Drink-Driving and DUI Recidivists' Attitudes and Beliefs: A Longitudinal Analysis*

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ABSTRACT. Objective: Cross-sectional survey research has shown correlations between drink-driving behavior and people's beliefs concerning the riskiness, social acceptability and morality of driving under the influence of alcohol. The current study examines the association between such beliefs and subsequent alcohol-impaired driving in a sample of offenders who were driving under the influence (DUI). **Method:** Repeated interviews were conducted with 182 multiple DUI offenders. Baseline data included measures of moral and prescriptive beliefs concerning alcohol-impaired driving (*internal behavioral controls*), perceived risks of criminal punishment and crashes associated with alcohol-impaired driving (*external behavioral controls*) and perceived peer-group attitudes toward alcohol-impaired driving (*social control*). The dependent variable in the study was a measure of self-reported alcohol-impaired driving over the preceding 2 years, collected at 2-year follow-up from baseline. **Results:** Results from multiple regression modeling showed significant protective effects associated with the beliefs that driving after drinking is immoral and that random police sobriety checks are a good idea (internal control items). Results also showed that a social desirability control measure was predictive of increased risk, at follow-up, for driving after drinking. **Conclusions:** These results suggest that internal controls may protect against alcohol-impaired driving behavior, even in a high-risk sample of repeat DUI offenders. The results also suggest that future policy interventions to curtail drink-driving might profitably be designed to promote these sorts of behavioral controls. (*J. Stud. Alcohol* **66:** 640-647, 2005)

DURING THE 1980s and early 1990s, a succession of public information campaigns, new state and federal laws, and new enforcement strategies were accompanied by impressive reductions in the incidence of traffic fatalities in which alcohol use was implicated. Whereas in 1982 more than 26,000 such deaths occurred, by 1994 that number was down by a third to roughly 17,300 (National Highway Traffic Safety Administration, 2002). Since then, however, efforts to further reduce this costly public safety problem have been less successful. In 2001, traffic fatalities in which alcohol was involved remained at about 17,400 and accounted for 41% of all motor vehicle fatalities (National Highway Traffic Safety Administration, 2002). Thus, despite initial successes in policy measures designed to curtail drink-driving, a large population of drivers has proven itself resistant to prevention efforts. This resistance suggests the need for new, more intensive or more tailored drink-driving prevention interventions. In turn, the success of new prevention efforts may depend on identifying and manipulating factors that influence resistant drivers, particularly in their decisions about whether to drive after drinking. The present longitudinal study examines the attitudes and beliefs reported by a group of drivers known to be resistant to current prevention strategies, recidivist offenders who were driving under the influence (DUI). The purpose of the study is to identify beliefs that might profitably be targeted in future DUI prevention efforts.

Policy interventions to deter or curtail alcohol-impaired driving have taken several different forms. Some such interventions are punitive and involve efforts to strengthen DUI legal sanctions, enforcement mechanisms and detection efforts (cf. Hatos, 1988). These interventions attempt to deter alcohol-impaired driving among potential offenders by manipulating their beliefs regarding the likelihood and severity of punishment (Ross, 1982). Several studies have shown such deterrence effects among DUI recidivists, in connection with increased criminal penalties for high blood-alcohol-concentration DUI violations (McCartt and Northrup, 2004; McCartt and Shabanova, 2002). Other studies have shown general deterrence effects connected with high-visibility enforcement mechanisms like sobriety checkpoints (Fell et al., 2004), or associated more generally with the passage of stringent anti-DUI laws (e.g., Homel, 1990; Neustrom and Norton, 1993; Rogers and Schoenig, 1994; Shults et al., 2001; Zador et al., 1988).

An alternate set of anti-DUI policy interventions involves public information campaigns, designed to raise awareness about the negative consequences and opprobrium of driving after drinking. Although some such campaigns may produce general deterrence effects by emphasizing the fatal

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consequences of DUI (e.g., Mothers Against Drunk Driving, 2003), media campaigns may also foster moral inhibitions and social controls against alcohol-impaired driving. For example, the "Friends don't let friends drive drunk" campaign, jointly promulgated by the U.S. Department of Transportation and several partners, attempted a direct manipulation of social controls and personal values concerning friendship, drinking and driving. Note that some theorists have suggested that anti-DUI laws could also contribute to the formation of moral and prescriptive attitudes against alcohol-impaired driving (e.g., Andanaes, 1978; Hingson and Howland, 1990), albeit perhaps less directly than public information campaigns. Regardless, empirical evidence has demonstrated the success of several anti-DUI media campaigns in reducing the frequency of alcohol-involved auto crashes (Elder et al., 2004). This evidence suggests that moral inhibitions and social controls against driving after drinking, as well as more instrumental fears about the consequences of such behavior, may be able to be manipulated and may be protective against DUI risk.

In sum, and drawing on the theoretical terminology of Snortum (1988) and Berger and Marelich (1997), laws and public information campaigns could affect individuals' decisions to drive after drinking in a number of different ways, including: (1) by enhancing drivers' perceptions of the risks of injury or punishment; (2) by bolstering moral inhibitions or prescriptive beliefs against drinking and driving; or (3) by changing social norms about drinking and driving. These three types of cognitive behavior control strategies have been described by Snortum (1988) and Berger and Marelich (1997) as concerning *external behavioral controls, internal behavioral controls* and *social controls,* respectively.

Evidence that internal, external and social control cognitions may indeed influence drink-driving has been reported by Snortum and Berger (1989) and Berger and Marelich (1997). Snortum and Berger (1989) found changes in U.S. drivers' self-reported beliefs and perceptions between subsequent cross-sectional surveys conducted in 1983 and again in 1986, changes that corresponded with reductions in alcohol-related traffic fatalities during the same period. More drivers in 1986 reported knowing someone jailed for drink-driving, and more reported believing that most offenders received the punishment prescribed by law, suggesting the possibility of an increased sense of vulnerability to prosecution (external behavioral controls). More drivers endorsed statements favoring random roadside breath checks and harsher jail sentences for first-time DUI offenders (internal behavioral controls). Berger and Marelich (1997) extended the previous study by comparing responses of California drivers in 1983 and 1986 to responses from a representative sample of California drivers surveyed in 1994. Between the 1983/1986 and 1994 surveys, a somewhat different pattern of changes in driver beliefs and attitudes emerged. Specifically, significantly more drivers in the later survey reported that their friends would disapprove of them driving while intoxicated (social controls), and more endorsed the view that driving while intoxicated is morally wrong (internal behavioral controls). In contrast, there were no significant changes in views about the perceived risk of arrest for drink-driving. Again, changes in drivers' beliefs from 1983 to 1994 were accompanied by a significant decline in the rate of self-reported DUI violations across the survey samples (Berger and Marelich, 1997).

More recently, Greenberg et al. (2004) examined the independent effects of internal, external and social controls on self-reported driving after drinking in a sample of repeat DUI offenders. The authors found that each source of control has an independent effect on DUI offenders' rates of drink-driving. Although results from the Greenberg et al. (2004) study are limited by a cross-sectional research design, those results are consistent with the earlier survey findings. Taken together, these studies suggest that the same attitudes and beliefs associated with general population trends in drink-driving may *also* be associated with frequency of drink-driving among DUI offenders.

The current study seeks to build on previous work by undertaking the first longitudinal analysis of behavioral control variables as predictors of subsequent driving after drinking, in a cohort of drivers known to be resistant to current public interventions against drink-driving (i.e., multiple DUI offenders). More specifically, by using multiple regression statistical modeling, this article examines the relative contribution to offenders' alcohol-impaired driving behavior of their beliefs regarding: (1) the risks of adverse consequences associated with driving after drinking; (2) the moral acceptability of driving while intoxicated; and (3), the social acceptability of alcohol-impaired driving within offenders' peer groups. Findings from the current study provide insight into the relative importance of various behavioral controls in preventing alcohol-impaired driving among those at high risk for committing this offense. Such controls might offer targets for manipulation by future public policy and clinical interventions aimed at curtailing the incidence of driving after drinking in high-risk, repeat-offender populations.

Method

Participants

Data for the current study are drawn from baseline (presentencing) and 2-year follow-up interviews conducted with participants in a larger, longitudinal study of alternative criminal sanctions for repeat DUI offenders. This parent study (the "Rio Hondo Experiment") entailed random assignment of participating offenders either to a therapeutic DUI Court (offering enhanced assessment, treatment and judicial supervision of alcohol rehabilitation), or to a "usual sanctions" condition (consisting chiefly of the mandatory

minimum criminal sentences provided under California law). Recruitment for the Rio Hondo Experiment ran from May 2000 to December 2002 at the Rio Hondo municipal court in Los Angeles County, California. Recruitment and all research procedures were reviewed and approved annually by RAND's Human Subjects Protection Committee. Research procedures were also reviewed and approved by the presiding judge at the Rio Hondo courthouse and by the Public Defender of Los Angeles.

Offenders were eligible to participate in the Rio Hondo Experiment if they had a history of DUI conviction and were currently being arraigned for a new DUI or other alcohol-related violation. Among all offenders court referred for sentencing through the DUI Court, all but three were recruited to participate in the study. One of these cases absconded before sentencing, one could not be interviewed before sentencing, and one went to prison on a prior conviction before sentencing. Interviews with each participant were conducted either in English or Spanish, depending on that participant's preferences.

In total, baseline and follow-up interview data on 182 participants were available for analysis in the current study, representing over 90% of those participants eligible for follow-up. More than 75% of the participants were Latino men, and about 40% of the participants were married. The average (SD) age of participants was 35.2 (9.1) years, and the average years of education were 10.8 (3.3). Fifty-six percent of respondents had completed at least 12 years of education. Three fourths of the sample reported having a full-time job, and 84% reported incomes under $2,000 in the preceding month. Approximately one quarter of the sample met self-report criteria for a lifetime diagnosis of alcohol-abuse disorder, and another quarter of the sample met criteria for a lifetime diagnosis of alcohol-dependence disorder according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 1994).

Procedures

Information about the Rio Hondo Experiment was provided to all public defense attorneys, district attorneys and judges at the courthouse, and also to private defense attorneys when they appeared at arraignment. Research staff at the courthouse described the experiment to eligible offenders upon arraignment and encouraged the offenders to discuss the possibility of participation with their defense attorneys. After pleading guilty to an offense, and in consultation with a defense attorney, candidate offenders notified the judge of their possible interest in participating in the experiment, whereupon their cases were referred for sentencing to Judge Steven Sanora, the court officer responsible for the DUI Court program. Prior to sentencing, the procedures, risks and benefits of the experiment were explained to candidates by a research staff member at the court. Written informed consent to participate was obtained immediately thereafter, and participants were then randomly assigned either to the DUI Court program, or to a "usual sanctions" control condition. Prior to sentencing, participants were interviewed in a private setting at the court by a research staff member.

At 2-year follow-up from the initial baseline interview, participants in the Rio Hondo Experiment were contacted by telephone and recruited to participate in a second interview in person.

Measures

The primary interview protocols for the Rio Hondo Experiment were developed at RAND to assess respondent alcohol use, driving patterns, related attitudes and expectancies, and other characteristics. Translation and back-translation were used to ensure the comparability of Spanish and English versions of the protocols. Data for this study were drawn from a number of items in the interview protocols, as described below. With the exception of the dependent measure, all variables included in this study were obtained from the baseline interview.

Sociodemographic characteristics. Demographic measures included age, gender, race, marital status, education, employment status and income level. Age and education were ascertained and modeled as continuous variables (years). Employment status was coded as a dichotomous variable, based on whether a respondent reported current full-time employment (i.e., working more than 35 hours per week). Income for the preceding month was assessed categorically on a 7-point scale, using monthly income brackets ranging from $500 or less (coded 1) to $5,000 or more (coded 7).

Alcohol-impaired driving behavior in the preceding 2 years (dependent measure). Alcohol-impaired driving behavior was assessed through questions in the follow-up interview asking whether, and with what frequency, the respondent had engaged in driving while under the influence in the preceding 2 years. Because a preponderance of cases reported no impaired driving in the past 2 years, this variable was dichotomized as any impaired driving in the preceding 2 years (coded as 1), or no impaired driving in the preceding 2 years (coded as 0). This dichotomous alcohol-impaired driving variable was the dependent measure for all of the regression models in the current study.

Behavioral control variables. The primary independent variables in the current study were a series of items drawn from the work of Snortum and Berger (1989) and of Berger and Marelich (1997; see also Greenberg et al., 2004). These items correspond to internal, external and social controls against drinking and driving and are listed (with descriptive labels) in Table 1. Behavioral control items were coded

on 4-, 5- or 7-point scales, and all were coded so that higher scores indicated stronger inhibitions against drinking and driving.

Note that in Berger and Marelich's 1997 survey work, the researchers did not consolidate these groups of items into unitary factors (i.e., internal controls, external controls). Exploratory data analysis in the current study revealed only very modest inter-item reliability within these item groups (Cronbach's = .65 for internal control items; Cronbach's = .47 for external control items), suggesting that the groups do not correspond to unitary, underlying constructs. Only one pair of items in the external control group demonstrated a sufficiently high alpha to justify consolidation: These were the "Risk of accident" and "Risk of police stop" items (Cronbach's =.83). For purposes of statistical analysis, these two items were summed into a single scale measure, "Risk of accident or police stop." The other items listed in Table 1 were entered individually as predictors in the regression models in this study.

Social desirability scale. Previous research has suggested that social desirability may affect offenders' self-reports of drinking after driving behavior (e.g., Schell et al., submitted for publication). Therefore, participants' socially desirable response set was assessed using a modified version of a 5-item instrument developed by Hays et al. (1989). Aggregate scores on social desirability were coded on a 20-point scale, with higher scores indicating more socially desirable responding. The social desirability scale was included as a predictor variable in the multiple regression analyses in this study, to ensure that observed relationships between the behavioral control measures and alcohol-impaired driving were not artifacts of a social desirability response bias.

Alcohol disorder variables. Clinical alcoholism was evaluated through a series of questions based on DSM-IV diagnostic criteria for alcohol abuse and alcohol dependence disorders. Presumptive lifetime alcohol disorder status was coded using DSM-IV diagnostic thresholds for alcohol abuse and dependence. Respondents were categorized as meeting alcohol "dependence," "abuse" or "no disorder" criteria. Note that alcohol-disorder status was included as a predictor variable in one of the multiple regression models in the current study to ensure that observed relationships between the behavioral control measures and alcohol-impaired driving frequency were not mediated by the presence or absence of a clinical alcohol disorder. Past research has suggested that pathological alcohol consumption may constitute an important risk factor for alcohol-impaired driving episodes (e.g., Kennedy et al., 1996).

Statistical procedures

To assess the effects of internal, external and social controls on the dependent measure of alcohol-impaired driving

TABLE 1. Behavioral control variables

Interview item	Short label
Internal control items	
What is your opinion about random police spot checks for alcohol use?	Spot checks
How do you feel about the present blood alcohol limit?	Blood alcohol limit
Do you think that a person should have to serve jail time for a first-time DUI conviction with a high BAC level?	Jail time if high BAC
How long should that jail time be?	Length of jail time
Do you feel that it is or is not morally acceptable for you to drive your car after consuming four [alcoholic] drinks of any kind within 1 hour?	Moral acceptability
External control items	
In the event you were caught for another drunk driving offense, what is the likelihood that a smart lawyer could "get you off," avoiding most of the penalties?	Smart lawyer
Given the penalties you think you would receive for another DUI conviction, how great an effect would it have on your personal life if you were to be arrested for drunk driving?	Ability conduct life
Of all the people convicted of a drunk driving offense, about how many do you think actually receive their proper punishment as is required by law?	Proper punishment
Supposing you drank six shots of whiskey in an hour, what are the chances that you would have an accident?	Risk of accident
Supposing you drank six shots of whiskey in an hour, what are the chances that you would be stopped by the police?	Risk of police stop
Social control item	
Do you think your friends would disapprove if they knew you were driving on the highway after drinking four cans of beer in 1 hour?	Friends disapprove

Notes: DUI = driving under the influence; BAC = blood alcohol concentration.

frequency, a series of univariate and multiple logistic regression models were undertaken. First, univariate models were run on each of the analytical covariates. Then a comprehensive multiple regression model was run, entering as predictors all of the behavioral control variables, as well as the demographic and alcohol disorder-status variables, plus the social desirability scale. To determine whether findings were sensitive to inclusion of demographic and alcohol-disorder variables in the analysis, a second multiple regression model was run, omitting these variables. For each of the models, the Hosmer-Lemeshow test was used to assess goodness of fit. Nonsignificant p values indicate adequate fit and are reported in Table 3.

Note that initial exploratory analyses revealed that the formal intervention in the Rio Hondo Experiment (i.e., participation in the DUI Court) was not associated with outcomes on the dependent measure (i.e., self-report of alcohol-impaired driving). For this reason, we did not include intervention status as an independent variable in any of our analyses here.

All statistical procedures were implemented using SAS System version 8.2 (SAS Institute Inc., Cary, NC).

Results

Univariate regression models were fitted for each of the demographic and analytical variables on the dependent measure of alcohol-impaired driving behavior. Results are presented as odds ratios in Table 2. For logistic regressions, the odds ratio represents the effect of a unit increase in the independent variable, on the odds of an adverse categorical outcome on the dependent measure. For example, the odds ratio of 0.58 for "Moral acceptability" suggests that with each unit increase in that variable, the odds of an adverse alcohol-impaired driving outcome are diminished by 42%.

In addition to "Moral acceptability," the internal control variable "Spot checks" and the external control variable "Proper punishment" showed significant protective effects against alcohol-impaired driving behavior. The demographic characteristic of participants' age also showed a significant protective effect against alcohol-impaired driving behavior, such that increasing age was associated with diminished likelihood of driving after drinking. None of the other demographic or predictor variables was significantly associated with the dependent measure in univariate models.

To examine relative effects of the behavioral control variables, we used a multiple regression framework, including the behavioral control variables, the alcohol disorder-status variable, the social desirability scale and the demographic variables as predictors on the dependent measure (see Table 3, Full Model). Results from the Full Model showed that the internal control items "Spot checks" and "Moral acceptability" both remained significantly protective against alcohol-impaired driving behavior, even while simultaneously adjusting for the inclusion of other predictors in the model. By contrast, the external control item "Proper

TABLE 2. Univariate logit models

Model	Odds ratio	95% CI Left	95% CI Right	p	n
Social desirability	1.07	0.96	1.20	.21	182
Internal controls					
Spot checks	0.73*	0.56	0.97	.03	181
Blood alcohol limit	1.03	0.77	1.38	.85	181
Jail time if high BAC	0.73	0.38	1.39	.34	179
How long jail time	0.98	0.78	1.23	.86	176
Moral acceptability	0.58†	0.37	0.90	.01	182
External control					
Risk of accident or stop	0.91	0.78	1.06	.23	182
Smart lawyer	0.97	0.65	1.46	.90	182
Ability conduct life	0.98	0.58	1.34	.55	182
Proper punishment	0.77*	0.60	0.99	.05	180
Social Control					
Friends disapprove	0.82	0.59	1.12	.21	180
Demographics					
Age	0.96*	0.93	1.00	.04	182
Marital status					182
Married/remarried	0.52	0.25	1.07	.08	
Separated/divorced	0.54	0.23	1.28	.16	
Education	1.10	0.99	1.22	.09	182
Work full time	1.17	0.55	2.48	.69	182
Income	1.01	0.80	1.27	.95	179
Lifetime alcohol disorder					182
Abuse	2.02	0.83	4.92	.12	
Dependency	1.38	0.61	3.12	.44	

Notes: BAC = blood alcohol concentration.
*$p \leq .05$; †$p \leq .01$.

TABLE 3. Multiple regression logit models

Predictor variables	Full Model: (Internal/external controls + alcohol disorder status + social desirability + demographics) Odds ratio (95% CI)	Reduced Model: (Internal/external controls + social desirability only) Odds ratio (95% CI)
Internal controls		
Spot checks	0.66* (0.45-0.98)	0.70* (0.50-0.99)
Blood alcohol limit	1.18 (0.81-1.74)	1.16 (0.81-1.66)
Jail time if high BAC	0.78 (0.26-2.32)	0.60 (0.21-1.70)
How long jail time	1.05 (0.73-1.51)	1.08 (0.76-1.53)
Moral acceptability	0.55* (0.32-0.95)	0.61[a] (0.37-1.02)
External controls		
Risk of accident or stop	1.07 (0.87-1.31)	0.99 (0.83-1.19)
Smart lawyer	0.90 (0.53-1.52)	0.98 (0.60-1.60)
Ability to conduct life	0.73 (0.43-1.25)	0.77 (0.47-1.26)
Proper punishment	0.78 (0.56-1.09)	0.79 (0.58-1.07)
Social control		
Friends disapprove	1.01 (0.69-1.49)	0.88 (0.62-1.25)
Social desirability scale	1.18* (1.06-1.38)	1.13[b] (0.99-1.29)
Demographics		
Age	0.98 (0.93-1.03)	–
Marital status		
Married/remarried	0.75 (0.26-2.14)	–
Separated/divorced	0.87 (0.28-2.72)	–
Education	1.02 (0.87-1.19)	–
Work full time	1.48 (0.51-4.30)	–
Income	0.86 (0.62-1.19)	–
Lifetime alcohol disorder		
Abuse	1.97 (0.65-5.99)	–
Dependency	2.33 (0.80-6.82)	–
N	170	173
Goodness-of-fit		
Hosmer-Lemeshow	0.47	0.57
c statistic	0.74	0.69
Rescaled r^2	0.21	0.15

*$p \leq .05$; [a]$p = .06$; [b]$p = .08$.

punishment" did not continue to show a significant protective effect in the multiple regression model. Finally, the social desirability variable was a significant incremental risk factor for alcohol-impaired driving behavior, with higher baseline social desirability scores being associated with greater likelihood of self-reported driving after drinking during the study period. Overall, the multiple regression model demonstrated reasonable goodness of fit (reflected by the nonsignificant Hosmer-Lemeshow statistic), good discrimination (reflected by *c* statistic of approximately 0.70) and moderate predictive power (rescaled $r^2 = .21$).

To assess whether the observed effects of the behavioral controls on the dependent measure were sensitive to the inclusion of demographic and alcohol disorder variables in the analysis, a second model was run that omitted these variables (see Table 3, Reduced Model). Results from the Reduced Model showed that the internal control items "Spot checks" and "Moral acceptability" continued to have protective effects against alcohol-impaired driving behavior ($p = .04$ and $p = .06$, respectively). The social desirability variable remained an incremental risk factor in this model as well but with only marginal significance ($p = .08$).

In sum, the internal control items "Spot checks" and "Moral acceptability" were significant protective factors against driving after drinking in all of the models studied. An external control item, "Proper punishment," was protective in univariate analysis but was not a significant predictor in the multiple regression models.

Discussion

Findings from this study suggest that some potentially malleable beliefs and attitudes about drinking and driving may be important to reducing alcohol-impaired driving behavior in a population of DUI recidivists. In particular, these beliefs include moral tenets or prescriptive notions regarding alcohol-impaired driving and DUI laws (internal behavioral controls). Two items in this class were significant predictors of self-reported alcohol-impaired driving, in both univariate and multiple regression analyses. Moreover, these results appeared resilient across full and reduced multiple regression models (i.e., regardless of the inclusion of demographic and alcohol-disorder predictors in analysis). By contrast, external behavioral controls (i.e., pragmatic beliefs about the likelihood and severity of DUI-related sanctions) were not consistently significant in protecting against alcohol-impaired driving. Only one external item, "Proper punishment," was significant as a predictor in univariate analysis, and its effect was nonsignificant in the multiple regression models.

Current results are also noteworthy for a finding that high scores on an index of social desirability were associated with increased risk for driving after drinking. This finding is inconsistent with the premise that social desirability is merely a response bias toward giving "good" answers in interviews (cf. Hayes et al., 1989), and it also seems in conflict with cross-sectional studies that have shown associations between high social desirability scores and more benign self-reports of drink-driving behavior (e.g., Schell et al., submitted for publication). In this regard, it may be relevant that the current finding occurred only in multiple regression models that also included behavioral control items as predictors. Nevertheless, we surmise that social desirability scores, to the extent that these capture individuals' vulnerabilities to negative peer group influences, might plausibly constitute a risk factor for driving after drinking. Our results suggest a need for future longitudinal research that focuses in greater detail on the relationship between social desirability and drink-driving.

Findings from the current study offer an extension of the earlier research of Berger and Marelich (1997) and of Greenberg et al. (2004). Whereas this prior work demonstrated cross-sectional associations between self-reported internal, external, and social control cognitions and drink-driving behaviors in both general population and recidivist DUI samples of drivers, the present study demonstrates the

relative predictive utility of these constructs in explaining subsequent drink-driving behavior.

The striking contrast between the current results and those from earlier studies lies in the fact that the current multiple regression analyses only revealed a protective effect associated with internal control items and not with the external and social controls that were also found significant in earlier work. This contrast may be accounted for by the different methods used in the various studies. In particular, the survey methods used by Berger and Marelich (1997) may not have been sufficient to identify direct causal relationships between behavioral controls and drink-driving, and in any event did not address those relationships in an offender population. Similarly, the cross-sectional design used by Greenberg et al. (2004) was retrospective in nature and therefore could not examine the link between behavioral controls and drink-driving in a prospective way. By using longitudinal methods, the current study finds that internal controls are of greatest importance in predicting drink-driving behavior among DUI offenders. If confirmed by replication, our results would suggest that internal controls are a prime target for prevention efforts designed to influence recidivist offenders, and perhaps more generally, to influence others in the population who are resistant to current drink-driving prevention campaigns.

Results from the current study are subject to several methodological limitations. The research sample for the study was drawn from a cohort of DUI offenders who passed through a particular criminal justice setting in Southern California. The sample was heavily weighted toward Latino men—neither geographically nor demographically representative of the American population. The dependent measure for the study is self-reported alcohol-impaired driving behavior in the past 2 years. Self-report data from interviews might be subject to distortion; for example, past research has suggested that self-report may depart significantly from justice system records as a measure of historical criminal offenses (Chang and Lapham, 1996). Nevertheless, although distortions in self-reporting could have affected the outcome measure used in this study, such distortions cannot, by themselves, explain the observed relationships between internal behavioral controls and subsequent drink-driving (particularly when social desirability response bias is statistically controlled). Moreover, research on offenders is important precisely because offenders are not representative of the general population and are in fact disproportionately represented among drivers in alcohol-involved crashes and DUI arrests (Brewer et al., 1994; Fell 1994). We acknowledge past investigations that have shown differential patterns in DUI, alcohol consumption and impulsivity, across Latino and white ethnic samples (e.g., see Cherpitel and Tam, 2000). Such findings suggest the value of future replication of the current study, drawing on samples from other ethnic and demographic groups.

Driving under the influence of alcohol is a complex behavior, likely manifesting as the product of many different behavioral, temperamental, environmental and interpersonal influences. On an important level, however, drink-driving can be understood as a result of individual decision-making and personal choices. There are many reasons that might plausibly influence someone to engage in drinking and driving, ranging from convenience and carelessness to thrill-seeking and suicidality. But if considerations like these might predispose someone to drink and drive, it follows that other reasons might predispose a choice *not* to drink and drive. Concerns about the consequences of the behavior, its moral implications and social acceptability, are all factors that could weigh against decisions that culminate in drinking and driving. The current study is an examination of precisely these sorts of factors. Results from the study are notable in showing that attitudes of moral intolerance toward drink-driving are associated with reduced risk for subsequent alcohol-impaired driving behavior, even among a sample of persons selected based on an index history of DUI conviction and even adjusting for the effects of social desirability. By implication, the results suggest that even those persons most prone to drink and drive might nevertheless be susceptible to considerations that could lead a rational decision-maker to desist from doing so. Again, these sorts of considerations may offer a logical focus for future prevention efforts.

A number of studies have described or evaluated public information campaigns against alcohol misuse or drink-driving (e.g., Elder et al., 2004; Haines and Spear, 1996; Barber et al., 1989; Maloney and Hersey, 1984; Cousins, 1980; Goodstadt and Kronitz, 1977). However, relatively few studies have been undertaken to demonstrate the effectiveness of such campaigns in reducing rates of DUI offending, and to the best of our knowledge, none has successfully done so in the context of a controlled trial. This is an obvious target for future investigation. By focusing on behavioral controls as a precursor to alcohol-impaired driving, the current study provides a substantive core around which a number of different interventions could be designed and evaluated. Both public information campaigns and DUI treatment interventions could potentially be designed to promote internal behavioral controls and prescriptive moral values incompatible with driving after drinking. Future controlled trial studies will be required to show the effectiveness of such interventions in modifying behavioral controls, and ultimately in reducing the incidence of drink-driving in at-risk populations.

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