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Binge drinking and negative alcohol-related behaviors: A test of self-control theory

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Abstract

Binge drinking and alcohol-related behaviors have been viewed as major concerns on college campuses. Although national studies were conducted to describe these behaviors, less research attempted to explain them. Self-control theory is extended as a theoretical framework to explain both while considering other known risk factors. Using a sample of college students (n = 268) from a university in the southern United States, the additive and interactive effects of self-control were modeled to predict binge drinking and negative alcohol-related behaviors. A series of multivariate regression models showed that low self-control had effects on binge drinking and related behaviors. Binge drinking's effect on negative alcohol-related behaviors varied across levels of self-control.

Introduction

For many years alcohol abuse and alcohol-related problems were identified as major concerns on college campuses (Carnegie Foundation for the Advancement of Teaching, 1990; Schuckit, Klein, Twitchell, & Springer, 1994; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998). Some argued that binge drinking[1] by college students was by far the single most serious public health problem confronting American colleges and universities (Wechsler et al., 1998). Over the past ten years, researchers showed that a disproportionate amount of college students partake in such drinking activities (Hurlbut & Sher, 1992; Johnson, O'Malley, & Bachman, 1996; Newman, Crawford, & Nellis, 1991; Wechsler et al., 1998). These findings have led to unprecedented public and governmental concern.

The Harvard School of Public Health's College Alcohol Study (CAS) (see Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994; Wechsler et al., 1998), drawn from a national probability sample of 140 colleges, concluded that binge drinking was widespread among college students. Over 40 percent of students in the CAS study were categorized as binge drinkers. Frequent binge drinkers constituted less than 23 percent of students, but accounted for 72 percent of all the alcohol students drink (Wechsler & Wuethrich, 2002). The CAS (Wechsler et al., 1998) also showed that the percentage of binge drinkers on college campuses was persistent with relatively no declines.

Heavy drinking practices do have consequences. Problems resulting from heavy episodic or "binge" drinking among college students led university administrators nationwide to define binge drinking

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as one of the most serious campus life problems. National studies revealed that problems range from personal to second-hand effects that can be damaging to the individual student, other students, and the community (Wechsler & Wuethrich, 2002).

The current study brought a major criminological theory to bear on college student binge drinking and its behavioral consequences; namely, Gottfredson and Hirschi's (1990) self-control theory. In doing so, this research extended prior work of Piquero, Gibson, and Tibbetts (2002) that assessed Gottfredson and Hirschi's (1990) spuriousness hypothesis as it related to binge drinking and alcohol-related behaviors in two important ways. First, a stricter test of self-control theory was conducted by considering competing factors that were shown to be linked to the behaviors under investigation. Second, the effects of binge drinking on alcohol-related behaviors were assessed across varying levels of self-control.

A brief overview of self-control theory

Gottfredson and Hirschi (1990) contend that individuals who lack the ability to restrain from engaging in behaviors that produce instantaneous gratification have low self-control. They argue that self-control (or lack of) is a relatively time-stable individual disposition that is developed in childhood due to insufficient parenting styles that include: inadequate behavioral monitoring, the inability to recognize deviant behavior, and inconsistent punishment of such behaviors. As stated by Gottfredson and Hirschi (1990, p. 90), "people who lack self-control will tend to be impulsive, insensitive, physical (as opposed to mental), risk-taking, short-sighted, and nonverbal..." and these traits will manifest across temporal and spatial domains.

Gottfredson and Hirschi (1990) claim that those lacking self-control are more likely to engage not only in criminal activities, but also imprudent behaviors such as drinking, gambling, smoking, and academic dishonesty. In addition, low self-control has other social consequences. Or, as Gottfredson and Hirschi (1990, p. 96) say, the dimensions that make-up low self-control are "not conducive to the achievements of long term goals and aspirations... they impede educational and occupational achievement, destroy interpersonal relations, and undermine physical health and well being" (see also Evans, Cullen, Burton, Dunaway, & Benson, 1997; Gibson, Wright, & Tibbetts, 2000).

Although under scrutiny by many criminologists, Gottfredson and Hirschi's (1990) general theory generated moderate and consistent empirical support (Pratt & Cullen, 2000). While many studies examined the effects of self-control on offending behaviors and deviant acts (Arneklev, Grasmick, Tittle, & Bursik, 1993; Burton, Evans, Cullen, Olivares, & Dunaway, 1999; Evans et al., 1997; Gibbs & Giever, 1995; Keane, Maxim, & Teevan, 1993; Piquero & Tibbetts, 1996; Polakowski, 1994), only one study, to the knowledge of the authors, used Gottfredson and Hirschi's (1990) theory to explain binge drinking and behaviors correlated with such practices (Piquero et al., 2002). Piquero and colleagues (2002) tested the spuriousness hypothesis of self-control theory as it related to drug use (binge drinking) and deviant behavior (alcohol-related behaviors). The spuriousness hypothesis implied that the link between drug use and delinquent behavior would be observed due to an unmeasured variable—low self-control. To clarify, Gottfredson and Hirschi (1990, p. 93) stated that, "the correlates are the same because drug use and delinquency are both manifestations of an underlying tendency to pursue short-term, immediate pleasure [i.e., low self-control]." Piquero and colleagues (2002) used bivariate probit models, absent of statistical controls, to conclude that low self-control was a significant predictor of both binge drinking and alcohol-related problems. Low self-control, however, did not diminish the strong correlation between the two outcomes.

The limited scope of Piquero and colleagues (2002) results begs for more empirical attention in two important ways. First, they did not statistically control for several variables that binge drinking research deemed important; therefore, not knowing the unique effects of self-control on both outcomes while holding other variables constant. Second, they did not consider the interactive effects of self-control and binge drinking in predicting alcohol-related behavior, this discussion will be returned to in the current study section.

Binge drinking and alcohol-related behaviors

Several studies identified characteristics that help describe binge drinking students. Research over the past twenty years revealed demographic and social factors such as gender, fraternity membership, grade point average, and religiosity to be influential in describing those more likely to engage in such practices during college. Men tend to be heavier drinkers than women, and they were increasingly more likely to drink to get drunk. On the contrary, recent research showed that the number of college females who drink excessively increased over the past decade, thus, resembling male drinkers in their college years (Engs & Hanson, 1990; Floerchinger & Ward, 1990). Fraternity and sorority members drink significantly more than their nonmember peers (Saltz & Elandt, 1986) and are the most likely of all students

to binge drink (Wechsler & Wuethrich, 2002). Heavy drinkers have lower grade point averages than others (Engs & Hanson, 1985; Maney, 1990; Saltz & Elandt, 1986). Finally, studies revealed an association between the lack of importance of religion and heavy alcohol use (Engs & Hanson, 1985; Miller & Garrison, 1982), indicating those reporting less religiosity were more likely to use alcohol heavily.

Although demographic factors are necessary controls in assessing binge drinking among college students, these factors alone have not been sufficient in explaining large amounts of variation. Findings from extant research linked individual differences and personality characteristics to binge drinking practices among youth and young adults. Some studies found that personality factors such as impulsivity and sensation seeking were correlated with heavy alcohol use among young adults (Beck, Thombs, Mahoney, & Fingar, 1995; Quigley & Marlatt, 1996). In addition, psychological factors such as depression, high anxiety, and shame proneness (i.e., shame as a stable individual trait) were positively correlated with alcohol abuse (Cook, 1988; Huber, 1985; Kaplen, 1979). The current study controlled for many of these factors when assessing the unique contribution of low self-control, resulting in a more conservative test of how Gottfredson and Hirschi's (1990) concept of low self-control was linked to binge drinking and alcohol-related behaviors.

Other studies focused on negative behavioral and health outcomes resulting from binge drinking practices (Wechsler & Wuethrich, 2002). Students who report binge drinking are more likely to report an array of negative behaviors that range from trivial to serious. For example, binge drinkers are more at risk for engaging in unplanned and unsafe sexual activity, contracting venereal diseases, being victims of physical and sexual assault, getting into trouble with police, suffering accidental injuries, experiencing increased interpersonal problems, cognitive impairments, and poor academic performance than students who report no binge drinking (Cooper, Pierce, & Huselid, 1994; Desiderato & Crawford, 1995; Volkwein, Szelest, & Lizotte, 1995; Wechsler et al., 1994; Wechsler et al., 1998). Other, more distal, concerns included health risks such as high-blood pressure, heart disease, and cirrhosis of the liver (Colliver & Mallin, 1986; Shaper et al., 1981; Sherlock, 1982). Clearly, such consequences can be long lasting and detrimental to the individual. While many of the medical conditions associated with high levels of alcohol consumption are often dependent upon persistent patterns of drinking over time, the adverse behavioral effects of excessive drinking are often related to high levels of alcohol consumption on a single occasion.

Current study

If Gottfredson and Hirschi (1990) are correct, self-control should (1) be a strong predictor of binge drinking and alcohol-related behaviors when simultaneously controlling for other known correlates, and (2) self-control should diminish the effect of binge drinking on alcohol-related behaviors. Piquero and colleagues (2002) showed that self-control could not account for the covariance between binge drinking and alcohol-related behaviors; however, they did show that self-control had significant effects on both. In light of their findings, perhaps self-control theory's explanation of binge drinking and related behaviors could be partially flawed in that low self-control should not be expected to account for the covariation between binge drinking and alcohol-related behaviors.

Gottfredson and Hirschi's (1990) spuriousness hypothesis may be questionable on logical grounds by considering the following hypothetical situation. Unemployment is related (inversely) to income. Yes, the likelihood that a person is unemployed might be affected by low self-control; and, yes, a person's income might be affected by low self-control, but can one really expect the correlation between unemployment and income to vanish when self-control is controlled?—probably not. Low income is a rather proximate consequence of unemployment. It will result from being unemployed, regardless of anything else.

A similar case can be made concerning alcohol-related behaviors. Such behaviors, as discussed in the alcohol literature, are proximate consequences of binge drinking. They are likely to be consequences of binge drinking even for people whose binge drinking occurs for reasons other than low self-control; therefore, it can be argued that self-control should not eliminate the correlation between the two. The next logical step, therefore, is to consider the interactive effects of self-control and binge drinking in understanding alcohol-related behaviors.

Binge drinking cannot be separated from the individual that partakes in the practice. Research implicitly stated that negative alcohol-related behaviors were a direct result of binge drinking, implying that its effect was similar across individuals. Studies, however, haven't fully considered factors that might moderate this relationship (see Piquero et al., 2002). Binge drinking may not lead to negative behavioral consequences for some, and then may have a magnified impact for others, depending on the individual characteristics of the person engaging in binging. Effects may be conditioned on a number of social and psychological factors, including low self-control.

The above reasoning leads to two important questions that went unanswered in Piquero et al.'s

(2002) research. First, does self-control play a statistically significant role in predicting both binge drinking and alcohol-related behaviors when important controls are in place? Piquero and colleagues (2002) did not assess the unique effects of self-control on both outcomes in light of important variables that could account for variation that was initially attributed to low self-control. Second, does the effect of binge drinking on alcohol-related behaviors vary at different levels of self-control? The second question extends Piquero et al.'s (2002) work; builds on new studies testing self-control theory that show social and psychosocial variables to have exacerbating and inhibiting effects on delinquent outcomes when considering high and low self-control individuals separately (Gibson & Wright, 2001; Tibbetts & Myers, 1999; Wright, Caspi, Moffitt, & Silva, 1999); and adds to the empirical literature on the behavioral consequences of binge-drinking.

Methods

Data

Data for the current study were taken from a sample of freshman-level courses at a university in the southern United States. Participants were asked to voluntarily complete an eleven-page, self-report survey and were informed that their responses would be held confidential. The original sample consisted of 337 students; however, the strategy employed by Muthen and Muthen (1999) was followed, where those individuals who reported they did not drink alcohol were dismissed from the analysis because they would not experience alcohol-related behaviors. The sample used in this study consisted of 268 students (see Piquero et al., 2002).

The sample consisted of 35 percent males ($n = 95$) and 65 percent females ($n = 173$), and 91 percent was White ($n = 244$) and 9 percent was non-White ($n = 24$). College classification consisted of 50 percent freshmen ($n = 135$), 21 percent sophomores ($n = 56$), 18 percent juniors ($n = 49$), and 11 percent seniors ($n = 28$). The age range was seventeen to forty-four; however, 87 percent of the respondents were under twenty-three years of age. The sample closely resembled the characteristics of the larger university with a slightly greater proportion of females in the study sample.

Measures

Binge drinking

Binge drinking was measured based on the number of alcoholic drinks an individual consumed on a typical drinking occasion. Given previous operationalizations of binge drinking (Johnson et al., 1996; Wechsler & Wuethrich, 2002) and, most importantly, to stay consistent with Piquero et al. (2002), this measure was dichotomized as 0 (on a typical occasion, four drinks or less at one sitting) or 1 (on a typical occasion, five or more drinks at one sitting). Research tended not to define 'drink,' thereby leaving it to the respondent to interpret the item. "Drink" refers to a glass of wine, bottle of beer, shot glass of liquor, or mixed drink (see Piquero et al., 2002). Future research endeavors should examine other operationalizations to determine the sensitivity of the results.

Alcohol-behavior scale

Alcohol-related behaviors were measured by eleven-items that asked respondents questions such as: while drinking alcohol have you ever gotten into trouble with police, been late to school, could have hurt yourself or others, got into fights, missed school or work, had problems with a teacher, had problems with a friend, stayed home from school, and hurt chances for a raise or better job. Responses for each item ranged from 0 (never) to 3 (fairly often). Higher scores indicated that respondents engaged in negative alcohol-related behaviors more frequently ($\alpha = .81$, mean = 4.39, SD = 4.32).

Self-control

Self-control was measured using a twenty four-item self-report scale (see Grasmick, Tittle, Bursik, & Arneklev, 1993). Several studies found this composite measure to be both reliable and valid (Nagin & Paternoster, 1993; Piquero & Tibbetts, 1996), although others have been skeptical of its unidimensionality (Piquero, MacIntosh, & Hickman, 2000).[2] Responses for each question ranged on a four-point Likert scale from 1 (disagree strongly) to 4 (agree strongly). High scores on this measure indicated lower self-control ($\alpha = .84$, mean = 50.09, SD = 8.66). In agreement with other studies (Brownfield & Sorenson, 1993; Nagin & Paternoster, 1993), a factor analysis indicated that scale items loaded on one factor (see also Arneklev et al., 1993; LaGrange & Silverman, 1999; Piquero & Rosay, 1998).

Shame proneness

A thirty-five-item scale was used to measure shame proneness (for a detailed review see Tibbetts, 1997). Items were designed to indicate global evaluation of self, loss of self-esteem due to negative evaluation, failure to live up to personal standards or ideals, internal attributions of blame, and increased levels of self-awareness. Tibbetts (1997) stated that the composite score captured the unique effects of

shame while excluding further influences of related emotions. Responses ranged on a five-point Likert scale where higher scores indicated higher levels of shame proneness (α = .91, mean = 108.04, SD = 19.06).

Embarrassment

Embarrassment was measured by a scale consisting of twelve items that asked respondents the degree of embarrassment they would experience if faced with certain situations such as falling down in public, speaking in public, walking in on a couple naked, and unintentionally interrupting a class by coughing. Each item ranged on a four-point Likert-type scale from 1 (disagree strongly) to 4 (agree strongly) (α = .85). Higher scores indicated being more easily embarrassed (α = .85, mean = 29.02, SD = 6.40).

Morals

A six-item scale was used to measure morals. Items asked respondents if they thought it was wrong to cheat on tests, use hard drugs, steal things, damage property belonging to someone else, verbally threaten a person, and physically attack a person. Item responses varied on a four-point Likert-type scale from 1 (disagree strongly) to 4 (agree strongly). Higher scores indicated more morals (α = .90, mean = 20.91, SD = 3.76).

Peer delinquency

A standard twelve-item scale was used to measure peer delinquency. Respondents were asked how many of their friends in the last twelve months participated in behaviors including: stolen something worth more than $50, stolen something worth less than $5, broke into a vehicle, drank alcohol, smoked marijuana, smoked cigarettes, been in a fist fight, purposely damaged someone else's property, skipped school, cheated on tests, had more than five drinks in one sitting, and had done something that could have led to arrest. Item responses varied on a five-point Likert-type scale from 1 (none of them) to 5 (all of them). Higher scores indicated having more friends involved in peer delinquency (α = .88, mean = 26.80, SD = 7.93).

Control variables

Five additional variables were included as controls: (1) gender, (2) grade point average (GPA), (3) Greek membership, (4) race, and (5) religiosity. Gender was coded as 1 (female) or 2 (male) (mean = 1.36, SD = .48). Greek membership was measured by one item that asked respondents if they were a member of a fraternity or sorority and coded as 0 (no) or 1 (yes) (mean = .11, SD = 31). Grade point average was measured by asking respondents to report their college grade point average, coded as 1 (below 2.0) to 5 (3.5 to 4.0) (mean = 3.36, SD = 1.12). Due to limited variation, race was recoded into a dichotomous measure, coded as 0 (White) or 1 (non-White). Religiosity was measured by asking respondents how religious they were, coded from 1 (not at all) to 3 (very religious).

Analytic strategy

The analytic strategy was threefold. First, a logistic regression model was calculated to assess the effect of self-control on binge drinking while statistically controlling for important variables known to be related to binge drinking. Second, restricted and unrestricted OLS regression models were calculated to assess the effect of binge drinking on alcohol-related behaviors while controlling for various factors when self-control was absent and included in the model to observe the unique contribution of low self-control. Finally, split-group regression models were calculated to assess the joint contribution of self-control and binge drinking on alcohol-related behaviors at different levels of self-control.

Results

Zero-order correlations between all variables were first estimated (although not reported, this table will be made available by authors upon request). Neither zero-order correlations nor collinearity diagnostics (i.e., variance inflation factors and condition number tests) showed severe collinearity problems. A .05 alpha level was adopted for all statistical significance tests.

Table 1 shows results from a logistic regression model predicting binge drinking.[3] Self-control exerted a positive and significant effect (B_R = .61, $p < .05$), indicating that individuals with low self-control were more likely to engage in binge drinking. The delinquent peers measure had the most important effect (B_R = 1.11, $p < .05$), indicating that individuals who had more delinquent peers were more likely to be binge drinkers. In regard to other variable effects, Greek membership ($B_R = -.05$, $p < .05$) and shame proneness ($B_R = -.38$, $p < .05$) both had negative and significant effects on binge drinking. The effect of Greek membership was opposite of what past research showed, however, this might be due to having only a small percentage of fraternity and sorority members in the sample.

Table 2 shows two OLS regression models predicting alcohol-related behaviors, a restricted model (Model 1) that did not include self-control and an unrestricted model (Model 2) that included self-con-

Table 1
Logistic regression predicting binge drinking (n = 268)

Variable	β_R	b	SE	Wald	Exp(B)
Self-control	.61	.07	.02	9.89 *	1.07
Shame proneness	− .38	− .02	.01	4.50 *	.98
Embarrassment	− .06	− .01	.03	.23	.99
Morals	.00	.00	.05	.01	1.00
Peer delinquency	1.11	.14	.02	34.08 *	1.15
Gender	1.11	.27	.33	.66	1.30
Grade point average	.08	.06	.14	.17	1.06
Greek membership	− .05	− 1.19	.53	4.99 *	.30
Race	− .01	− .36	.56	.42	.70
Religiosity	.21	.37	.29	1.49	1.43
Constant		− 6.57	2.20	8.94	–
− 2 log-likelihood		263.73			
Chi-square/df		90.36 * /10			
Nagelkerke R^2		.39			

* p < .05; two-tailed.

trol were estimated. Consistent with past research on binge drinking (Cooper et al., 1994; Desiderato & Crawford, 1995; Wechsler et al., 1994), Model 1 showed that binge drinking had the largest effect (beta = .35, p < .05), whereas, peer delinquency exerted the second largest effect (beta = .31, p < .05). Embarrassment had a negative and significant effect (beta = − .12, p < .05), indicating that students who were not easily embarrassed were more likely to exhibit alcohol-related behaviors. Finally, and inconsistent with past research, shame proneness exerted a positive and significant effect (beta = .17, p < .05), indicating that students who were more shame prone were more likely to engage in negative alcohol-related behaviors. Overall, Model 1 accounted for 36 percent of the overall variance in alcohol-related behaviors.

Self-control was entered into the unrestricted model (Model 2) in Table 2. As predicted, self-control exerted a positive and significant effect (beta = .23), indicating that students with low self-control were more likely to engage in negative alcohol-related behaviors. Furthermore, binge drinking (beta = .27), shame proneness (beta = .16), and peer delinquency (beta = .30) remained significant predictors of alcohol-related behaviors. As shown in Model 2 of Table 2, the inclusion of self-control did reduce the effect of binge drinking on alcohol-related behaviors; however, the reduction was marginal. The inclusion of self-control also reduced the effects of peer delinquency, shame proneness, and embarrassment. Overall, Model 2 accounted for 39 percent of the explained variance in alcohol-related behaviors, although the unique contribution of self-control did not substantially increase this amount.

Table 3 shows two models: (1) high self-control students (i.e., all students having less than the median self-control score), and (2) low self-control students (i.e., all students having greater than the median self-control score). Model 1 shows binge drinking had a positive and significant effect on alcohol-related behaviors (beta = .22, p < .05), indicating that individuals possessing high self-control are likely to engage in alcohol-related behaviors when binge drinking. Also, peer delinquency had a positive and significant effect on alcohol-related behaviors (beta = .37, p < .05). In Model 2, binge drinking had a positive and significant effect on alcohol-related behaviors (beta = .33, p < .05) as well, indicating that students possessing low self-control were also likely to engage in alcohol-related behaviors. Additionally, shame proneness (beta = .30, p < .05), embarrassment (beta = − .16, p < .05), and peer delinquency (beta = .31, p < .05) all exerted significant effects on alcohol-related behaviors.

Although both models in Table 3 reveal that binge drinking had a significant effect on alcohol-related behaviors, a Z-test was employed to compare the equality of these coefficients (see Paternoster, Brame, Mazerolle, & Piquero, 1998). According to Paternoster et al. (1998), the Z-test is a strategy that allows researchers to assess whether a regression coefficient is statistically similar or different across two independent samples. The regression coefficient being compared across groups is the effect of binge drinking on

Table 2
OLS regression models predicting alcohol-related behaviors (n = 268)

Variable	Restricted (Model 1)		Unrestricted (Model 2)	
	Beta	t	Beta	t
Self-control	–	–	.23	4.07*
Binge drinking	.35	5.76*	.27	4.65*
Shame proneness	.17	3.09*	.16	2.96*
Embarrassment	− .12	− 2.05*	− .09	− 1.61
Morals	− .07	− 1.19	.02	.43
Peer delinquency	.31	5.20*	.30	5.04*
Gender	− .05	− .97	− .05	− .87
Greek membership	.07	1.36	.07	1.29
Grade point average	− .08	− 1.47	− .02	− .32
Race	.04	.78	.08	1.50
Religiosity	− .01	− .10	− .02	− .39
Constant		− .10		− 2.86
R^2	.36		.39	
F	14.65		14.86	
Df	267		267	

* p < .05; two-tailed.

Table 3
Split-group OLS regression models predicting alcohol-related behaviors for individuals with high self-control and low self-control

Variable	High self-control (n = 125)		Low self-control (n = 143)	
	Beta	t	Beta	t
Binge drinking	.22	2.30 *	.33	4.11 *
Shame proneness	− .01	− .12	.30	3.88 *
Embarrassment	.05	.50	− .16	− 2.01 *
Morals	− .01	− .02	− .01	− .19
Peer delinquency	.37	3.69 *	.31	3.92 *
Gender	− .01	− .08	− .04	− .50
Greek membership	.02	.21	.09	1.27
Grade point average	− .09	− 1.07	− .07	− .90
Race	.08	.10	.09	1.22
Religiosity	− .03	− .33	− .04	− .57
Constant		− .13		− 1.19
R^2	.29		.35	
F	4.78		7.02	
df	123		142	

* $p < .05$; two-tailed.

alcohol-related behaviors. A Z-test indicated that the effect of binge drinking on alcohol-related behaviors was statistically similar for individuals with low and high self-control ($b_{\text{low self-control}} = b_{\text{high self-control}}$, $z = -1.23$, $p > .05$).

The final analysis disaggregated the sample by groups to assess the varying effects of binge drinking on alcohol-related behaviors at *extreme* levels of high and low self-control. The sample was split into three groups based on −1/+1 standard deviation units, where the *extremely* high self-control students were below −1 standard deviation, moderate self-control students were between −1 and + 1standard deviations, and *extremely* low self-control students were above 1 standard deviation. The effect of binge drinking was the largest for the group that scored 1 standard deviation above the mean on self-control (beta = 4.70; $p < .05$) (*extremely* low self-control); whereas, binge drinking did not reach a level of statistical significance for the *extremely* high self-control group. The effect of binge drinking for the medium self-control group was statistically significant (beta = 3.15, $p < .05$), but smaller than that of the *extremely* low self-control group. A Z-test indicated that each of the effects were statistically different from one another. This extended set of analyses indicated that the effect of binge drinking on alcohol-related behaviors depended on the level of self-control students possessed, with binge drinking having the strongest impact on those possessing extremely low self-control.

Discussion

The current study began with the claim that binge drinking among college undergraduates was widespread and carried numerous negative consequences for their health and behavior. Researchers began to investigate the origins of the binge-drinking phenomenon, and focused attention on a range of explanations, including membership in Greek organizations, self-esteem, and peer influences. This research brought a major criminological theory to bear on college student binge drinking. Gottfredson and Hirschi's (1990) self-control theory asserts that the habit of ignoring long-term negative consequences—i.e., low self-control–results in a range of antisocial and self-destructive behaviors. Binge-drinking behavior–in view of the long-term consequences noted in the literature–appeared to be a behavior that was quite consistent with low self-control.

In light of other known correlates, results from the current study showed that self-control was an important predictor of binge drinking and alcohol-related behaviors. Similar to Piquero et al.'s findings (2002), low self-control could not account for the effect binge drinking had on alcohol-related behaviors. That is, both low self-control and binge drinking had important effects on alcohol-related behaviors. Subsequent analyses that explored interaction effects revealed that binge drinking was a more important predictor of alcohol-related behaviors for students possessing low self-control compared to their high self-control counterparts, with those possessing *extremely* low self-control being more susceptible to the negative behavioral effects of binge drinking. Although support for self-control theory emerged, other variables were also important in predicting both outcomes. Delinquent peers exerted almost twice the effect of low self-control, indicating that social learning was an important theoretical avenue to pursue in explaining binge drinking and alcohol-related behaviors among college students.

Data used in this study had some limitations. A sample of predominantly younger students attending a single southern university was employed, thus, limiting generalizability. While a broad sampling frame was a desirable objective, the main goal was to develop an exploratory test of the relationship between binge drinking, alcohol-related behaviors, and the additive and interactive effects of self-control. Readers should view the current results as preliminary evidence of a linkage between self-control, binge drinking, and behavioral problems associated with such drinking practices. Future research should strive to broaden the sampling frame.

The definition of binge drinking in the current research was based on a conventional, but arbitrary,

threshold. Five or more drinks during one sitting appeared in comparable research (e.g., Piquero et al., 2002), but one might reasonably question whether the five-drink rule ought to apply to everyone equally. Females, for instance, might become intoxicated after fewer drinks. Utilizing the five-drink cut-off could have underestimated the number of binge drinking females in this sample. The cut-off used in this study, nevertheless was employed for two important reasons. First, the current study's purpose was to extend findings from Piquero et al. (2002); therefore, it was essential to remain operationally consistent. Second, if a different standard was used across gender, it would have forced the researchers to compute separate models for males and females, thus jeopardizing the statistical power of a sample that was initially small to begin with. Finally, five drinks could be too few for those of sufficiently large body mass. A more valid criterion for binge drinking in future research should incorporate measures estimating blood-alcohol level per drink for each respondent, given the gender and body mass of the imbiber.

Despite limitations, the current study indicated that self-control theory could be helpful in developing a better understanding of binge drinking and alcohol-related behaviors. Future studies should take into account accessibility to alcohol and the level of freedom of the student from adult supervision and university restrictions. A consideration of these opportunity variables, which Gottfredson and Hirschi (1990) considered an essential component of their self-control theory, would further elucidate why binge drinking takes place among college students and on campuses across the United States. Finally, while further exploration of self-control, binge drinking, and alcohol-related behaviors warrants more empirical attention, the influence of peer groups warrants the same. Peer delinquency, although not the focus of the current study, had the most important impact on binge drinking. Future research should expand on the important role of peer groups and how they can influence drinking practices during college. Research interests might include peer group dynamics such as formation and selection, stability, primary and secondary groups, and formal peer groups (fraternities and sororities).

Notes

1. The most common operational definition used to measure binge drinking came from Harvard's College Alcohol Survey (CAS), which used a criterion of five or more drinks in a row for men and four or more drinks in a row for women, at least once in the last two weeks. Other studies however, employed similar, yet different, operational definitions. Piquero and colleagues (2002) used the criterion of five or more drinks on a typical occasion for both males and females. The current study used the latter for reasons discussed in the discussion section of this study.

2. The use of the Grasmick et al. scale to operationalize self-control has undergone much theoretical and empirically scrutiny. Psychometric empirical assessments have produced conflicting results on whether the twenty-four items should be treated as representing a unidimensional construct or multiple dimensions (Grasmick et al., 1993; Longshore, Turner, & Stein, 1996; Piquero et al., 2000; Piquero & Rosay, 1998). Although important, an extensive psychometric assessment and/or construct validation of the scale was beyond the scope of this study. To stay consistent with most treatments of Grasmick et al.'s scale, the researchers summed responses across items. In consideration of the above points, future studies should continue to explore new ways of measuring self-control.

3. Coefficients in logistic regression, representing an increase/decrease in the log odds, are difficult to interpret and have no utility in comparing magnitudes of effects. The formula derived by Roncek (1996) and employed by Gibson, Swatt, and Jolicoeur (2001) can produce interpretable coefficients using the "b" coefficients. All independent variables are regressors of the same dependent variable, thus, the independent variables can be ranked according to the strength of their effects. Roncek coefficients allow for a simplistic and easy interpretation that is comparable to the interpretation of OLS standardized estimates (Roncek, 1996). It is important to note, however, that because the logit function is non-linear and there is no term for the standard deviation of the dependent variable, the coefficients are no longer constrained to less than one (as are beta weights in OLS regression). Menard (1995) reports a similar formula for calculating semi-standardized effects in logistic regression, but whether using Roncek (1996) or Menard (1995), the ranking of relative strength of effects will be the same.

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