



The behavioral economics of drunk driving[☆]



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ABSTRACT

This study investigates whether drinker-drivers attributes are associated with imperfect rationality or irrationality. Using data from eight U.S. cities, we determine whether drinker-drivers differ from other drinkers in cognitive ability, ignorance of driving while intoxicated (DWI) laws, have higher rates of time preference, are time inconsistent, and lack self-control on other measures. We find that drinker-drivers are relatively knowledgeable about DWI laws and do not differ on two of three study measures of cognitive ability from other drinkers. Drinker-drivers are less prone to plan events involving drinking, e.g., selecting a designated driver in advance of drinking, and are more impulsive. Furthermore, we find evidence in support of hyperbolic discounting. In particular, relative to non-drinker-drivers, the difference between short- and long-term discount rates is much higher for drinker-drivers than for other drinkers. Implications of our findings for public policy, including incapacitation, treatment, and educational interventions, are discussed.

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1. Introduction

There is no consensus about which conceptual framework should be used to explain why some people drive while intoxicated (DWI). On the one hand, there is a model of crime in which rational agents weigh expected gains and losses when deciding to violate the law (Becker, 1968). Such persons may engage in criminal behavior because they value the gain more and/or the loss less highly (Fehr and Gächter, 1998). Certain behaviors are consistent with rationality; for example, being selfish, i.e., not considering the negative effect of one's behavior on others, being risk tolerant, or having a high rate of time preference. More altruistic persons may be more cautious drivers because they internalize the consequences of harming others on the road. More risk tolerant and more present-oriented individuals may be more likely to engage in behaviors that others would avoid.

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The behavioral economics literature has focused on deviations from pure rationality in decision making, including: cognitive limits on decision-making; reliance on heuristics' utility of outcomes reflecting a person's well being relative to others; "reference points" (Mas, 2006); lack of self-control (Bettman et al., 1998; Slovic et al., 1977); social pressure to conform (DellaVigna, 2009); and emotions affecting decision making (Loewenstein, 1996). A substantial amount of economic research lends empirical support to the behavioral economics critique (see e.g., McFadden, 1999). The boundary between standard and behavioral economics is not well defined (see e.g., Jolls et al., 1998; Posner, 1998). Nor is it necessary to draw a precise line between the two views of behavior. Behavioral economics offers particular advice for public policy interventions, including legal interventions that might be worth following to the extent that there is empirical support for the behavioral economics critique.

On its face, DWI seems like a prototypical case of non-rational decision making. The activity leads to bad outcomes downstream. If anything, alcohol addiction and emotions in various combinations would seem to play a large role in the decision to become intoxicated and once intoxicated the decision to drive is anything but a rational calculation.

An alternative to the rational view is that people may commit illegal acts because they are imperfectly rational (Cawley, 2008). They are rational in the sense that they consider the future consequences of their actions, but they may have time inconsistent

preferences. They may have biased beliefs about the probabilities of adverse consequences of their actions, seeing ahead only a few periods at a time (Jehiel and Lilico, 2010). Further, they may have difficulty thinking about utility in a state in which adverse outcomes are realized, or in remembering heuristics based on previously determined algorithms for responding to common life situations, e.g., actions to be taken before or after consuming alcoholic beverages.

An even further departure from pure rationality is irrational actors.¹ Their decisions may be totally influenced by emotions, including visceral urges provoked by external cues rather than an objective assessment of benefit versus cost. Major cognitive limitations and/or psychiatric disorders, which are more common among substance abusers, may lead to irrational decision-making.

There are several alternative, albeit non-mutually exclusive approaches, for dealing with DWI. At one end of the spectrum is imposition of criminal penalties. Such penalties involve a combination of disincentives to violate the law and incapacitation, the former more likely to be effective if drivers make rational calculations with incapacitation most clearly appropriate when individuals do not respond to disincentives to violate criminal sanctions embodied in criminal statutes. In the context of DWI, incapacitation takes the forms of incarceration, routine blood tests, ignition interlock which restricts the ability of an intoxicated individual to drive a vehicle, and Secure Continuous Remote Alcohol Monitoring (SCRAM) devices, bracelets attached to the person's ankle that monitor the presence of alcohol in perspiration. Non-response to disincentives may reflect that the disincentives are insufficiently high to deter or that some individuals do not rationally weigh long-term benefits versus costs of DWI. Penalties for DWI are rarely imposed in that the probability of arrest conditional on drinking and driving is so low. According to our survey findings, the probability of arrest for DWI, conditional on driving after having had too much to drink is 0.008. Considering the probability of prosecution and conviction for DWI, the probability of a DWI conviction given a drinking and driving episode is about 0.006.²

Empirical evidence may not only yield information on the effectiveness of criminal penalties but also affect their design. For example, evidence on high rates of time preference would imply that punishment following a DWI violation should be swift.

Two other general approaches for reducing rates of DWI are education campaigns and therapies. The rationale for education campaigns at a macro, e.g., messages on billboards, or micro level, e.g., private provision of information by physicians to individual patients, about the harms of DWI is that people lack relevant knowledge in particular and/or suffer from cognitive limitations more generally. Underlying the case for therapy are the notions that DWI stems from dependence on and/or abuse of alcohol and drugs. Conditional on being dependent or abuse of these substances, DWI is plausibly not the result of a rational calculation. At a minimum, judgment is likely to be impaired. Empirical evidence on drinker preferences can inform the design of therapy to the extent that DWI reflects alcohol dependence/abuse versus other attributes of the individual, e.g., impulsiveness and impatience in contexts other than in situations involving alcohol consumption. Some individual

characteristics, such as lack of self-control, may itself be the cause of alcohol dependence/abuse, as well as drinking and driving. If so, just treating the alcohol problems may be ineffective in reducing rates of DWI in that the basic issue underlying decisions remains unaffected.

This study investigates whether or not persons who engage in drinking and driving tend to possess some attributes that are importantly associated with imperfect rationality or irrationality. Using data collected for this study, we address these specific issues. First, does the cognitive ability of persons who report that they drank and drove in the past year differ from those who did not? Perhaps drinking and driving is a byproduct of cognitive deficits. Second, is such behavior attributable to lack of knowledge of DWI laws? One reason for lack of knowledge is that the cost of acquiring the requisite information may be higher for some individuals in part because of lower cognitive ability. Third, do drinker drivers lack self-control, as indicated by a lower propensity to plan for the future and by greater overall impulsivity? Time inconsistency reflects lack of self-control. A fourth possibility is that drinker drivers have time-inconsistent preferences, which implies that rather than use a constant discount rate for evaluating present and future costs of benefits and costs of current decisions, persons apply a higher discount rate to benefits and costs accruing in the short-term than they do for benefits and costs accruing later. As a long-term goal, they would like to quit their bad habit, but they postpone doing this because the near-term benefit of quitting is discounted at a relatively high rate.

We find first that persons who engage most often in drinking and driving are relatively knowledgeable about DWI laws, and second, drinker drivers do not differ on two of the three study measures of cognitive ability from persons who consume some alcohol but do not drive. Drinker drivers are less prone to plan events involving drinking, e.g., selecting a designated driver in advance of the drinking episode, and are more impulsive as measured by a scale not specifically designed to measure alcohol consumption and related behaviors. Drinker drivers do tend to have higher rates of time preference, which the framework based on Becker and Murphy's (1988) rational addiction model envisions. Furthermore, we do find evidence in support of hyperbolic discounting. In particular, relative to non-drinker drivers, the difference between short- and long-term discount rates is much higher for drinker drivers than for other drinkers. To our knowledge, this is the first study of differences in cognitive status and ignorance of laws among persons who do or do not engage in a harmful behavior such as drinking and driving and provides the strongest empirical evidence in support of hyperbolic discounting on the part of a segment of the U.S. adult population.

Section 2 provides background on the issues raised by our study questions. Section 3 describes the data and empirical specification, which is followed by a discussion of empirical findings in Section 4. A final section reviews and discusses implications of our findings and relates them to previous findings in the behavioral economics literature.

2. Background

2.1. Cognitive limitations

Research that has been conducted on the relationship between cognitive status and decision-making stems from the path-breaking work by Simon (1955, 1979) on "bounded rationality." However, although DWI is a "bad" decision from a social perspective, in general, the fact that decision making patterns differ on average according to the individual's cognitive status does not

¹ There are no fine dividing lines between these categories. For example, Hoch and Loewenstein (1991) describe some decision making as a tug of war between desire and willpower. The relative strength of desire and willpower presumably determines where a particular choice is classified in the above scheme.

² The probability of conviction for DWI given a DWI arrest based on arrest data from North Carolina is 0.74. This calculation is based on our own analysis of DWI arrest data for this state. Hoch and Loewenstein (1991) reported a 0.82 DWI conviction rate for Maryland. Another study reported an even lower probability of arrest conditional on drinking and driving, i.e., 0.001 (Beitel et al., 2000).

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