Do Citizens Know Whether Their State Has Decriminalized Marijuana?

Assessing the Perceptual Component of Deterrence Theory

Robert MacCoun, University of California at Berkeley

Rosalie Liccardo Pacula, RAND Corporation and NBER

Jamie Chriqui, University of Illinois Chicago and The MayaTech Corporation

Katherine Harris, RAND Corporation

Peter Reuter, University of Maryland - College Park and RAND

ABSTRACT: Deterrence theory proposes that legal compliance is influenced by the anticipated risk of legal sanctions. This implies that changes in law will produce corresponding changes in behavior, but the marijuana decriminalization literature finds only fragmentary support for this prediction. But few studies have directly assessed the accuracy of citizens' perceptions of legal sanctions. The heterogeneity in state statutory penalties for marijuana possession across the United States provides an opportunity to examine this issue. Using national survey data, we find that the percentages who believe they could be jailed for marijuana possession are quite similar in both states that have removed those penalties and those that have not. Our results help to clarify why statistical studies have found inconsistent support for an effect of decriminalization on marijuana possession.

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The primary reason for prohibiting marijuana use (and possession) is the presumption that such a policy deters individuals from using marijuana. According to criminal deterrence theory, the prevalence of marijuana use should be influenced by the swiftness, severity and certainty of punishment (see reviews by Kessler and Levitt, 1999; Nagin, 1998; Paternoster, 1987). Ceteris paribus, reductions in the statutory penalties for using marijuana should weaken the deterrent effect of the prohibition and increase drug use. But this prediction hinges on three important assumptions (MacCoun, 1993). First, it assumes that the change in statutory policy accurately reflects a real change in how the policy is implemented. Second, it assumes that there are no offsetting changes in enforcement that occur simultaneously with the change in law. Third, it assumes the public is aware and cognizant of the change in statutory penalties and hence incorporates this new information into their behavior.

In the 1970s about 12 states "decriminalized" marijuana possession. As commonly interpreted (though see discussion below) this meant that an individual who was caught by the police in possession of a small amount of marijuana would no longer be subject to a potential term of incarceration but would receive only a civil penalty, presumably seen as less serious. Although a large research base exists examining the effects of marijuana decriminalization in the United States on marijuana use, substantially less work has been done examining the three underlying assumptions that are necessary in order to properly interpret the effects found when examining the statutory change. In particular, only one study has examined whether the public was even aware of the change in law, and this study examined knowledge of high school seniors – not the entire population (Johnston, O'Malley, and Bachman, 1981). This paper begins to fill the void by providing new evidence of the public's knowledge of marijuana sanctions using a nationally representative sample of individuals 18 years and older.

The appropriate legal response to marijuana possession has been a matter of public debate in the U.S. and Western Europe since the 1970s, and in Canada and Australia more recently (MacCoun and Reuter, 2001; Pacula et al., 2005). The debate has many dimensions, and only some are empirical (MacCoun, Kahan, Gillespie, and Rhee, 1993). But the core empirical question – does decriminalization increase marijuana use? -- has been surprisingly difficult to resolve. Elsewhere (Hall and Pacula, 2003; MacCoun and Reuter, 2001; Pacula et al., 2005), we review in some detail the decriminalization experiences of the United States, Australia, the Netherlands, and other countries.[1] Here we briefly summarize that literature.

The Existing Literature

Early U.S. studies generally found that decriminalization had no statistically significant impact on use in the United States. These studies focused on the years immediately following the passage of decriminalization statutes in eleven states. The most ambitious analysis found no

[1] This section draws on material in Pacula et al. (2005).

significant association with use in both cross-sectional and longitudinal comparisons, using micro-level data from the late 1970s Monitoring the Future Survey of High School Seniors (Johnston, O'Malley, and Bachman, 1981). Other state-specific analyses found similar null results (see Single, 1989).

Studies examining the early years of decriminalization in several Australian jurisdictions also failed to find an effect on prevalence in simple cross-sectional and longitudinal comparisons (Donnelly, Hall, and Christie, 1995; McGeorge and Aitken, 1997). Drawing on a sparse set of cross-sectional and longitudinal indicators, MacCoun and Reuter (1997, 2001) argued that Dutch decriminalization in the 1970s had no measurable impact on levels of use over the first decade, though they tentatively attributed a later increase in prevalence to the rapid expansion of the number of commercial retail coffeeshop outlets for cannabis.

Only one study has suggested an effect of state decriminalization during the 1970s. Model (1993) analyzed the effect of marijuana decriminalization on drug mentions in hospital emergency room episodes using data from the 1975-1978 Drug Abuse Warning Network (DAWN). Her analyses showed that cities in states that had decriminalized marijuana experienced higher marijuana ER mentions and lower other drug mentions than non-decriminalized cities. Model did not estimate a demand function directly, but her results implied that under decriminalization, drug users might have substituted marijuana for hard drugs.

More recent statistical analysis have generated mixed findings, with some studies showing no effect while others showed a positive and statistically significant effect. For example, DiNardo and Lemieux (2001) found no effects of state marijuana decriminalization using state-level aggregated data from the 1980-1989 Monitoring the Future Survey. They estimated log-linear and bivariate probit models of the likelihood of using alcohol and marijuana, so unlike previous models, their model considered the possible relationship between alcohol and marijuana use. Thies and Register (1993) found no significant impact of decriminalization in their analysis of data on young adults from the 1984 and 1988 National Longitudinal Survey of Youth (NLSY). They estimated logit and tobit specifications of the demand for marijuana, binge drinking, and cocaine and included cross-price effects in all of the regressions. Finally, Pacula (1998) found no significant effect of decriminalization policy in her two-part model specification of the demand for marijuana using data from just the 1984 NLSY. Her model differed from that of Thies and Register in that it included additional proxies for the price of marijuana and other substances.

Saffer and Chaloupka (1999) also found a significant decriminalization effect in individual level prevalence equations for past year and past month use of marijuana, alcohol, cocaine, and heroin using data from the 1988, 1990, and 1991 National Household Survey on Drug Abuse. Unlike other analyses, Saffer and Chaloupka's work controlled for various measures of the monetary price of legal and illicit drugs in addition to controlling for whether a state had a formalized decriminalization policy. Additional analyses finding evidence of a statistically positive association in nationally representative samples of youth and young adults in the United States include Williams et al (2004), DeSimone and Farrelly (2003) and Pacula et al (2003).

What Explains the Discrepancies?

The inconsistencies in these results may reflect statistically or methodological artifacts. The correlational nature of the analyses does not permit rigorous causal identification, and the statistical models presented by past authors vary in many respects. But putting aside the very real possibility of statistical or methodolological artifacts, we see at least two possible substantive explanations.

One is that the effect of law varies by age. Cameron and Williams (2001) find in their analysis of Australian cannabis use that the impact of legal sanctions varies substantially across people depending on the age of the population being examined. Youth in their study were less likely to be influenced by legal sanctions while behavior among young adults was statistically influenced by these policies. Studies finding a policy effect have examined adult populations (Model, 1993; Saffer and Chaloupka, 1999); studies finding no effect have tended to focus on youth or young adults (DiNardo and Lemieux, 1992; Johnston, O'Malley, and Bachman, 1981; Pacula, 1998; Thies and Register, 1993). It is tempting to conclude that youths are less sensitive to marijuana arrest risks due to lower levels of risk aversion and/or greater impulsivity. But Reyda and Farley (2006) review evidence that "(a) despite conventional wisdom, adolescents do not perceive themselves to be invulnerable, and perceived vulnerability declines with increasing age; (b) …adolescents typically overestimate important risks... and (c) some biases in judgment and decision making grow with age."

Another possibility is that the period in which the policies were evaluated may matter. This inconsistency in years evaluated may be generating differences due to cohort effects or unidentified policy changes that are not captured fully in the analysis. Cohort effects are likely to exist due to the fact that public awareness of specific policies generally declines over time as we move farther away from the period in which the policy was discussed or adopted. There are a number of other unidentified policy changes that could also be occurring during the time period, such as changes in enforcement practices associated with marijuana offences. For example, Reuter, Hirschfield and Davies (2001) find that one third of those arrested for marijuana possession in three major Maryland counties spend time in jail pre-trial, even though almost none receive a sentence involving incarceration. Thus there may be variations over time in the extent of pre-trial detention that affect perceived penalties even though not targeted at marijuana use.

Murphy (1986) conducted an analysis of FBI records and showed that 7 out of the 11 states that chose to decriminalize marijuana during the late 1970s ranked in the lowest 21 states in per capita marijuana possession arrests before they enacted their decriminalization law. Two states, Mississippi and North Carolina, were among the top 23 states in per capita arrests before their policy change. Murphy's (1986) analyses of changes in arrest patterns before and after the reform took place suggests that the statutory change had little impact on arrest patterns for any of these states. But survey data from that period, examined below, suggests that youth perceived significantly lower penalties following the legal change, and this shift only occurred in those states changing their laws. We will present evidence that these perceptual differences across states have largely vanished, suggesting either that "decriminalization" and "non-

decriminalization" states no longer differ in their actual enforcement patterns, or that citizens no longer perceive the difference – perhaps due to the lower salience of the change over time.

WHAT DOES IT MEAN TO DECRIMINALIZE?

Much of the confusion about decriminalization involves terminology. The term "decriminalization" is often seen by the public as a synonym for "legalization." But this is a mistake; decriminalization refers to penalties for marijuana possession, and does not imply any change in the legal status of (or sanctions against) marijuana sales. Also, "decriminalization" literally implies a removal in the criminal status of marijuana possession offences; however, many jurisdictions that are recognized as having decriminalized marijuana in fact merely reduce the penalties associated with possession of specified amounts. In many ways, the term marijuana "depenalization" is a more useful term for describing the diversity in liberalizing policies that have arose across and within countries (e.g., MacCoun and Reuter, 2001). Decriminalization, nonetheless, remains the more common term in policy debates.

In addition, progress in understanding the effects of marijuana laws has been hindered by an over-reliance on a crude dichotomous "decriminalization" indicator. Recent research demonstrates that this simple dichotomy is quite inadequate for uniquely identifying real differences in the criminal treatment of low-level marijuana offenders in the United States (Pacula et al., 2003, 2005). Table 1 summarizes statutory penalties in effect as of January 2001 for first time marijuana possession offenders caught in possession of small amounts of marijuana for all fifty states and the District of Columbia (Pacula et al., 2003). The correspondence between the "decriminalization" label and actual policies is quite variable. Seven states that had actually removed the criminal status of minor possession offences (by 2001), were not formally recognized as decriminalized states. Five states that are widely recognized as having decriminalization statutes (Alaska, Arizona, California, North Carolina and Ohio) maintain the status of marijuana possession offences as a criminal charge. Some states allow a minor marijuana possession charge to be removed through a formal process called expungement. Many of the states that have expungement provisions are not known as decriminalized states, and only three of the five so-called decriminalized states retaining the criminal status of minor marijuana possession offences (Arizona, California, and North Carolina) allow for the removal of the criminal charge upon completion of mandated punishment. It is also important to note that the decriminalization statutes do not remove criminal penalties for smoking marijuana in public, which has always constituted an important source of possession arrests.

In addition to this conceptual confusion, there is empirical uncertainty about the effects of marijuana laws on enforcement patterns. Pacula et al. (2005) examined the relationship between state marijuana statutes and actual enforcement during 1991-2000. They report a 264% increase in marijuana possession arrests across all states, mostly occurring between 1991 and 1995. Between 1991 and 2000, there was a dramatic increase in variation across states, with the range increasing from about 30 arrests per 10,000 in 1991 to 110 arrests per 10,000 in 2000. More importantly, by 2000, states that had eliminated the criminal status of possession offences involving amounts of one ounce or less of marijuana did not have systematically lower arrests per capita than those states retaining the criminal status. More than half of the states that do not consider small marijuana possession offences a criminal offence still had per capita arrest rates

greater than the national average and they still experienced a significant increase in arrests during the 1992-1995 time period. One interpretation is that these arrests do not reflect simple possession of marijuana but that many are the result of bargaining down from more serious offenses, such as marijuana distribution (see Caulkins and Chandler, 2006 for supportive evidence). But if these arrest rates do correspond to actual legal risks for marijuana possession, then it is puzzling that recent studies find a consistent and statistically significant effect of the simple decriminalization dummy indicator on use even after controlling for enforcement (DeSimone and Farrelly, 2003; Pacula et al., 2003; Williams et al., 2004).

Table 1

Recognized U.S. State Policies and Statutory Law as of January 2001

	I	II	III		I	II	III
State	Recognized Decrim State	Non-Criminal Status Offence	Expunge Charge Upon Completed Sentence	State	Recognized Decrim State	Non-Criminal Status Offence	Expunge Charge Upon Completed Sentence
Alabama				Montana			Yes
Alaska	Yes			Nebraska	Yes	Yes	
Arizona	Yes		Yes	Nevada			
Arkansas				New Hampshire			
California	Yes		Yes	New Jersey		Yes	
Colorado	Yes	Yes		New Mexico			Yes
Connecticut		Yes		New York	Yes	Yes	
Delaware				North Carolina	Yes		Yes
Dist. Columbia			Yes	North Dakota			Yes
Florida			Yes	Ohio	Yes		
Georgia				Oklahoma			Yes
Hawaii			Yes	Oregon	Yes	Yes	
Idaho				Pennsylvania			Yes
Illinois				Rhode Island			Yes
Indiana			Yes	South Carolina			Yes
Iowa			Yes	South Dakota			
Kansas			Yes	Tennessee			Yes
Kentucky			Yes	Texas			
Louisana		Yes		Utah			Yes
Maine	Yes	Yes		Vermont		Yes	Yes
Maryland				Virginia			
Massachusetts		Yes		Washington			
Michigan				West Virginia		Yes	Yes
Minnesota	Yes	Yes		Wisconsin		Yes	
Mississippi	Yes	Yes	Yes	Wyoming			
Missouri				Total # of States	12	14	22

DETERRENCE THEORY

In theory, any deterrent effect of levels of marijuana sanctioning should be mediated by citizens' perceptions of sanction certainty and severity (see Caulkins and MacCoun, 2003; MacCoun, 1993; Paternoster, 1987; Nagin, 1998).[2] The "perceptual deterrence literature," which examines

[2] We refer here to general deterrence; sanctions may also influence marijuana use through incapacitation (surely a negligible effect here), specific deterrence, price effects, availability effects, and stigma effects (see MacCoun, 1993; MacCoun and Reuter, 2001).

correlations between perceived sanction threats and self-reported behavior, suggests that the certainty of marijuana sanctioning has a modest deterrent effect, but that the effects of sanction severity are weak and unreliable (see Paternoster, 1987; MacCoun and Reuter, 2001). A recent meta-analysis (Pratt et al., 2006) estimated that the average correlation between perceived certainty and self-reported offending was -.171 (n=107 estimates); the average correlation for perceived severity was only -.049 (n = 47 estimates).

Because decriminalization is a severity-based intervention, these results may explain those studies failing to detect reliable decriminalization effects. But as we have seen, those studies operationalized decriminalization using an imprecise and somewhat misleading dichotomous indicator. It is also possible that perceptual deterrence studies conducted *within* a criminalization regime understate the potential effects of decriminalization (MacCoun, 1993). The sanction certainty dimension may have important threshold effects. Sanctioning risks should have the greatest impact at the transition from a non-zero to a zero probability (Kahneman and Tversky, 1984). Also, the mere fact that an act is illicit (as marijuana possession remains under decriminalization) may influence behavior independently of the magnitude of the legal threat.

There may be similar discontinuities for the sanction severity dimension. Human judgment is notoriously susceptible to range and anchoring effects (Kahneman, 2003; for an application to sentencing judgments, see Enough and Mussweiler, 2001). Statutory maxima are an example of the kind of "worst case scenarios" that people tend to weight disproportionately (March and Shapira, 1987).

Whether decriminalization might have a larger than expected effect depends, in part, on whether citizens actually know something about their state's marijuana laws. Various lines of evidence suggest that citizens may have distorted or biased beliefs about sanctioning threats (see MacCoun, 1993, MacCoun and Reuter, 2001), but very little work has been done to empirically investigate whether this is true with respect to drug laws.

Relatively few studies have ever measured the accuracy of citizens' beliefs about legal sanctions. Early studies found that the general public tends to exaggerate the risks of arrest and punishment for many crimes (e.g., California Assembly Committee on Criminal Procedure, 1968; Erickson and Gibbs, 1978). But in accordance with the availability heuristic (Tversky and Kahneman, 1974), personal experiences play an important role in shaping perceived risks. Those with personal experiences of arrests—as either offender, victim, or acquaintance—expect greater arrest risks than citizens without such experiences (Parker and Grasmick, 1979; Pratt et al., 2006).[3] Those with personal experience in offending without sanctions perceive lower (and more accurate) sanctioning risks than the broad non-offending public (Horney and Marshall, 1992; Parker and Grasmick, 1979; Paternoster, 1987).[4] Unfortunately, most of these studies

[3] Anderson (2002) reports that a majority of his sample of prison and jail inmates thought it was unlikely (at the time of their offense) that they would be caught.

[4] MacCoun and Reuter (2001) estimated that marijuana users face a 3% risk of arrest for a year of marijuana use. Caulkins and Sevigny (2006) estimated that marijuana users face a risk of about one hour in prison for every year of marijuana use. This latter calculation does not include time in local jail which may account for most of the incarceration served by marijuana possession arrestees.

have examined relative risk on Likert-type attitude scales, rather than assessing actual knowledge of the criminal statutes.

Williams, Gibbs, and Erickson (1980) surveyed the beliefs of 2400 Arizona adults about the penalties in their state for nineteen different crimes. They found moderate correlations between perceived and actual statutory maximums, but public beliefs were more strongly correlated with their attitudes toward appropriate sanctioning than with their knowledge of actual sanctioning. It is also possible that citizens' beliefs are shaped by legal tradition and fail to reflect more recent legal reform. Darley et al. (1996) examined public beliefs about sanctions for various crime scenarios, and found that citizens' intuitions better corresponded to the traditional common law than to the newer Model Penal Code in force in their state. The most comprehensive study of perceived sanction levels involved interviews in fifty-four urban counties (Kleck, Sever, Li, and Gertz, 2005); in multivariate analyses, these perceptions were statistically unrelated to actual punishment levels in these counties.

We are aware of only one previous study examining the accuracy of citizen beliefs about their state marijuana laws, and it is quite dated. Using the Monitoring the Future survey of high school seniors, Johnston, O'Malley, and Bachman (1981) reported ratings for the Classes of 1976, 1977, 1978, 1979, and 1980 on the item "Which best describes the law IN YOUR STATE regarding marijuana? Possession in private of an ounce or less of marijuana (by an adult) is..." In Table 2, we summarize their results for the Classes of 1976 and 1980.

The most striking feature of Table 2 is the obvious difference in perceptions across states as a function of their legal status. In the early change states, only 14% (1976) to 16% (1980) of citizens believed marijuana possession carried a possible jail sentence. In the late change states the proportion of citizens holding this belief dropped precipitously, from 58% in 1976 to 18% by 1980. In non-decriminalization states, roughly a third of citizens believed marijuana possession was punishable by jail: 39% in 1976, 35% in 1980.

The contrast to the actual statutory penalties described in Table 1 is quite striking. In the U.S. in the 1970s, it appears that many people were aware of their state marijuana laws. As Johnston and colleagues summarized their results: "In sum, we can say from the data just reviewed that there were substantial shifts in the perceptions of prevailing laws, but also that there were sizeable segments of the population in all three types of states who either did not know what the law was, or who very likely had an incorrect perception of what it was. In the decriminalized states roughly 10-20% of the respondents still believed that the penalty could include a jail sentence, while in non-decriminalized states roughly 30-40% incorrectly believed that a jail sentence was not an option."

Thus, it appears that in the 1970s, when most decriminalization reforms were still recent, citizens were moderately accurate in their knowledge of these laws. But as reviewed above, it is no longer certain that "decriminalization" as a label accurately distinguishes actual state differences in statutory maximum penalties for marijuana possession. In the remainder of this paper, we examine the accuracy of citizen perceptions using much more recent survey data, and we do so in a way that accounts for the complexity of state laws and for possible covariates that influence citizen perceptions.

Table 2. High School Seniors' Beliefs About Their State Marijuana Laws, by State Decriminalization Status (Johnston, O'Malley, and Backman, 1981)

	Early change states (by April 1976)		Late change states (by July 1977)		Other states	
	1976	1980	1976	1980	1976	1980
A criminal offense, carrying a possible jail sentence	14.3	16.1	57.8	17.6	39.3	34.6
A criminal offense, carrying a possible fine, but not a jail sentence	14.3	16.4	15.6	23.1	16.1	22.9
A non-criminal offense—like a traffic ticket—carrying a small fine and no criminal record at all	33.1	20.6	1.5	18.7	4.2	5.2
I don't know if the offense is criminal, but I know it carries a fine	15.9	10.8	2.2	16.5	9.5	5.8
Not a legal offense at all	2.1	3.8	1.5	2.2	2.7	1.8
I just don't know	20.5	32.2	21.5	22	28.4	29.8
N	435	286	135	91	861	708

DATA AND ANALYTIC STRATEGY

Data Source

Starting in 2001 the National Survey on Drug Use or Health began inquiring about people's knowledge of penalties associated with possession of one ounce of marijuana. We pooled data from the 2001, 2002, and 2003 National Surveys on Drug Use and Health (NSDUH, formerly the National Household Survey on Drug Abuse). The Substance Abuse and Mental Health Services Administration conducts the NSDUH survey annually for the primary purpose of estimating the prevalence of illicit drug, alcohol, and tobacco use in the United States. The NSDUH sample is drawn from a clustered, multistage sampling design, resulting in a nationally representative sample of non-institutionalized civilians. There are roughly 600 adult respondents 18 and older in each state in each annual cross-section. Respondents are not followed over multiple years.

Interviews occur continuously throughout the calendar year and take roughly one hour to complete. To assure confidentiality, respondent names are not used; interviews are conducted in private; and sensitive questions about drug use are completed though audio-assisted computer interview technology (ACASI) where respondents key answers directly into a laptop computer in response to pre-recorded instructions. Further information on survey methodology is provided in the annual NSDUH findings report (SAMHSA 2003). Several modifications to the survey design were initiated in 2002: a $30 incentive was paid for completed interviews, a program to monitor and improve interviewer quality was implemented, and the name of the survey was changed from the National Household Survey on Drug Abuse to the NSDUH.

Analytic Variables

Our primary dependent measure for this analysis comes from a survey question inquiring about the respondent's knowledge of state penalties for possession of one ounce of marijuana. In each wave of the survey used here, respondents are asked, "What is the maximum legal penalty in (State of residence) for first offense possession of an ounce or less of marijuana for your own use?" Possible responses were (1) a fine, (2) probation, (3) community service, (4) possible prison sentence, (5) mandatory prison sentence, and (5) Don't know. For the purposes of our analysis and to most closely match information on state penalties, we collapse responses into three categories: (1) Fine, probation and/or community service; (2) Don't know, and (3) possible or mandatory prison sentence. It is this categorical variable that is estimated using multinomial logistic regression.

Additional information about the individual is also captured from these surveys to control for individual factors that may be associated with use and/or knowledge of the law. These include the following: gender (whether the respondent is male), race/ethnicity (white, Black, Hispanic, and other), age (18-25, 26-34, and older than 35 years), education (less than high school, some college, finished college), household composition (number of people in the household, number of children ages 17 and under), income (< $15K, $15K - $24K, $25K - $34K, $35K - $49K, $50K - $74K, or greater than $75K), participation in a government assistance program, religious beliefs (religious beliefs are important and attend services regularly), marital status (married, widowed, divorced/separated, and never married), employment status (full time, part time, unemployed and out of the labor force), school enrollment, and an indicator of whether the individual binge drank in the past 30 days.[5] We also include as additional controls measures of the census region the person resides in and the size of the MSA (large, small, or non-MSA).

Information on each state's laws regarding marijuana policy come from two sources. First, information on decriminalization status comes from MacCoun and Reuter (2001). Second, information on statutory penalties associated with possession of <u>one ounce</u> of marijuana for first

[5] Analyses were run without the measure of binge drinking and results were qualitatively similar to those presented here. We also considered models that included measures of perceived risk from regular use of marijuana. However, we are concerned that this variable also captures perceived legal risk, and hence may be endogenously determined. When the variable is included in the model, we find slightly larger policy effects in the direction shown in the paper here.

time offenders was collected by the MayaTech Corporation as part of the ImpacTeen project (see Pacula et al, 2003 for more information about these data). The penalties represent laws in effect as of January 1st of each year (2001, 2002 and 2003) and include the minimum and maximum jail term, minimum and maximum fine, conditional discharge provisions, and expungement provisions for the lowest two quantity trigger amounts, which capture amounts of one ounce or less for all states.[6] The conditional discharge variable reflects instances where compliance with the specified conditions leads to a dismissal of charges.

For the purposes of this analysis, we collapse information collected from these statutes into two alternative sets of policy variables. The first group represents the actual laws in terms of the maximum fine statutorily imposed for possession of an ounce of marijuana, the maximum jail time statutorily imposed, the possibility of diversion to treatment, an education program, or community service for first time offenders, and the presence of conditional discharge provisions for first time offenders (meaning that the criminal charge is erased upon successful completion of the sentence). This first group is the most correct assessment of these laws, but unlikely to be known precisely even by educated individuals. Thus, we also construct a second group of policy variables intended to reflect the public's general understanding of each state's law. For example, we construct an indicator of whether the state has no maximum jail time mandated, whether diversion is allowed for any offender, and whether only a fine is imposed by the state. This second group of policy variables are intended to capture the most salient aspects of the statutory laws and are presumed to be better predictors of knowledge.

To capture the risk of getting caught using marijuana, information on marijuana possession arrests are obtained from the Federal Bureau of Investigation's (FBI) Uniform Crime Report (UCR). The UCR system provides information on the number of crimes reported to the police in specific crime categories each year for every police jurisdiction in the United States. Arrests are reported by primary criminal offence. Data is collected on a monthly basis from approximately 17,000 law enforcement agencies and jurisdictions, although the crime and arrest data are not always complete from every agency. Each year, the Intra-university Consortium of Political and Social Research (ICPSR) generates county-level arrest estimates from the incomplete agency data by imputing for missing values and makes these data available to the public. We aggregate these data to construct an estimate of marijuana possession arrests per capita within each state and match this variable to our data based on state of residence of the respondent.[7]

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[6] Illinois is the only state in which the penalty for possession of an ounce of marijuana is captured in a higher quantity trigger (trigger number 3). In this one case we collected additional information so that we can reflect the penalties in place in all states for amounts involving one ounce of marijuana.

[7] Given the paucity of UCR data for Florida, Illinois, Kansas and Montana, no state estimate was calculated for these states and observations within these states are dropped when analyses include the marijuana enforcement variable. We also conducted runs using an alternative measure of enforcement: the percent of all drug possession arrests that are due to marijuana. Results are qualitatively similar to those presented here and are available upon request.

Analytic Sample and Analytic Strategy

Our analysis focuses on 135,388 adults age 18 and older, among whom are 25,015 past-year and 14,739 past-month marijuana users (unweighted n's). We exclude individuals under 18 years of age because some states differ in their treatment of adults and juveniles and hence statutory penalties may not actually apply to all juvenile offenders. We also exclude a small percent (<3%) of respondents with missing data on a few key control variables, including gender and religiosity. Imputed values, constructed by RTI for SAMHSA, on race/ethnicity, education, income, marital status and family composition were used to avoid excessive loss of observations.

We used a 'restricted use file' with geographic identifiers that enabled us to link state-level policy information and arrest data to respondents in the NSDUH based on state of residence. Because of the sensitive nature of these restricted data, all analyses were conducted on site at SAMHSA by SAMHSA staff to protect confidentiality.

Our dependent variable capturing knowledge of the state laws is a mutually exclusive, categorical variable, in that people respond that the maximum penalty is a fine (fine, probation, and/or community service), some jail time, or that they do not know. No state has a maximum fine not specified in the law, but the person is asked what they believe is the maximum penalty, so to some extent it is irrelevant that the state imposes multiple penalties, as the individual only identifies what they believe is the gravest penalty. Given that response categories are mutually exclusive (the respondent can only identify one), we estimate the model using a multinomial logistic framework given by:

$$Prob\ (Y_i = j) = e^{(\beta j' Xi + \gamma j' Zi)} / \sum_{k=0}^{2} e^{(\beta k' Xi + \gamma k' Zi)} \quad (1)$$

where Y_i represents the choice of respondent i, j = the particular choice specified (jail, fine/probation/community service, and don't know), X_i represents individual and locational (region, MSA, and year) characteristics that influence reported knowledge of the laws, while Z_i represents the actual state policies operating within the state in which the respondent resides. For analytic purposes and ease of interpreting the coefficients, we have specified the three choices as follows:

$k = 0$ if maximum penalty is some jail (2)
$= 1$ if maximum penalty is a fine, probation or community service
$= 2$ if respondent says they don't know what the maximum penalty is.

Thus for all models, the omitted reference group is "some jail". All regression parameters, odds ratios, and standard errors were estimated using a methodology that accounts for the NSDUH's complex survey design using the survey data analysis procedures in STATA 8.0 (StataCorp, 2003). We calculated robust standard errors to reflect clustering resulting from the survey's complex, multistage design. (See Office of Applied Studies, NHSDA Series H-22, DHHS Publication No. SMA 03-3836. Rockville, MD) We also evaluated models adjusting for clustering at the state level, but report here the more conservative standard errors based on the

survey's primary sampling units. Finally, we applied weights reflecting selection probabilities and non-response to all analyses in order to generalize to the U.S. population (SAMHSA 2003).

Limitations

As with all self-reported studies of illicit behavior, there is a known risk of underreporting of drug use by respondents. Several changes to the NSDUH design were initiated in 2002, including a $30 incentive offered to respondents who provided a complete interview, a change in the name of the survey from the National Survey on Drug Abuse, and improved quality control procedures. These changes were associated with increased reporting of illicit drug use. [Substance Abuse and Mental Health Services Administration (2003). Results from the 2002 National Survey on Drug Use and Health: National Findings (Office of Applied Studies, NHSDA Series H-22, DHHS Publication No. SMA 03-3836). Rockville, MD] In order for the methodology changes to bias our results, however, it would have to be the case that the methodology change affects the measured relationship between reported use and penalty perceptions after controlling for calendar year and covariates.

RESULTS

Simple cross-tabulations[8]

Table 3 presents aggregated state population level information on the proportion of people reporting particular penalties. The first column of Table 3 presents the fraction of the state population reporting a particular maximum penalty across all states, regardless of the state's actual penalties. On average we see that nearly one-third of the population do not know what the maximum penalty is for marijuana possession offences in their state and another third believe that possible or mandatory jail is the maximum offence. Note that 6% of the population reports that mandatory jail is the maximum offence for possession of an ounce of marijuana even though no U.S. state imposes a mandatory jail time for low-level marijuana possession offences.

We next categorized states based on whether they were recognized in the literature as having a decriminalization policy ("decrim") or not ("non-decrim"). Although we showed in Table 1 that these policies do not reflect actual differences in the criminal status of marijuana offences, it may be the case that the mere label that has been applied to these states for the past 25 years might generate a greater awareness of the state's actual penalties for those living within these states. If people living in decriminalized states were actually aware of this labeled policy (i.e., that a violation was <u>not</u> subject to criminal penalties), then we would expect that they would be less likely to report jail as the maximum penalty and more likely to report fines, probation, or community service as the maximum penalty than people living in non-decrim states. The findings in the second and third columns of Table 3 show that this is indeed the case, as people living in so-called decriminalized states are statistically less likely to report jail as the maximum penalty and more likely to report fines and/or probation as the maximum penalty. However, the

[8] This section is adapted from material in Pacula et al. (2005).

actual magnitude of these differences is extremely modest and nearly 30% of people living in a so-called decriminalized state still report jail as the maximum penalty imposed.

Table 3
Reported Maximum Penalty for Possession of One Ounce of Marijuana
Aggregated State-Level Data from the 2001 NSDUH

	Full Sample	Decrim	Non-Decrim		No Record or No Jail	Other	
Number of Observations	51	12	39		14	37	
Max penalty - fine	0.151	0.199	0.136	***	0.177	0.141	**
Max penalty - jail	0.326	0.307	0.331	*	0.309	0.332	*
Max penalty - mandatory jail	0.063	0.058	0.064		0.058	0.065	
Max penalty - probation	0.134	0.121	0.138	**	0.131	0.135	
Max penalty - community service	0.073	0.070	0.074		0.074	0.074	
Max penalty - Don't know	0.317	0.303	0.321		0.310	0.319	

Notes: Each cell represents the fraction of the weighted state-sampled population reporting that the specific penalty is the
maximum penalty associated with first-time marijuana possession offences for amounts less than an ounce of marijuana.

5% level (two-tailed test), and * indicates significance at the 10% level (two-tailed test).

One explanation for this small difference in reported penalties is that we have misclassified people based on decriminalization status, as several other states have also eliminated jail time for possession offences (Pacula et al., 2003). So, in the second part of Table 3, we show differences in the fraction of the state population reporting specific penalties for states in which the jail times have been removed as a penalty (either by a change in the criminal status or a reduction in penalties) and those that do not. Again we find that individuals living in states that have statutorily removed jail sentences as penalties for possession of up to an ounce of marijuana are statistically less likely to report jail as the maximum penalty and more likely to report fines as the maximum penalty. However, again we see that the actual difference in knowledge across states is small.

Interestingly, the “Don’t Know” rates in Table 3 (30 % for decrim and 32% for non-decrim states) correspond relatively closely to the “Don’t Know” rates in the 1976 and 1980 Monitoring the Future Survey data in Table 2 (20 to 32 percent). There is no indication that citizens perceive themselves to be better informed in one period than in the other.

Multivariate Analyses

In Table 4 we report the results of a set of multivariate logit models which more precisely assess the association between state marijuana laws and the perception that marijuana possession is

punishable by a fine or probation (henceforth, "lenient sanctioning") relative to mandatory/possible jail time. The reported coefficients are relative risk ratios. Each model included 42 control variables not presented in the tables, including gender, race, income category, household size, number of children < 17 years of age, attendance at religious services, importance of religion, Census region (9 regions), age, marital status, educational attainment, employment status, school enrollment status, year dummies, and MSA size. All regressions were adjusted for sampling weights and for clustering at the county level.

In Model 1, lenient sanctions are perceived to be more common in decrim states, states with a maximum fine for 1 ounce in possession, and states with a conditional discharge for up to 1 ounce in possession. Although these effects are statistically significant, they are quite small. The largest effect is for the decriminalization indicator, suggesting that citizens in decriminalization states are about 29 percent more likely to perceive a fine or probation as the maximum sanction for an ounce of marijuana.

In Model 2, we find somewhat strong effects for an alternative set of 3 state indicators. In this model, the decrim indicator is no longer significant, but citizens in states with no jail risk for an ounce of marijuana are about 36 percent more likely to believe that there is no jail risk.

Models 3 and 4 replicate Models 1 and 2, but controlling for actual enforcement – operationalized as the number of marijuana possession arrests per 10,000 residents. We find no relationship between perceived sanction leniency and the relative emphasis on marijuana in actual state enforcement, and as such, the effects of state laws on beliefs are identical to the earlier models.

Models 5 and 6 replicate Models 1 and 2, but with past-year marijuana use as a covariate. We caution that this variable is likely to be endogeneous; users are likely to differ in their knowledge of risks, but knowledge of risks is hypothesized to influence use. We find that marijuana use is associated with perceptions that sanctions are more lenient, but that controlling for this relationship has no detectable influence on the effects of the sanction variables, our primary variables of interest.

In Table 5, we present an additional four models; in these analyses we limit the sample to those who report having used marijuana in the past year. Because we are interested here in the fact of their use rather than their amount of use (or other correlates of use), we control for the frequency of their past-year use in all of these models. Model 7 suggests that past-year users are more aware of their state's decriminalization status (RRR = 1.7) than are citizens in general (RRR = 1.3 in Model 1). Similarly, model 8 shows that users are more likely to perceive lenient sanctions in states without a jail risk (RRR = 1.9) than are citizens in general (RRR = 1.4 in Model 2). Models 9 and 10 show that these beliefs are not influenced by including enforcement risk (marijuana arrests per 10,000 citizens) in the analysis.

Table 4. Multinomial Logistic Regression Results (All Respondents)

RESPONSE: Fine/Probation (any prison is the base outcome)

	Model 1				Model 2			
	RRR	Std. Err.	z	P>|z|	RRR	Std. Err.	z	P>|z|
Decrim State	**1.293**	0.048	6.88	0.000	1.045	0.054	0.86	0.392
Max Fine 1 oz	**1.000**	0.000	-4.79	0.000				
Max Jail 1 oz	1.001	0.012	0.10	0.918				
Diversion 1 oz	**1.092**	0.035	2.71	0.007				
Condit. Discharge 1 oz	**0.900**	0.039	-2.41	0.016				
No Jail					**1.355**	0.097	4.22	0.000
Penalty Diversion					**1.176**	0.041	4.60	0.000
Only Fine					1.140	0.078	1.92	0.055
N	132,611				132,611			

	Model 3				Model 4			
	RRR	Std. Err.	z	P>|z|	RRR	Std. Err.	z	P>|z|
Decrim State	**1.299**	0.050	6.75	0.000	1.055	0.056	1.00	0.315
Max Fine 1 oz	**1.000**	0.000	-4.61	0.000				
Max Jail 1 oz	0.989	0.015	-0.68	0.495				
Diversion 1 oz	**1.076**	0.039	2.05	0.041				
Condit. Discharge 1 oz	**0.898**	0.040	-2.45	0.014				
No Jail					**1.343**	0.098	4.06	0.000
Penalty Diversion					**1.177**	0.049	3.96	0.000
Only Fine					**1.155**	0.080	2.06	0.039
Marijuana arrests per 10,000	1.000	0.000	-1.73	0.084	1.000	0.000	-1.08	0.280
N	115,261				115,261			

	Model 5				Model 6			
	RRR	Std. Err.	z	P>|z|	RRR	Std. Err.	z	P>|z|
Decrim State	**1.291**	0.048	6.84	0.000	1.043	0.054	0.82	0.414
Max Fine 1 oz	**1.000**	0.000	-4.75	0.000				
Max Jail 1 oz	1.000	0.012	0.02	0.981				
Diversion 1 oz	**1.093**	0.035	2.75	0.006				
Condit. Discharge 1 oz	**0.901**	0.040	-2.38	0.017				
No Jail					**1.359**	0.098	4.27	0.000
Penalty Diversion					**1.178**	0.041	4.65	0.000
Only Fine					1.138	0.078	1.89	0.058
Used Marijuana Past Year	**1.226**	0.038	6.56	0.000	**1.231**	0.038	6.72	0.000
N	132,611				132,611			

Table 5. Multinomial Logistic Regression Results (Past-Year Users Only)

RESPONSE: Fine/Probation (any prison is the base outcome)

	Model 7				Model 8			
	RRR	Std. Err.	z	P>|z|	RRR	Std. Err.	z	P>|z|
Decrim State	**1.723**	0.125	7.50	0.000	**1.196**	0.106	2.02	0.043
Max Fine 1 oz	**1.000**	0.000	-2.37	0.018				
Max Jail 1 oz	0.977	0.026	-0.88	0.379				
Diversion 1 oz	**1.218**	0.082	2.94	0.003				
Condit. Discharge 1 oz	0.965	0.092	-0.37	0.709				
No Jail					**1.862**	0.251	4.60	0.000
Penalty Diversion					**1.181**	0.088	2.22	0.026
Only Fine					0.936	0.131	-0.47	0.640
Frequency of MJ use past yr	**1.001**	0.000	4.45	0.000	**1.001**	0.000	4.57	0.000
N	24,561				24,561			

	Model 9				Model 10			
	RRR	Std. Err.	z	P>|z|	RRR	Std. Err.	Z	P>|z|
Decrim State	**1.745**	0.131	7.43	0.000	1.134	0.105	1.37	0.172
Max Fine 1 oz	**1.000**	0.000	-2.36	0.018				
Max Jail 1 oz	1.004	0.032	0.12	0.908				
Diversion 1 oz	**1.222**	0.092	2.65	0.008				
Condit. Discharge 1 oz	0.929	0.091	-0.75	0.450				
No Jail					**1.968**	0.268	4.97	0.000
Penalty Diversion					**1.231**	0.102	2.50	0.012
Only Fine					0.988	0.141	-0.09	0.931
Frequency of MJ use past yr	**1.001**	0.000	4.86	0.000	**1.001**	0.000	4.98	0.000
Marijuana arrests per 10,000	1.000	0.001	0.00	0.997	1.001	0.001	1.05	0.292
N	21,388				21,388			

DISCUSSION

Our study finds significant associations between the maximum penalty specified in state marijuana laws and citizen's perceived maximum penalties. But the associations are very small in magnitude. Citizens in decriminalization states are only about 29 percent more likely to believe the maximum penalty for possessing an ounce of marijuana is a fine or probation (relative odds ratio = 1.29). About a third of citizens in each type of state believes the maximum penalty is a jail sentence. People are not oblivious to their marijuana laws, but the average citizen's awareness is pretty tenuous. This fact, combined with prior evidence for only weak effects of perceived sanction severity on offending (Pratt et al., 2006), goes a long way toward clarifying why decriminalization effects are fairly weak and inconsistent.

As might be expected, experienced users showed a greater awareness of their state marijuana laws. Past-year users were 72 percent more likely (relative odds ratio = 1.72) to believe the maximum penalty was a fine when they lived in a decriminalization state than when they did not. This suggests that decriminalization may have greater potential to influence how much experienced users consume (in economic jargon, the "intensive margin") than it does to influence whether people use at all (the "extensive margin").

Unfortunately, most studies of decriminalization have focused exclusively on its effects on prevalence. This is perhaps explainable by the paucity of reliable measures of quantity or frequency of consumption. But it is also consistent with the dominant question in the policy debate (MacCoun & Reuter, 2001): "Would decriminalization encourage more people to use marijuana?" An alternative framing -- "Would decriminalization increase total consumption of marijuana?" -- would be consistent with the way demand is conceived in conventional microeconomic analysis, and arguably the better way to assess the public health and safety impacts of drug laws.

There is a need for caution in generalizing from the effects of state marijuana laws to any effect of a comparable change at the federal level. States that have depenalized marijuana remain subject to the more stringent federal prohibition. In practice, this means more for traffickers than for ordinary users. But in a state like California, citizens have repeatedly seen news coverage of federal crackdowns on marijuana (e.g., raids on medical marijuana buying clubs). This inconsistency may cloud citizens' understanding of their state laws. Federal decriminalization (rather than legalization) of marijuana might have modest legal consequences but a more profound perceptual effect.

Various methodological differences make it difficult to directly compare our results to those of the 1980 Monitoring the Future data (Table 2). Still, it is intriguing that students in the late 1970s seemed so cognizant of their state's legal status. Of course, that was the peak period for student marijuana use, and we have seen that users track their laws better than do non-users. But it is also possible that the publicity surrounding a change in law has a stronger effect on perceptions than the law's actual implementation. In the 1970s, the initial decision to decriminalize marijuana was a matter of active public debate. MacCoun and Reuter (2001, Table 3.2; also see MacCoun, Kahan, Gillespie, and Rhee, 1993) report that in the 1970s, 22 out of 22 New York Times op-ed essay on drug legalization or drug decriminalization mentioned marijuana; only 15 out of 37 did so in the 1990s. We believe that recent changes in these penalties have received far less publicity; only those interested in obtaining this information search it out. There may also have been erosion over time in knowledge of what may have been, in the 1970s, a real policy change. Indeed, research in other policy areas have shown that the impact of a policy is usually seen within a one to three year period following the policy's adoption/effectiveness date (MacCoun 1993; Ross 1976). Given that many of the depenalization policies examined here occurred well before 2001, time may have decayed people's knowledge or awareness of the laws.

Our understanding of the effects of marijuana decriminalization is far from perfect. Early studies *failed* to find an effect of decriminalization in an era in which citizens clearly recognized a difference in policies across states. Yet some recent studies have appeared to *find* a decriminalization effect in a more recent era, when the average citizen can just barely detect a difference in state laws. Of course, some citizens might use regardless of state laws, and others would never use marijuana (they are "inframarginal"), so what matters is knowledge among those at the margin. But three lines of evidence – the direct estimates of the effects of US and international marijuana laws, the weak severity effect in the perceptual deterrence literature, and the limits of citizen knowledge of penalties -- leads us to believe that marijuana decriminalization has far more modest effects than opponents anticipate.

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