and alcohol-related behaviours? *Criminal Behaviour & Mental Health*, 12(2), 135.
- Piquero, A. R., & Goode, E. (2008). Measuring self-control. In E. Goode (Ed.), *Out of control: Assessing the general theory of crime* (pp. 26–37). Stanford, CA: Stanford University Press.
- Piquero, A. R., Jennings, W. G., & Farrington, D. P. (2010). On the malleability of self-control: Theoretical and policy implications regarding a general theory of crime. *Justice Quarterly*, 27(6), 803–834.
- Pitkänen, T., Kokko, K., Lyyra, A.-L., & Pulkkinen, L. (2008). A developmental approach to alcohol drinking behaviour in adulthood: A follow-up study from age 8 to age 42. *Addiction*, 103, 48–68.
- Pratt, T. C., & Cullen, F. T. (2000). The empirical status of Gottfredson and Hirschi's general theory of crime: A meta-analysis. *Criminology*, 38(3), 931–964.
- Pratt, T. C., Cullen, F. T., Sellers, C. S., Winfree, L. T., Madensen, T. D., Daigle, L. E., . . . Gau, J. M. (2010). The empirical status of social learning theory: A meta-analysis. *Justice Quarterly*, 27(6), 765–802.
- Rothman, E. F., DeJong, W., Palfai, T., & Saitz, R. (2008). Relationship of age of first drink

- to alcohol-related consequences among college students with unhealthy alcohol use. *Substance Abuse*, 29(1), 33–41.
- Sampson, R. J., & Laub, J. H. (1993). *Crime in the making: Pathways and turning points through life*. Cambridge, MA: Harvard University Press.
- Schaffer, M., Jeglic, E. L., & Stanley, B. (2008). The relationship between suicidal behavior, ideation, and binge drinking among college students. *Archives of Suicide Research*, 12(2), 124–132.
- Sun, I. Y., & Longazel, J. G. (2008). College students' alcohol-related problems: A test of competing theories. *Journal of Criminal Justice*, 36(6), 554–562.
- Sutherland, E. (1947). *Principles of criminology* (4th ed.). Chicago, IL: JP Lippincott Company.
- Thombs, D. L., O'Mara, R., Tobler, A. L., Wagenaar, A. C., & Clapp, J. D. (2009). Relationships between drinking onset, alcohol use intensity, and nighttime risk behaviors in a college bar district. *American Journal of Drug & Alcohol Abuse*, 35(6), 421–428.
- Tittle, C. R., Antonaccio, O., Botchkovar, E., & Kranidioti, M. (2010). Expected utility, self-control, morality, and criminal probability. *Social Science Research*, 39(6), 1029–1046.
- Wagner, E. F. (1996). Substance use and violent behavior in adolescence. *Aggression and Violent Behavior*, 1(4), 375–387.
- Ward, J. T., Gibson, C. L., Boman, J., & Leite, W. L. (2010). Assessing the validity of the retrospective behavioral self-control scale: Is the general theory of crime stronger than the evidence suggests? *Criminal Justice and Behavior*, 37(3), 336–357.
- Wechsler, H., & Kuo, M. (2000). College students define binge drinking and estimate its prevalence: Results of a national survey. *Journal of American College Health*, 49(2), 57–64.
- Wechsler, H., Lee, J. E., Kuo, M., Seibring, M., Nelson, T. F., & Lee, H. (2002). Trends in college binge drinking during a period of increased prevention efforts. *Journal of American College Health*, 50(5), 203.
- Williams, M. W. M., Fletcher, R. B., & Ronan, K. R. (2007). Investigating the theoretical construct and invariance of the self-control scale using confirmatory factor analysis. *Journal of Criminal Justice*, 35(2), 205–218.
- Wolfe, S. E., & Higgins, G. E. (2008). Self-control and perceived behavioral control: An examination of college student drinking. *Applied Psychology in Criminal Justice*, 4(1), 108–134.
- Wright, B. R. E., Caspi, A., Moffitt, T. E., & Silva, P. A. (2001). The effects of social ties on

crime vary by criminal propensity: A life-course model of interdependence.
Criminology, 39(2), 321–348.