

THE POLITICAL ECONOMY OF MEDICAL MARIJUANA

by

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DISSERTATION ABSTRACT

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Title: The Political Economy of Medical Marijuana

This study aims to shed light on several vexing questions surrounding marijuana at various levels of analysis. Why have some states adopted medical laws when others have not, and what are the implications of these adoptions for elites at the federal level? Why are certain areas within states hotbeds of marijuana use and production? Why, in the face of serious penalties, do certain individuals continue to use, produce, and sell this particular drug? How is the marijuana market structured and how much economic impact does it have? Possible sociopolitical factors responsible for passage (or failure) of marijuana-related voter initiatives and legislation in states are examined and the process of policy diffusion occurring between states that adopt such measures is detailed. An analysis of geographic variations in medical cardholder rates in Oregon is conducted using longitudinal data. Using a Respondent-Driven Sample and a detailed survey of legal and illegal marijuana users in Oregon, I identify differences between the two groups, elucidate differences between marijuana users and the general population, and estimate the economic impact of marijuana on Oregon's informal economy. Overall, the study finds that innovative, Democratically dominated states tend to pass medical marijuana laws and are the most at risk of doing so in the future. Within Oregon, county-level participation in the medical marijuana program is associated with Democratic party

members, unemployment rates, and timber harvest levels. The Oregon marijuana market consists of a robust network of small producers, with individual users primarily managing distribution of the drug. Economic estimates indicate that the legalization of marijuana could generate between \$37 million and \$153 million per year in taxes for the state. Finally, historical evidence suggests that legalization of this drug could lead to its control; however, doing so could structurally transition the market from a robust network of small producers into tight oligopolic control by a limited number of producers, thereby disenfranchising small, artisan growers, communities traditionally reliant on marijuana for revenue, consumers who seek variety, and the plant's genetic diversity.

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Dr. Julie O. Gardner (1935-2011)
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Nothing we accomplish is ours alone.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.....	1
II. STATES OF HEADS OR HEADS OF STATES?: MARIJUANA VOTER INITIATIVES, MEDICAL MARIJUANA LAWS, AND STATE POLICY DIFFUSION.....	8
Introduction.....	8
Voter Initiatives.....	8
Literature Review.....	11
Aspects of the Marijuana Policy Planning Network.....	19
Empirical Studies of Voter Initiatives.....	30
Data and Methods.....	33
Qualitative Comparative Analysis Models.....	33
Event History Analysis Models.....	35
Results.....	37
QCA Results.....	37
EHA Results.....	39
Discussion.....	42
Conclusion.....	45
III. PATCHES OF GREEN: EXPLAINING VARIATION IN CARDHOLDER RATES BETWEEN OREGON COUNTIES.....	47
Introduction.....	47
Literature Review.....	49
Who Uses Marijuana and Why?.....	49
Young Adults.....	50
Adults.....	51
Medical Use.....	53
Who Grows Marijuana and Why?	53
Literature Conclusions.....	61
Methods.....	61
Political.....	62
Social.....	63
Economic.....	64
Ecological.....	66
Results.....	68
Discussion.....	73
Conclusion.....	76
IV. REVISITING THE OUTSIDERS: INNOVATIVE RECRUITMENT OF MARIJUANA USERS USING WEB-BASED RESPONDENT DRIVEN SAMPLING.....	78
Introduction.....	78

Chapter	Page
Marijuana Users.....	79
Theoretical Overview.....	80
Methods.....	89
WebRDS Investigation of Marijuana Users in Oregon.....	94
Survey Instrument.....	95
Results.....	96
Hypothesis Testing.....	105
Discussion.....	106
Conclusion.....	109
V. ESTIMATING THE QUASI-UNDERGROUND: OREGON'S INFORMAL MARIJUANA ECONOMY.....	111
Introduction.....	111
Literature Review.....	112
Methods of Calculating Underground Economy Size.....	115
Direct Methods.....	116
Indirect Monetary Methods.....	116
Indirect Non-Monetary Methods.....	119
Best Method?.....	123
The Marijuana Economy.....	123
Methods.....	125
Results.....	126
Obtaining Marijuana: Sources, Use Amount, and Costs.....	126
Who Sells and How Much?.....	130
Who Grows and Why?	132
Marijuana and Oregon's Informal Economy.....	133
Demand.....	134
Supply.....	135
Discussion.....	137
Conclusion.....	140
VI. CONCLUSION: THE FUTURE OF MARIJUANA IN AMERICA.....	142
APPENDICES	
A. MEDICAL MARIJUANA LAWS IN THE US.....	152
B. QCA TRUTH TABLE.....	155
C. NUMBER AND RATES OF CHANGE IN MEDICAL MARIJUANA CARDHOLDERS IN OREGON COUNTIES.....	156
D. EFFECTS OF MARIJUANA: RESPONSES FROM USERS (1970)..	158

Chapter	Page
E. ASSOCIATION OF USE MEASURES WITH CLOSE FRIENDS WHO USE.....	160
F. RECRUITMENT LETTER AND SURVEY INSTRUMENT.....	162
REFERENCES CITED.....	175

LIST OF FIGURES

Figure	Page
1-1. FBI Uniform Crime Report Data on Drug Arrests, 1970-2010.....	3
2-1. Gallup Public Opinion Poll Data on Marijuana Legalization.....	9
2-2. Images from NIDA Presentation on Addiction Science.....	25
2-3. Millions of Drug Doses Seized by DEA, 1986-2011.....	29
2-4. Kaplan-Meier Survival Estimates for Republican and Democratic States.....	41
3-1. Oregon Cardholder Prevalence by County, 2011.....	48
3-2. Merton’s Typology of Deviance.....	58
4-1. RDS Sample At End of Week 1.....	98
4-2. RDS Sample At End of Week 2.....	98
4-3. RDS Sample At End of Week 4.....	99
4-4. RDS Sample At End of Week 8.....	99
4-5. Political Ideology of Oregon Marijuana Users.....	102
4-6. Sample Network with Reported Friendships Imputed.....	104
4-7. Sample Network with Reported Friendships Imputed (users in green)	105
5-1. Marijuana Price and County-Level Cardholder Rates.....	129
5-2. Marijuana Prices by OMMP Status.....	130

LIST OF TABLES

Table	Page
2-1. NIDA Administrators.....	24
2-2. DEA Administrators.....	28
2-3. Cox Survivor Function Estimates for US States.....	39
2-4. Cox Proportional Hazard Regression Models.....	40
2-5. Survivor Functions for Republican and Democratic States.....	41
3-1. Cross-Sectional (2008) OLS Regression Models (Std. Error).....	68
3-2. Prais-Winsten PCSE Regression Models, 2005-11.....	70
3-3. County-Specific Prais-Winsten Time-Series Models.....	71
4-1. Description of RDS Network Sample.....	100
4-2. Counts and Ranks of Reasons for Use.....	103
4-3. Mean Friend Counts by Recruitment Wave and Use Status.....	104
5-1. Sources of Marijuana for Users and OMMP Status.....	127
5-2. OLS Regression Models Estimating Marijuana Use Amounts.....	128
5-3. Marijuana Selling and OMMP Participation.....	131
5-4. Counts and Ranks of Reasons for Growing.....	133
5-5. Oregon Marijuana Demand and Supply Estimates.....	136
5-6. Oregon Marijuana Tax Revenue Estimates.....	139

CHAPTER I

INTRODUCTION

Barring all possibility of double entendre, the role of marijuana in American society is a sticky issue. Psychoactive plants of all shapes and sizes pervade the pantheon of human consciousness alteration, but few—if any—have enjoyed the ubiquity or historical longevity of cannabis. Anthropologic and botanical evidence indicate that humans have cultivated and consumed cannabis since at least 3000 BCE, and that it dispersed widely through trading networks from the Far East into the Middle East and Europe (Rudgley 2000). Genomic studies suggest that semi-distinct varieties first emerged from Vavilovian centers in China and India, and, later, Eastern Europe (Hillig 2005). Some of these varieties (with very low psychoactive constituents) have been utilized for their unique fiber production capabilities, while others (with higher psychoactivity) were used for various medical and consciousness alteration applications. Anthropological accounts of cannabis consumption suggest that its use has been invariably minor, but persistent across many societies and time periods (Rudgley 2000).

The history of cannabis regulation in the United States is robustly detailed elsewhere (Becker 1963; Goode 1970; Herer 1998; Kane 2001; Deitch 2003; Ferraiolo 2007) and bears little need for repeating. In short, cannabis (both fiber and drug cultivars) was unregulated at the federal level in the United States until the Pure Food and Drug Act of 1906, when the government required that “narcotic ingredients be listed on the labels of patent medicines shipped in interstate commerce,” though enforcement of this law was lax and sporadic (Ferraiolo 2007: 150). Spurred by racialized fear mongering (the drug was primarily associated with Mexican immigrants, Blacks, and, to

a lesser extent, counterculture Whites) at the behest of Harry Anslinger and the newly formed Federal Bureau of Narcotics (FBN), the Marihuana Tax Act of 1937 dramatically altered the oversight of cannabis (Turk 1976; Chambliss 1995; Goode and Ben-Yehuda 1994a, 1994b). The tax act required that producers of hemp and cannabis (it did not distinguish between non-psychoactive hemp and psychoactive cannabis) obtain production licenses from the FBN and pay taxes on their agricultural products; however, the FBN refused to issue any production licenses—commercial hemp and cannabis production essentially vanished overnight (Ferraiolo 2007). Despite the new, stringent oversight on production, possession and use remained unregulated by the federal government until 1970¹, when Congress passed the Comprehensive Drug Abuse Prevention and Control Act (also referred to by the name of a subsection within it, known as the Controlled Substances Act (CSA)), followed shortly thereafter by President Nixon’s proclamation of a “war on drugs.”

The CSA established a five-tier categorization of drugs in which specific substances are ranked according to their potential for abuse, current accepted medical use, and treatment under international treaties ratified by the United States. Marijuana was placed in the most stringent category (Schedule 1), which is reserved for drugs with a high potential for abuse, no current accepted medical use, and a lack of safety associated with its use².

Due to this classification, federal penalties for possession and production can be

¹ By 1937, all 48 states had implemented marijuana control legislation of one variety or another—yet it remained unregulated by the federal government (Bonnie and Whitebread 1970).

² Cocaine and methamphetamine—two other common drugs of abuse—are classified as Schedule 2 substances.

very harsh; first-time offenders face felony charges, up to 5 years in prison, and a \$250,000 fine (for possession of 1 to 49 plants or less than 50kg of marijuana). As Figure 1-1 illustrates, the so-called “war” has been primarily waged against individuals involved with marijuana.

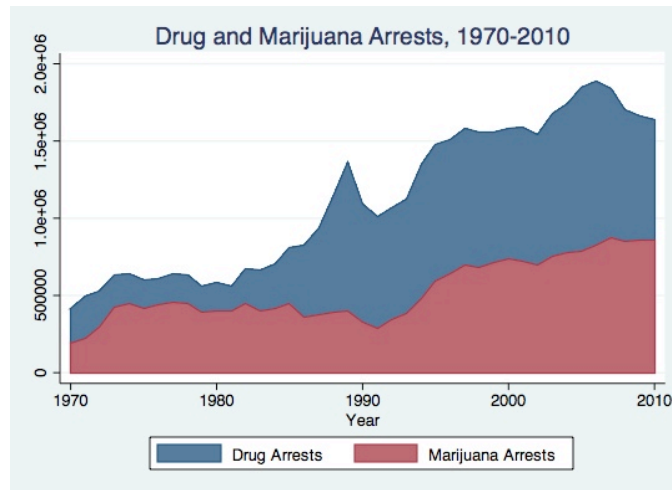


Figure 1-1. FBI Uniform Crime Report Data on Drug Arrests, 1970-2010

This is, in large part, due to marijuana’s status as the most widely used drug in the US, and because law enforcement agencies spend the majority of their allocated drug enforcement funding on marijuana suppression activities (Miron 2005). Between 1980 and 1996, state and federal incarceration rates increased by over 200%; this growth is attributed primarily to drug offense arrests, which increased by a factor of ten in the same period (Blumstein and Beck 1999). The context of these arrests is highly racialized; as Beckett (2005) and Golub (2007) note, Blacks and Latinos are much more likely to be arrested for marijuana related offenses than their White counterparts, even though Whites use at a higher rate (McCabe et al. 2008). The classification of marijuana as one of the most dangerous drugs in the US (by the CSA) has also hindered genuine research on its effects: medical, economic, and sociological studies of this drug are impeded by legal

and institutional sanctions against those who seek a broader understanding of its role in society.

Despite its classification and the un/official research moratorium imposed (coupled with a concomitant push by the US to maintain its illegality worldwide), some evidence has accumulated about marijuana and its effects on the human body. Researchers have identified 483 active chemical constituents, with tetrahydrocannabinol, tetrahydrocannabivarin, cannabidiol, cannabinol, and cannbigerol thought to be the most useful to humans (ElSohly and Slade 2005). For adults, the negative effects of marijuana use include short-term cognitive impairment following heavy, long-term use (Crean et al. 2011), potential kindling effects in people predisposed to schizophrenia (Wassink et al. 2011), impaired motor skills when consuming very high doses (Brickner et al. 2008), anxiety, nervousness, and dry mouth (Crippa 2012), an extremely rare condition known as “cannabis hyperemesis syndrome” following decades of chronic use (Soriano-Co et al. 2010), social ostracizing, and severe legal implications if prosecuted. On the other hand, positive effects have also been demonstrated.

Marijuana has “therapeutic potential” for inflammatory disorders and diabetes (Pacher 2012), alleviating muscle spasms (Valle 2006), and as an anti-cancer treatment (Munson et al. 1975; Guzman 2003; Bifulco et al. 2006; Singh and Budhiraja 2006; Preet et al. 2007; Velasco et al. 2012); additionally, it provides positive immunological effects (Turner 2010), suppresses or reduces many symptoms for those with epilepsy (Gordon and Devinsky 2001), chronic pain (Ware et al. 2010), depression (Denson and Earleywine 2006), post-traumatic stress disorder (Bremner et al. 1995), glaucoma (Nucci 2008), migraines (Russo 2008), erectile dysfunction (Shamloul and Bella 2011),

Tourettes syndrome (Hemming and Yellowlees 1993; Sandyk and Awerbuch 1988), severe nausea (Cotter 2009), and cachexia (Gorter 1999). Moderate lifetime use is associated with higher pulmonary and lung function over abstainers, though chronic use results in similar pulmonary and lung function as abstainers (Pletcher et al. 2012). Marijuana is also known to provide euphoria and lowers overall indicators of mental stress for several personality types (Zablocki et al. 1991), while not negatively influencing an individual's ability to operate a motor vehicle³ (Hindrick et al. 1993; Robbe 1995; Anderson et al. 2010). While the US government classifies marijuana as one of the highest risk drugs, studies of drug risks indicate that it is among the least dangerous of legal or illegal drugs (Nutt et al. 2010).

Despite concerted efforts by law enforcement officials and federal policy makers, cannabis continues to be widely used and relatively ubiquitous in American society. Estimates of economic impact suggest that marijuana is the one of the largest cash crops in the country (Gettman 2006; Miron 2010). Public opinion polls indicate that, for the first time in polling history, more people support its legalization (50%) than those who do not (46%) (Gallup 2011), while medical marijuana continues to enjoy an overwhelming majority of support (72%) (Gallup 2010). As of this writing, 18 states (and the District of Columbia) have enacted medical marijuana laws, allowing their citizens to obtain legal protection from state authorities to use the drug for qualifying medical conditions. These states (including DC) account for 32.5% of the total US population. As I complete this dissertation, two laws allowing for the re-legalization of “recreational” use—in Washington and Colorado—go into effect early in the month (12/2012). The wave of

³ The only significant effect found in studies of marijuana use and driving indicate that, when under the influence, users drive slower.

direct democracy responsible for the passage of medical marijuana and recreational use in some states has dispelled many of the pervasive myths propagated by the federal government and anti-marijuana moralists. In many tangible ways, the emerging shift in public opinion and legal changes have altered perceptions. In states where sales are legal, some elements of production have moved into the formal economy, giving us an opportunity to assess the size and impact of this activity on state-level economies. In states where medical use is legal, but sales remain illicit, individuals are more likely to discuss their use, sale, and production of this psychoactive plant with candor than previously possible. This particular moment in time offers researchers the chance to compare the current marijuana economy—which I consider “quasi-underground”—to the emerging, legitimate marijuana economy of the future.

This study aims to shed light on several vexing questions surrounding marijuana at various levels of analysis. Why have some states adopted medical laws when others have not? Why are certain areas within states hotbeds of marijuana use and production? Why, in the face of serious penalties, do certain individuals continue to use, produce, and sell this particular drug? How is the marijuana market structured and how much economic impact does it have? While its contribution is limited by data availability, the methods selected to investigate these questions, the fluidity of current policy developments, and my own shortcomings, I hope this study can at least partially illuminate some key aspects of marijuana’s modern political economy. An overview of the dissertation structure follows.

Chapter II examines the possible sociopolitical factors responsible for passage (or failure) of marijuana-related voter initiatives and legislation in states and details the

process of policy diffusion occurring between states that adopt such measures. Chapter III moves from the macro-level to the mezzo-level of analysis; a single-state case study is presented to assess which social, political, economic, and ecological factors explain the wide variations in medical cardholder rates between Oregon counties. Chapter IV relies on a Respondent-Driven Sample (RDS) and a detailed survey of legal and illegal marijuana users in Oregon to identify differences between the two groups, differences between marijuana users (legal or otherwise) and the general population, and to elaborate on some of the potential cultural factors that could explain differences in cardholder rates between Oregon counties. Chapter V relies on the same survey to provide estimates of the economic impact of marijuana on Oregon's informal economy. Chapter VI offers concluding thoughts on the evolving political economy of American marijuana and outlines possible directions of future policy developments.

CHAPTER II

STATES OF HEADS OR HEADS OF STATES?: MARIJUANA VOTER INITIATIVES, MEDICAL MARIJUANA LAWS, AND STATE POLICY DIFFUSION

Introduction

When are marijuana-related voter initiatives successful? What has led to the adoption of medical marijuana laws in US states? Which states are most likely to pass medical marijuana laws in the future? In this study, I inspect two interrelated components of policy diffusion amongst states to better understand the current trajectory of marijuana policy in the US. In the first section, I examine marijuana-related voter initiative outcomes in states between 1972-2011 using Qualitative Comparative Analysis; this model employs social, political, and economic variables to assess the relationship between states' characteristics and their propensity to pass direct-democracy marijuana measures. In the second section, I turn to the process of medical marijuana policy diffusion amongst states, using geographic, sociopolitical, and temporal factors in an Event History Analysis model to assess their respective roles in the adoption of marijuana policy. Finally, the findings of the research sections are compared to marijuana-related ballot measure results in several states for the 2012 election cycle to assess their validity in predicting passage or failure, and I develop a predictive roadmap of future states "at risk" of adopting medical marijuana laws.

Voter Initiatives

The use of direct-democracy marijuana initiatives in US states has been the core pro-legalization strategy for decades, though it yielded little success and rarely placed measures on the ballot (Ferraiolo 2007). After years of failed lobbying (and in some cases, because of personal health crises), many leaders of the marijuana legalization

movement began signature gathering campaigns in the early 1990s and sent *medical* marijuana ballot measures directly to state voters (Ferraiolo 2007). In a four-year surge of direct democratic action (1996-2000), the elected officials of six states were bypassed by successful medical marijuana ballot initiatives. Ten other states (and the District of Columbia) implemented similar laws in the subsequent decade, some through voter initiatives and others through legislative processes (see Appendix A). Today, 18 states and Washington, DC have medical marijuana laws in place. The laws enacted are fairly uniform in terms of (1) qualifying conditions, (2) allowing for personal production, (3) permissible marijuana possession amounts, and (4) plant counts per patient—though California and Oregon are exceptions⁴.

The recent success of medical marijuana ballot measures has corresponded with a radical shift in popular support for full legalization and concerted efforts by legislatures in non-medical states to implement similar programs. Until recently, support for marijuana legalization—medical or otherwise—was very low.

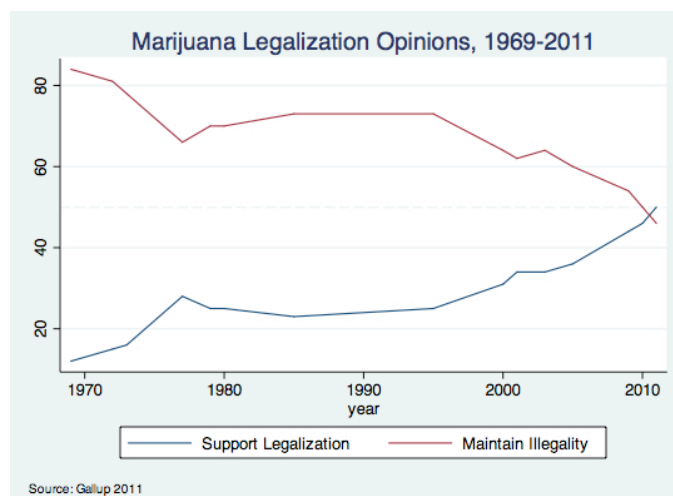


Figure 2-1. Gallup Public Opinion Poll Data on Marijuana Legalization

⁴ See Appendix A.

However, recent Gallup surveys indicate that public opinion has moved from 12% support of legalization in 1969 to 50% in 2011 (Gallup 2011; see Figure 2-1), while support for medical marijuana provisions rests at 70% (Gallup 2010). Support for full legalization is particularly high in younger age groups (18-29; 62%), self-reported “liberal” political orientations (69%), those who live in the west (55%), and males (55%). The causal mechanisms driving this shift in public opinion are unknown, but the surge in medical marijuana programs and potential cohort effects (de Beer 1985; O’Brien 2000) stemming from higher rates of lifetime use among more recent generations are prime suspects (Jacobson 2004).

Much has been written about the role of elites in establishing marijuana prohibition (Becker 1963; Lindesmith 1967; Bonnie and Whitebread 1974) through the manufacture of a racially motivated moral panic (Turk 1976; Chambliss 1995; Goode and Ben-Yehuda 1994a, 1994b). Becker suggests that the application of rules, mores, and norms do not occur in a vacuum; “moral entrepreneurs,” who are often members of the upper class, actively pursue agendas to outlaw specific activities that they deem inappropriate or deleterious to society (1963: 152). Once enacted, the laws are upheld by “rule enforcers” (usually law enforcement officers, attorneys, and judges), who face the dual problem of demonstrating their proficiency at stomping out acts of deviance and pointing to the deviant acts as a continuing scourge (which is particularly apparent with marijuana). Lindesmith (1967) argues that, even at the outset of marijuana prohibition, scientific studies had established the relative banality of its use. Despite expert opinion, however, Harry Anslinger and his Federal Bureau of Narcotics compatriots were successful in creating a widespread coalition of legislators, churches, temperance

organizations, and drug manufacturers to have marijuana production criminalized (Lindesmith 1967; McWilliams 1990; Gerber 2004). As with any successful bureaucratic agency, the FNB was able to increase its budget and expand its scope of operation over time; this process continued with the reformation of the FNB into the DEA in 1972 (Gerber 2004).

Little, however, is known about the state-level processes responsible for overturning the decades-long moratorium on marijuana possession, use, production, and distribution. In addition to the ten successful voter initiatives (see Table 1 in Appendix A), nine states have used legislative procedures to implement medical marijuana programs, despite vociferous outcries by federal agencies tasked with maintaining this particular prohibition.

Literature Review

Major theories that address political action include pluralist theory and class-domination theory. The uniting element present in these approaches is the fundamental assumption that political activities represent an expression of power. The definition of “power” is multifaceted and the subject of many fruitful interpretations (Russell 1938; Dahl 1957; Weber 1978; Adorno 1973; Lukes 1974; Foucault 1977; Gramsci 1971; Althusser 1971; Domhoff 2010), though, in the confines of political activity, mainstream researchers tend to focus on aspects of distributive power—a concept best elaborated upon by Weber (1978): “we understand by ‘power’ the chance of a man or a number of men to realize their own will in a social action even against the resistance of others who are participating in the action” (43). An overview of pluralist and class-domination

theories are presented, followed by findings from empirical examinations of voter initiatives.

Pluralist theory contends that power within American politics is distributed broadly amongst issue-oriented, compartmentalized, competing interest groups (Dahl 1961). Power, in Dahl's words, is a relation between "individuals, groups, roles, offices, governments, nation-states, or other human aggregates" and exists where "A has power over B to the extent that he can get B to do something that B would not otherwise do" (1957: 202-203). According to Dahl, a key feature of the American political system (at any level of analysis) is the inability of any one group to dominate multiple policy development arenas or issues, which leads to a democratic equilibrium (1971). Power, then, is viewed as a diffuse entity requiring coordinated action amongst actors to harness and direct towards any particular goal. Once a group coalesces and begins to engage in political activity, action takes many forms, but is dependent upon the resources and potential policy paths available to the group. Elected or appointed political leaders play a key role in pluralist decision-making processes, but are under constant threat due to re-election concerns; the transient nature of political office leads to an "ambiguity of leadership," where reciprocal influence is possible between engaged citizens or interest groups and officeholders (1961: 89). When the interests of a particular group are shared with a majority of the voting public, pluralists predict that elected officials will often respond to their concerns, even in the face of disagreement from other powerful groups (business groups, unions, academics, etc.). Thus, in the context of marijuana policy, pluralist theory suggests that state governments will only alter the status quo (strict prohibition) if their constituents pressure them to do so and a majority supports such a

change. I expect that a majority of state citizens must have a positive opinion of medical marijuana programs—which, in this case, serves as a proxy for both constituent pressure and public support—for a state legislature to approve such a program.

H₁: State medical marijuana laws will only be passed legislatively when a majority of citizens support it.

The narrow interests of particular interest groups—when combined with positive public support—should also sway state-level political leaders (Dahl 1971). Medical marijuana laws can protect the economic interests of marijuana producers by shielding them from state prosecution and granting public legitimacy to a federally prohibited activity. So long as growers represent a significantly large interest group, such programs would also allow medical marijuana producers and associated interests to provide campaign funding in support of individual political leaders. In that regard, I expect states that are targeted by DEA marijuana eradication programs—an indicator of the size of marijuana interests in a particular state—to be adopters of medical laws, as it offers states (and their citizens) an opportunity to preempt the assertion of federal supremacy over drug regulation (Mikos 2009) and protect an economically lucrative, locally produced commodity (Gettman 2006).

H₂: States targeted by the DEA eradication program are more likely to adopt medical marijuana laws

Citizen-driven voter initiatives carve out a unique position in pluralist thought. On one hand, voting outcomes are an expression of the polity's interests on issues that elected officials have often neglected; on the other hand, citizen initiatives provide an avenue for interest groups (from the very small and disorganized to very large, professional political machines) to challenge political orthodoxy or advance narrow

policy interests (Boyte 2005). The challenge to orthodoxy seems necessary in certain circumstances, as Dahl (1998) notes:

One of the imperative needs of democratic countries is to improve citizens' capacities to engage intelligently in political life...In the years to come...older institutions need to be enhanced by new means for civic education, political participation, information, and deliberation that draw creatively on the array of techniques and technologies available in the twenty-first century (187-8).

While state-level citizen initiatives are not new technology or techniques (South Dakota was the first in 1898; Oregon the second in 1902), their use has expanded in recent years to the point where they serve as a powerful alternative to institutional-based political regimes (Piott 2003). In some regards, medical marijuana voter initiatives present a minor theoretical crisis for pluralist theory; if the citizens of a state overwhelmingly support medical marijuana and local government officials fail to construct an assuaging policy—but one is passed through the initiative process anyway—are these leaders truly heeding the public's will? It seems that multiple approaches are necessary to understand this phenomenon, as the method of passing these laws has been almost evenly split: ten were approved voters and nine were enacted by state legislatures. Are there other considerations or processes involved that may sway political leaders into action?

States are commonly viewed as fertile laboratories for policy experimentation (Volden 2006). Differences between states—especially in regards to education attainment, urbanization, industrialization, political ideology, wealth, and geographic proximity to other innovative states—appear to influence their adoption of novel policy approaches (Dawson and Robinson 1963; Dye 1966; Walker 1969; Gray 1973; Hofferbert 1974; Grupp and Richards 1975; Sharkansky 1978; Blomquist 1992). The analysis of policy diffusion amongst states traditionally focused on either internal

determinants or regional diffusion models to explain variations in policy adoption or experimentation; however, many current studies attempt to integrate these approaches using event history analysis models for hypothesis testing (Berry and Berry 1990). Most studies focus on single policies, such as lotteries (Berry and Berry 1990), tax policy (Berry and Berry 1992; Best and Teske 2002), hate crime legislation (Haider-Markel 1998), crime policy (Hays 1996), same-sex marriage laws (Haider-Markel 2001), environmental policy (Blomquist 1992), abortion policy (Mooney and Lee 1995), insurance regulation (Cheit 1993), tobacco lawsuits (Winder and LaPlant 2000), energy policy (Andrews 2000), and educational policy (McLendon et al. 2005; 2007). Using a data set comprised of 85 separate policies from 1960-1999, Boehmke and Skinner (2012) provide the most comprehensive analysis of policy diffusion amongst states, finding that the most innovative states have large, diverse populations, high per capita incomes, and are geographically proximate to other innovative states.

I expect that states that border other medical marijuana states will adopt similar policies more often than non-border states. I also expect that greater ethnic diversity, higher per capita incomes, and larger populations will be positively associated with the adoption of these laws. Since educational attainment (Mauss 1969; Gallup 2010, 2011) and Democratic political orientation (Pollock 1983; Martinez 1990; Ferraiolo 2007; Gallup 2010, 2011) are prominent predictors of marijuana acceptance at the individual level, I expect that both of these factors will be positively related to medical marijuana adoption at the state level as well.

H₃: States bordering medical marijuana states are more likely to adopt medical marijuana laws

- H₄: State ethnic diversity is positively related to the adoption of medical marijuana laws
- H₅: State per capita incomes are positively related to the adoption of medical marijuana laws
- H₆: State population is positively related to the adoption of medical marijuana laws
- H₇: State-level aggregate educational attainment is positively related to the adoption of medical marijuana laws
- H₈: Democrat-dominated states are more likely to adopt medical marijuana laws

C. Wright Mills offered a comprehensive explanation of arising collusion between government, industry, and the military, indicting the upper echelons of these bureaucratic organizations, and those who inhabit the positions of power within them, as the dominant forces of control in the United States (1956). This approach to explaining power in the US was decried by a cacophony of pluralist scholars, who claimed that power is too dispersed, and competing interests too divided amongst potential allies for any sustained coalition to dominate the decision-making process (Dahl 1961). In response to both Mills and the pluralist rebuttal, Domhoff recast Mills' general argument in more specific terms by identifying key organizations inside and outside of government, examining the outcomes of several key policy battles between the elite and competing interests, and re-specifying the nexus of power in the United States as a set of four interrelated power networks (2010).

These primary power networks—policy-planning, special interest, candidate selection, and opinion shaping—are said to be dominated by the social elite, the corporate community, and policy-planning directors (2010: 116). Scholarly interest in the policy-

planning network has resulted in a proliferation of studies that track the penetration of corporations into this increasingly influential sociopolitical process. While some studies focus on the most powerful organizations in the national policy-planning network (Mizruchi 1982; Domhoff 1990; Burris 1992; Domhoff 2005), others investigate sector-specific networks (Roose 1975; Dreiling 2000; Crawford 2012), and a few examine local planning networks (see Domhoff 2007). The findings at all levels of analysis suggest that elites consistently win policy battles, benefit from policy decisions, and influence the policy-planning network. Though power and influence are thought to be achieved through a number of avenues, power structure research has often relied on the existence of director interlocks when examining corporate influence on the policy development process (Domhoff 1978; Burris 1992; Mizruchi 1996; Crawford 2012). In the case of marijuana, several of the leading policy-planning organizations⁵ (Burris 1992: 121) have issued research reports that argue against various forms of marijuana legalization (Heritage Foundation 2010; Hoover Institution 2000), while others (Council on Foreign Relations and American Enterprise Institute) have advocated for a repeal of current laws (Shirk 2011; Satel 2005; Gottlieb 2008; Frum 2009) or conducted studies demonstrating the benefits of medical marijuana laws on crime incidence (RAND 2011). Local affiliates of the US Chamber of Commerce (particularly in California) have spent considerable amounts of money fighting against proposed legalization voter initiatives (Hoeffel 2010). The other three networks identified by Domhoff have not received recent, similar extended studies; for an issue like marijuana legalization (medical or

⁵ Burris (1992) includes: American Enterprise Institute, Business Council, Business Roundtable, Brookings Institution, Committee for Economic Development, Conference Board, Council on Foreign Relations, Heritage Foundation, Hoover Institution, National Association of Manufacturers, Trilateral Commission, and US Chamber of Commerce.

otherwise), examinations of the public opinion shaping (i.e. media) apparatuses and special interest networks would be eminently useful. One study of early marijuana rhetorical framing (Speaker 2001) draws parallels between the government's anti-drug propaganda and previous castigations of Masons, Mormons, and Catholics, arguing that it "is linked to a larger American rhetorical tradition, one that stems from Protestant-Republican ideology and cultural concerns—fears of being owned or controlled, fears of anarchy, fears of loss of dynamism, fears of falling away from past virtue and promise" (591). Another problematic aspect of class domination theory of power is its focus on national issues, leaving state and local political battles largely unaddressed—though an important insight is presented in Domhoff's description of local "growth coalitions" (2010: 49).

Growth coalitions bring together the most important small businesses within a particular geographic area to ensure the passage of measures intensifying land use and increasing rents. The goals of growth coalitions differ in an important way from large corporations, namely:

Growth coalitions are trying to maximize *rents* from land and buildings, which is a little different than the goal of the corporate community, namely, maximizing profits from the sale of goods and services. To emphasize this difference, the concept of rents includes purchases of land and buildings as well as payments that tenants or home buyers make to landlords, realtors, mortgage lenders, and title companies (Domhoff 2010: 49-50).

The legalization of marijuana—medical or recreational—presents an interesting paradox where local growth coalitions are potentially pitted against federal power elites; when implemented at the state level instead of nationally, this type of policy change offers local growth coalitions an opportunity to produce a high-value agricultural commodity and

capture an increase in property value when storefront dispensaries are permitted. This local revenue generation is a threat to corporate profits in the alcohol, tobacco, and pharmaceutical industries⁶. Simultaneously, it has the potential to increase federal funding to local law enforcement agencies when they cooperate with DEA eradication programs, while reducing local expenditures for judicial proceedings and incarceration costs. The class domination theory of power suggests federal elite supremacy over these local growth coalitions, while acknowledging the possibility that pockets of resistance may be successful—in the short term—at hedging elements of their control (Mikos 2009).

Aspects of the Marijuana Policy Planning Network

Since the first medical use law was established in California, prominent policy-planning organizations have addressed the issue, though contradictory messages have emerged and no elite consensus can be distilled from these actions. Is this evidence of a pluralist reform process underway or the early stage of policy cohesion amongst elites? Delineating some aspects of the federal marijuana policy planning structure is necessary to properly approach this question, as state-level medical marijuana policy implementation can be viewed (in several regards) as a response to federal recalcitrance towards rescheduling marijuana.

In light of the compelling scientific evidence which suggests that marijuana is, at minimum, a medically useful palliative, a number of individuals and organizations have beseeched the federal government to reschedule marijuana into a classification that

⁶ Conflicting evidence has emerged regarding marijuana's substitutability for alcohol; Reiman's (2009) findings suggest it is a substitute, but Williams et al. (2001) indicate they are complementary.

would, at minimum, allow for sustained research into its effects. The agencies and individuals who have power over rescheduling decisions are the key actors in the marijuana policy-planning network, and the attempts to reclassify this drug offer a view of this network's structure.

Due to its legislative origins, parallel processes allow for the rescheduling of CSA drugs. Any drug can be rescheduled by Congress and presidential signature—this is the least complicated route towards rescheduling, but also the most politically tenuous⁷. The US attorney general retains the power to unilaterally reschedule as well (as provided in Section 201 of the CSA). In contrast, the DEA (a sub-agency within the Department of Justice)—which is tasked with enforcing the CSA provisions—and the Department of Health and Human Services (HHS) can initiate proceedings to reschedule at any time. Affected citizens, advocacy groups, state and local governments, and other recognized organizations can petition that either the DEA or HHS conduct rescheduling proceedings as well. Before rescheduling proceedings are initiated, the DEA is allowed to gather necessary data (which includes non-binding fact-finding provided by HHS)—if the data supports rescheduling, the DEA can initiate rescheduling proceedings. If rescheduling proceedings are initiated, both the DEA and HHS must conduct scientific reviews. Two HHS departments—the Food and Drug Administration (FDA) and National Institute on Drug Abuse (NIDA)—play a powerful role in the scientific reviews, as any recommendations made by them are mandatorily binding and enforced by the DEA. One must imagine how definitive the evidence must be for a rescheduling proceeding to be initiated by the DEA; in the case of marijuana, none have ever taken place. This is not

⁷ Rep. Barney Frank (D-MA), Rep. Ron Paul (R-TX), and others have unsuccessfully introduced bills to this effect several times, but none have made it out of committee.

due to a lack of effort by marijuana advocates. Individuals, patient advocacy groups, scientists, physician groups, and the governors of two states⁸ have all submitted petitions to reschedule, but most have languished on DEA desks for years.

The first major challenge to this particular drug scheduling was filed in 1972 by the National Organization for the Reform of Marijuana Laws (NORML), who asked the DEA to reclassify whole-plant marijuana as Schedule 2 due to its usefulness in treating chemotherapy-induced nausea and vomiting in cancer patients (Young 1988). The DEA rejected this supplication, claiming that the required FDA assessment of marijuana found no “accepted medical use” because the drug had not received FDA approval for lawful marketing. In 1988, Francis Young—the chief administrative law judge at the DEA—ruled against the agency’s decision, claiming that this approach was not in the spirit of the law. In his ruling, Young addresses the “accepted medical use” argument, stating:

It is not for this Agency to tell doctors whether they should or should not accept a drug or substance for medical use. The statute directs the Administrator merely to ascertain whether, in fact, doctors have done so. The overwhelming preponderance of the evidence in this record establishes that marijuana has a currently accepted medical use in treatment in the United States for nausea and vomiting resulting from chemotherapy treatments in some cancer patients. To conclude otherwise, on this record, would be unreasonable, arbitrary and capricious (1988: 32-34).

Young also addresses the safety of this drug; after reviewing the evidence, he claims that: “Marijuana, in its natural form, is one of the safest therapeutically active substances known to man. By any measure of rational analysis marijuana can be safely used within a supervised routine of medical care” (58-59). Despite this ruling (which was non-binding), the DEA rejected the rescheduling petition. The most recent major petition was

⁸ <http://www.mpp.org/media/press-releases/governors-ask-obama-to.html>

filed in 2003 and is now before the US Court of Appeals (DC) (*Americans for Safe Access v. Drug Enforcement Administration*) after being rejected by the DEA on the following grounds (*Federal Register* 2011: 40551):

(1) Marijuana has a high potential for abuse. The DHHS evaluation and the additional data gathered by DEA show that marijuana has a high potential for abuse. (2) Marijuana has no currently accepted medical use in treatment in the United States. According to established case law, marijuana has no “currently accepted medical use” because: the drug's chemistry is not known and reproducible; there are no adequate safety studies; there are no adequate and well-controlled studies proving efficacy; the drug is not accepted by qualified experts; and the scientific evidence is not widely available. (3) Marijuana lacks accepted safety for use under medical supervision. At present, there are no US Food and Drug Administration (FDA)-approved marijuana products, nor is marijuana under a New Drug Application (NDA) evaluation at the FDA for any indication. Marijuana does not have a currently accepted medical use in treatment in the United States or a currently accepted medical use with severe restrictions. At this time, the known risks of marijuana use have not been shown to be outweighed by specific benefits in well-controlled clinical trials that scientifically evaluate safety and efficacy.

The arguments against holding a rescheduling hearing have evolved very little in the last 40 years and most are dismissible off-hand: there are no known deaths from marijuana, its addictive capacity is less than caffeine, significant scientific consensus exists that the drug provides relief for a number of clinical maladies, and a synthetically-derived THC (dronabinol, known by its trade name Marinol) is classified as a Schedule 3 drug and has been available via prescription since 1986 in the US (Nutt et al. 2010). Additionally, NIDA has operated the only federally legal medical marijuana program since 1978 (the “Compassionate Investigational New Drug Study”); NIDA currently grows and provides an average of 8.5 ounces of marijuana to a handful of individuals on a monthly basis⁹. Furthermore—in a move that can only be described as highly ironic—HHS applied for

⁹ <http://archives.drugabuse.gov/about/organization/nacda/MarijuanaStatement.html>

and received a patent on the use of “cannabinoids as antioxidants and neuroprotectants” from the US Patent and Technology Office in 2003; as the abstract of their awarded patent describes (USPTO #6,630,507):

Cannabinoids are found to have particular application as neuroprotectants, for example in limiting neurological damage following ischemic insults, such as stroke and trauma, or in the treatment of neurodegenerative diseases, such as Alzheimer's disease, Parkinson's disease and HIV dementia. Nonpsychoactive cannabinoids, such as cannabidoil, are particularly advantageous to use because they avoid toxicity that is encountered with psychoactive cannabinoids at high doses useful in the method of the present invention.

The federal agency, which actively claims that marijuana has no medical use, patented the application of marijuana-derived cannabinoids for targeted medical treatment. By all accounts, the activities of federal marijuana policy planners (NIDA and DEA in particular) seem scientifically disingenuous—why would they approach a drug with such significant medical benefits in this manner?

NIDA—the HHS department that conducts the bulk of scientific reviews on drug classification and oversees federally-sponsored drug abuse research—provides an interesting case. NIDA’s directors are credentialed, professional researchers who specialize in various aspects of addiction (see Table 2-1). The three previous administrators’ research investigates dopamine receptor inhibition from drug consumption and suggest the disruption of natural dopamine uptake brought on by chronic drug use leads users into a cycle of continued use—each has staked their professional career on this particular form of the disease model of addiction (Leshner 1997; Fleckenstein et al. 2007; Volkow et al. 2004). There is no question that marijuana, when consumed, leads to higher concentrations of dopamine in the body (Loeber and

Yurgelun-Todd 1999). Does this feature justify its classification as one of America’s most dangerous drug?

Table 2-1. NIDA Administrators

Name	Years	Degree/University	Previous Occupation
Alan Leshner	1994-2001	BS, Franklin and Marshall College MS, Rutgers University Ph.D., Rutgers University	Director, NIMH
Glen Hanson	2001-03	BS, BYU DDS, UCLA Ph.D. University of Utah	Professor, Dept. of Pharmacology University of Utah
Nora Volkow	2003-	BA, Modern American School MD, National University of Mexico	Professor, Dept. of Psychiatry SUNY-Stony Brook

Unlike central stimulants or even depressants, marijuana is associated with relatively low levels of peak dopamine increase: 6.6x lower than amphetamines, 2.3x lower than cocaine, 1.5x lower than nicotine, and 1.1x lower than alcohol (Di Chiara and Imperato 1988). In fact, the dopamine response triggered by eating food and having sex are stronger than from marijuana use (Di Chiara et al. 1999; Fiorino and Phillips 1997). The long-term consequences of marijuana use on our dopamine system are unlike other drugs; once reaching adulthood, there are no known alterations even with chronic use (Stokes et al. 2011; Urban et al. 2012). Despite this knowledge, NIDA continues to demonize marijuana as a drug of abuse through their spurious dopamine argument; between 1998 and 2004, the agency spent over \$1 billion on anti-marijuana ads¹⁰, often invoking their newly constructed and technologically sophisticated variant of “this is your brain on drugs” (see Figure 2-2).

¹⁰ <http://archives.drugabuse.gov/initiatives/westat/>

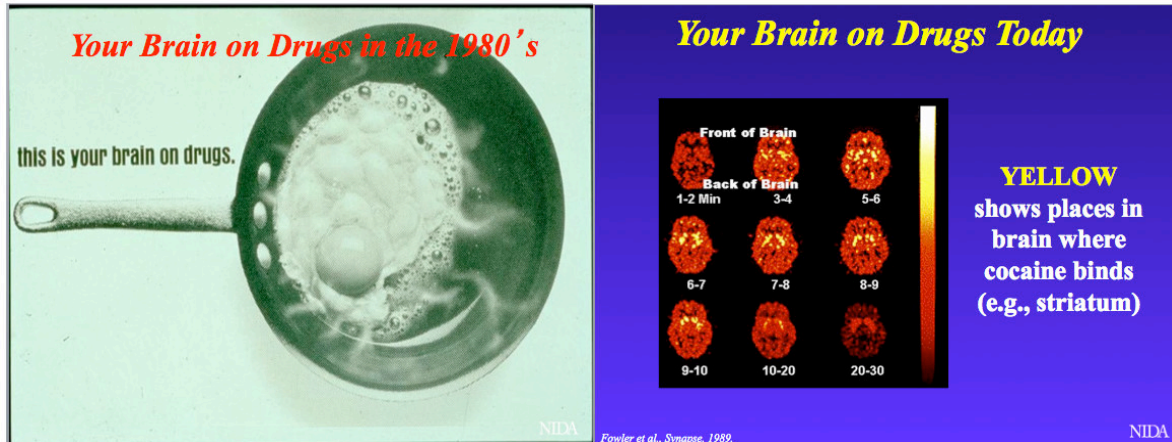


Figure 2-2. Images from NIDA Presentation on Addiction Science¹¹

Recasting the anti-marijuana argument in terms that are unassailable by the average person is a common tactic implemented by a society's intellectual class (Konrad and Szelényi 1979), allowing them to build and wield cultural capital through their framing of and determining what constitutes legitimated knowledge (Gouldner 1982). In that vein, Verdery (2005) argues "the intelligentsia seek to obtain power and reward for itself by exploiting its relative monopoly of complex knowledge as a means of...justifying one's social position" (2). Since most people do not have the luxury of foraging through university libraries and paid-access electronic databases, or the requisite knowledge to investigate the validity these arguments, we can view the debate over marijuana's status as a Schedule 1 drug as a battle within the intellectual class over finite resources and social distinction.

NIDA administrators are powerful actors in the federal marijuana policy apparatus because of their command of capital. Bourdieu's (1986) delineation of capital forms helps elucidate the roots of NIDA's power; he contends that:

¹¹ <http://www.drugabuse.gov/sites/default/files/addictionscience.ppt>

Capital can present itself in three fundamental guises: as economic capital, which is immediately and directly convertible into money and may be institutionalized in the forms of property rights; as cultural capital, which is convertible, on certain conditions, into economic capital and may be institutionalized in the forms of educational qualifications; and as social capital, made up of social obligations ('connections'), which is convertible, in certain conditions, into economic capital and may be institutionalized in the forms of a title of nobility (243).

In NIDA administrators' case, their economic capital is derived from large budgets (\$1.08 billion in FY2012¹²) and the funding of extramural research (the agency claims to control 85% of world's total research funding for drug abuse studies¹³). This economic power is intimately related to their accumulated social capital, which Bourdieu defines as:

the aggregate of the actual or potential resources which are linked to the possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition...which provides each of its members with the backing of the collectivity-owned capital, a 'credential' which entitle them to credit, in the various senses of the word (1986: 248-49).

NIDA administrators directly oversee about 500 employees, control over 1700 research grants, and engage in nearly 200 research and development contracts with individual scientists, non-profit organizations, and for-profit corporations¹⁴. They are deeply embedded in networks of power, authority, and knowledge generation, which bestows the ability to exert influence over other scientists and policy makers. Previous administrators have used this capital to gain academic appointments and prestigious editorships

¹² <http://www.drugabuse.gov/about-nida/legislative-activities/budget-information/fiscal-year-2012-budget-information>

¹³ <http://www.nih.gov/news/pr/jul2001/nida-19.htm>

¹⁴ <http://www.drugabuse.gov/about-nida/legislative-activities/budget-information/fiscal-year-2012-budget-information>

following their dismissal at NIDA¹⁵. Cultural capital is manifested in three particular states:

In the embodied state, i.e., in the form of long-lasting dispositions of the mind and body; in the objectified state, in the form of cultural goods (pictures, books, dictionaries, instruments, machines, etc.); and in the institutionalized state, [i.e.] educational qualifications (Bourdieu 1986: 243).

The cultural capital of NIDA administrators stems from their institutionalized educational credentials and their ability to cultivate the normative guidelines of embodied capital through the exercise of scientific authority. Creating definitions of and framing the debate around marijuana's usefulness is a powerful element of this scientific authority. Whatever NIDA recommends to other federal agencies regarding this drug must be adhered to, and, since the federal government claims supremacy over states on this issue, NIDA definitions of marijuana's medical-scientific value is the law of the land and can be enforced through the state's monopoly on legitimate violence (Weber 1978).

The adoption of medical marijuana laws by state legislatures or their passage by popular referendum can be viewed as a direct challenge to this particular subset of scientific claims, or alternately, as an attempt by state elites and the general public to recoup capital—in this case, cultural—from dominant members of the marijuana policy planning network. For NIDA administrators—past and present—legitimizing marijuana research (let alone use) is a challenge to their accumulated capital, particularly in its social and cultural forms, but also in a pure economic sense as well.

Gordon (1994) suggests that DEA administrators are powerful actors in the marijuana policy-planning decision-making process and are primarily driven by

¹⁵ Alan Leshner is a professor of pharmacology at the University of Utah; Glen Hanson is the Executive Editor of *Science*.

unconscious ideological commitment to drug prohibition. As Table 2-2 illustrates, no administrator has been trained as a scientist or medical doctor¹⁶. Since its creation in 1972, the agency has been lead by two former FBI agents, two former DEA agents, a former NYPD cop, four former US district attorneys, and a sales manager from the Brunswick Corporation. In terms of educational attainment, one held a high school diploma, five possessed a bachelor’s degree (only), and four earned law degrees.

Table 2-2. DEA Administrators

Name	Years	Degree/University	Previous Occupation
John Bartels, Jr.	1973-75	BS, JD Harvard University	US District Attorney
Peter Bensinger	1976-81	BS Yale University	Sales Manager Brunswick Corporation
Francis Mullen, Jr.	1981-85	BS Central Connecticut State Coll.	Special Agent FBI
John Lawn	1985-90	BA, MA St. Francis College of Brooklyn, St. John’s University	FBI Agent
Robert Bonner	1990-93	BA, JD University of Maryland, Georgetown University	US District Attorney
Thomas Constantine	1994-99	---	NYPD
Donnie Marshall	2000-01	BS Stephen Austin State University	DEA Agent
Asa Hutchinson	2001-03	BS, JD Bob Jones University, University of Arkansas	US District Attorney
Karen Tandy	2003-07	BS, JD Texas Tech University	US District Attorney
Michele Leonhart	2007-current	BS Bemidji State University	DEA Agent

¹⁶ <http://www.docstoc.com/docs/1086185/DEA-History-Book-part-1---PDF>

They are classic examples of Becker’s (1963) “rule enforcers,” doubly bound to demonstrate their effectiveness at controlling drugs, while not being so effective as to wipe out the problem altogether. Their history of enforcement—of all drugs, but particularly with marijuana—suggest exogenous factors could be influencing their actual effectiveness (Figure 2-3).

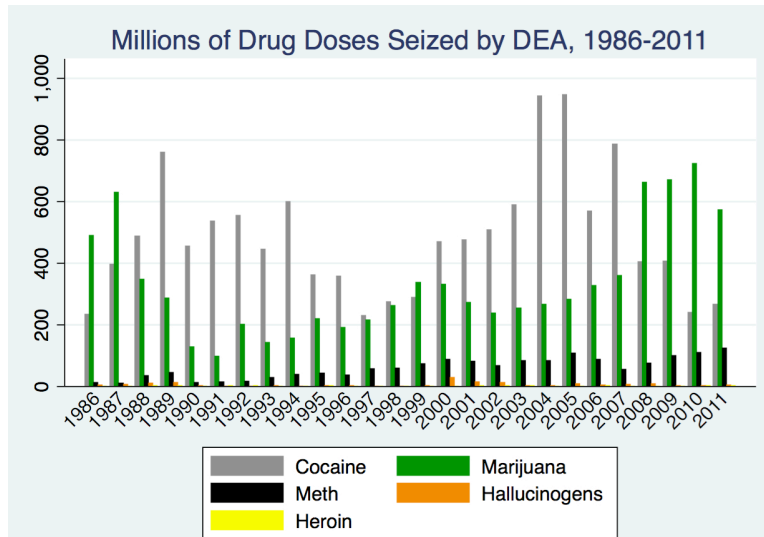


Figure 2-3. Millions of Drug Doses¹⁷ Seized by DEA, 1986-2011¹⁸

The direction of oscillation in DEA-reported marijuana confiscation is strongly associated with changes in presidential administrations. The amount seized dramatically declined under George H. W. Bush (though it crept up in the year of his failed re-election bid). Clinton’s tenure is associated with an immediate decline in the first year, followed by modest increases in seizures for the next three; he presided over steady increases for his entire second term. George W. Bush presents a mixed case; his first term saw small

¹⁷ Doses are estimated from Itzhak and Anderson (2012), Dobler-Mikola et al. (1999), Stough et al. (2012), and Weill et al. (1968). The figure assumes very high purity for all drugs. Standardization in this regard (doses) is necessary to compare enforcement strategy alteration with respect to various drugs, as the impact of seizing 1kg of marijuana is different than 1kg of methamphetamine.

¹⁸ <http://www.justice.gov/dea/resource-center/statistics.shtml>

declines from Clinton's high seizure year (1999), but they steadily increased during his second term. The most pronounced seizure spike in modern history occurred in Bush II's final year in office, with an 83% increase between 2007 and 2008. Seizures continued to increase under Barack Obama, reaching their highest point in US history in 2010, then slightly declined in 2011. The DEA seized more marijuana in Obama's first three years than under Clinton's entire eight-year presidency. This data lends credibility to the contention that DEA enforcement of marijuana prohibition is strongly influenced by presidential administrations, particularly in election years (Gordon 1994). The DEA is a powerful actor in the marijuana policy-planning network, but their importance appears to be overshadowed by presidential politics.

Deriving a testable hypothesis regarding marijuana laws from elite domination theories presents a conundrum; at this point, there appears to be a lack of consensus among elite policy-planning organizations—some favor legalization and some favor maintaining prohibition. It appears as if the passage of state-level medical marijuana laws, through both grass-roots movements and local legislative initiative, have forced elites to reconsider the issue seriously. If marijuana prohibition repeal is anything like that of alcohol, we will see consensus among elites emerge first, followed by federal action (Levine 1985). At this point, however, no such consensus exists and the status quo is firmly entrenched.

Empirical Studies of Voter Initiatives

The success of individual voter initiatives often depends on campaign spending, ideologically motivated voter turnout, the complexity of proposed measures, and the degree of departure each proposal offers from established laws. Some assessments of

campaign spending on ballot measures suggest that spending by opponents against a particular measure is an effective strategy, but of limited utility to proponents (Gerber 1999; Lupia and Matsusaka 2004). Others (Schrag 1998; Smith 1998; Ellis 2002) find that spending is advantageous—and necessary—to both proponents and opponents to particular ballot measures—Broder (2000) goes so far as to claim that it is the single-greatest determinant of passage. Stratmann (2006) finds that spending is effective for supporters and opponents to achieve their desired outcome, with supporter spending having a slightly larger impact, but suggests that further research in this area requires “for controlling of voter preferences and initiative particulars” (798). Contrary to others (and similar to Stratmann’s claims), Ferraiolo (2004) finds that campaign spending in contested medical marijuana initiatives during the 1990s had little to no effect on their outcome; instead, public opinion on medical marijuana (which did not change significantly during the campaign process) was accurately reflected in the successful passage of these particular policies, outside of endogenous factors. A comparison of campaign spending by proponents/opponents at the state level could help elucidate the magnitude of this particular relationship in marijuana-related voter initiatives; however, , the veracity of campaign spending records varies with time and from state to state, making a reliable longitudinal, cross-state comparison difficult to initiate¹⁹.

Hrebenar and Benedict (1991) find that (in western states) voter turnout is not significantly influenced by the presence of initiatives on the ballot; rather, candidates for

¹⁹ Candidate campaign spending reports are required in all states; however, independent spending, either candidate or ballot initiative related, is treated differently by individual states. Some states have detailed reports (e.g. Washington, California, and Ohio) while others have minimal to no reporting requirements (e.g. New Mexico, Alabama, and Indiana). More details can be found at: <http://www.followthemoney.org/press/ReportView.phtml?r=482>

major state offices (governor, senators, congress members) attract voters to the polls (134). Childers and Binder (2012), on the other hand, demonstrate that contentious voter initiatives tend to produce higher turnout during mid-term elections, but—for non-contentious issues and presidential elections—voter turnout is unaffected by the presence of initiatives. Higher voter turnout on its own does not predict the success of a specific ballot measure; however, in states where a particular measure might be ideologically palatable to the majority of citizens, Gerber et al. (2008) find that such initiatives mobilize voters to pass legislation that most government officials would not otherwise support. In this sense, contextualizing each measure and the ideological orientation of the respective voting populations of each state will likely provide more analytical value than comparing voter turnout rates (Stratmann 2006: 798).

Contextually, clear language plays a significant role in ballot measure success; Reilly and Richey (2011) note that the reading level required of prospective voters to comprehend a specific initiative and the total word count of the measure were significant determinants in the success of 1,211 ballot measures. The concept of clear language extends to clear thinking as well—the presence of multiple policy issues within a measure often leads to failure (Reilly and Richey 2011). I expect that single-issue marijuana-reform measures will be more likely to pass than their multiple-issue counterparts. For marijuana, Democratic political orientation is the strongest predictor of support for policy change (Pollock 1983; Martinez 1990; Ferraiolo 2007; Gallup 2010, 2011); I expect that states with this orientation will be more likely to pass marijuana reform laws. The historical innovativeness of a state—or its propensity to adopt unique policies before other states—should affect an electorate’s willingness to vote in favor of

future innovations (Boehmke and Skinner 2012). I expect that historically innovative states are more likely to adopt marijuana reform measures as well.

H₉: Single-issue marijuana-reform ballot measures are more likely to pass than their multiple-issue counterparts

H₁₀: Marijuana-reform ballot measures are more likely to pass in states who vote for Democratic presidential candidates

H₁₁: Innovative states are more likely to pass marijuana-related ballot initiatives

Data and Methods

Two methods—QCA and EHA—are applied to two unique pools of data to answer the proposed research questions and hypotheses. An explication of both models and their data sources follows.

Qualitative Comparative Analysis Models

QCA, developed by Ragin (1987), offers researchers an alternative strategy to traditional quantitative and qualitative studies. QCA is arguably more appropriate than a quantitative approach in this case, as the goal is to elucidate “convergent causal conditions” (Ragin 1987: 14), operationalized via voter initiative and state attributes in this study, that enable certain marijuana-related voter initiatives to pass. Additionally, QCA allows for an examination of necessary and sufficient causes of passage or failure. Notation of voter initiative attributes in the constructed QCA models follows Ragin’s prescription, where upper-case letters refer to the “presence of a condition and lower-case letters indicate an absence” (89). In this model, data is derived from qualitative assessments of all statewide voter initiatives involving marijuana between 1972 and 2011 ($n=34$) and state-level sociopolitical measures. Data begins in 1972 with the first marijuana voter initiative (California) and ends in 2011, allowing for the resulting models

to be compared against the historic results of 2012. The text of each initiative was obtained from respective state elections offices, then examined based on the presence of specific categories of proposed legal alteration. These categories include: deescalating penalties for marijuana (such as reducing jail time and expungement requirements for drug offenders, but not decriminalizing), decriminalizing possession or production of marijuana, full legalization, medical use provision, and allowing medical marijuana dispensaries. The presence of proposed legal changes to one of those categories is operationalized as an upper case letter, while the absence of any proposed changes is operationalized as a lower case letter. Sociopolitical variables include Democratic political orientation and historical state policy innovation rankings. The Democratic political orientation variable is operationalized as “*P*” if a state was carried by the Democratic presidential candidate in the election preceding the initiative in question, and a “*p*” if the state was carried by the republican presidential candidate. As previously noted, Democrats are (and have been historically) more supportive of liberalizing marijuana laws. The historical state policy innovation variable relies on Boehmke and Skinner’s (2012) ranking of states based on their adoption of innovative policies between 1959-2009. Boehmke and Skinner partition states into six tiers of innovativeness based on their speed of policy adoption relative to other states and the number of innovative policies adopted over time (2012: 40). In this study, states who scored in the first three tiers are assigned an “*I*” and states in the bottom three tiers are assigned an “*i*”. While previous research suggests that campaign spending by proponents and opponents of measures have a significant impact in many issue-oriented elections, I do not include this

variable due to inconsistencies in state campaign reporting over time—much of the data is missing or fraught with operationalization issues.

The dichotomous dependent variable (S) represents passage or failure of a voter initiative. Dichotomous independent variables for the model are: Democratic political orientation (P), policy innovator (I), deintensifying penalties for marijuana (but not decriminalizing) (D), decriminalizing possession or production of marijuana (C), medical use provision (M), and providing for medical dispensaries (R). The full model is expressed as:

$$S = P + I + D + C + L + M + R$$

Event History Analysis Models

EHA models are a tool for estimating the hazard probability of an event occurring to an actor or set of actors, with respect to other operant conditions, within specific duration data. The hazard probability “expresses the instantaneous risk of having the event at time t , given that the event did not occur before time t ,” or “the ratio of unconditional instantaneous probability of having the event $f(t)$ divided by the survival probability” (Yamaguchi 1991: 9-10). In this study, the hazard probability of medical marijuana policy adoption is investigated at the state level between 1996 and 2011, with the adoption of a medical marijuana law treated as the failure event. Continuous-time Cox proportional hazard regression models are used to assess the estimated effect of several key independent variables (Yamaguchi 1991: 101). The hazard function for this model is expressed as:

(1)

$$\lambda(t|X) = \lambda_0(t) \exp(\beta_1 X_1 + \dots + \beta_p X_p) = \lambda_0(t) \exp(\beta' X).$$

This gives the expected hazard at time t for a state with explanatory variables X . The partial likelihood is estimated as:

(2)

$$L(\beta) = \prod_{i:C_i=1} \frac{\theta_i}{\sum_{j:Y_j \geq Y_i} \theta_j},$$

where $\theta_j = \exp(\beta'X_j)$ and X_1, \dots, X_n are the covariate vectors for the n independently sampled states in the dataset.

Independent variables include population, racial diversity, per capita income, education attainment, Democratic political orientation, the presence of a border state with a medical marijuana law, and the number of marijuana plants eradicated by the US Drug Enforcement Administration. Population data are derived from the US Census Bureau's current population estimates. Racial diversity is operationalized as the estimated percentage of white residents in each state (US Census Bureau). Per capita personal income is derived from US Bureau of Economic Analysis data (chained 2011 dollars). Education attainment is operationalized as the percentage of state residents over the age of 25 who hold a bachelor's degree or above (derived from the US Census Bureau's American Community Surveys). Democratic political orientation is operationalized as a dichotomous variable representing a state's voting history in the last four presidential elections; states who were carried by a Democratic presidential candidate in three or more elections are assigned a "1"—all other states are assigned a "0". Border states—those who share a political boundary with a medical marijuana state—are assigned a "1" in the year following adoption by their neighbor and for every year after that; all other states receive a "0". Marijuana plant eradication data is collected from historical US

DEA figures; to normalize the data, this measure is operationalized as each state's percentage of the total cultivated plants eradicated by the agency.

Results

QCA Results

QCA results are presented below in their reduced form for specific combinations of voter initiative and state-level sociopolitical attributes (truth table located in Appendix B). Certain characteristics—historically—have lead to failure, success, and contradictory results. Unsuccessful results are presented first.

Unsuccessful Results (n=11):

$$(1) \quad \begin{aligned} s &= PIdcLMr \\ s &= pIdcLmr \end{aligned}$$

$$(2) \quad \begin{aligned} s &= pIDclMR \\ s &= PIDclMr \end{aligned}$$

$$(3) \quad \begin{aligned} s &= PIdClmr \\ s &= pidClmr \end{aligned}$$

$$(4) \quad s = PIdclmR$$

In the first group of unsuccessful results, it is apparent that any ballot measure attempting to legalize marijuana possession, consumption, or production for recreational use (*L*) has failed²⁰, regardless of all other attributes involved. In the second group, measures that mix decriminalization (*D*) or de-escalation of penalties for marijuana possession (*C*) with medical marijuana laws (*M*) have also failed, even in the presence of a Democratic majority and an innovative policy adoption history. The third group demonstrates that de-escalating penalties for marijuana crimes (*C*) are rarely successful at the ballot box; no voter initiative attempting to pass this type of legislation has succeeded

²⁰ November 2012 election results have altered this finding in a surprising way.

(though it has on a number of occasions in legislative assemblies). The fourth group (one case) was the result of Oregonians voting down medical marijuana dispensaries several years after the passage of their 1998 medical use provision; while it is only one case, it does suggest that proponents of dispensary systems should include them in initial medical marijuana measures to have a chance at success. Successful results are detailed next.

Successful Results (n=12):

- (1) $S = IdclM$
 $S = pdclMR$
 $S = PdclMr$

All of the successful combinations involve medical marijuana policies; some include dispensaries where patients can obtain the drug, while others do not. Innovative states and those with Democratic political orientations have experienced the most success in passing medical laws. However, even Republican dominated states have passed these laws (though only when dispensaries included). The key finding derived from these results is that medical laws have only been successful when they do not attempt to alter aspects of recreational marijuana prohibition.

Contradictory Results (n=10):

- (1) $S / s = IDclmr$
- (2) $S / s = pidclMr$

Two contradictory results emerge in this analysis: decriminalization measures in innovative states (*ID*) and medical marijuana laws (without dispensaries) in non-innovative, Republican dominated states (*piMr*). The first finding is similar to those noted in the unsuccessful ballot measures; it appears that altering the level of criminality associated with recreational marijuana use through popular referendum is a poor

approach that results in only occasional success. The second finding is that non-innovative, Republican dominated states have mixed success when dispensaries are not included in medical marijuana legislation—it appears that these states may require more assurance of bureaucratic control and oversight in the distribution of this substance before acquiescing to a new policy regime.

EHA Results

The estimated survival function for US states between 1996 and 2011 are presented in Table 2-3. As the table indicates, 2/3rds of states remain at risk for the adoption of medical marijuana laws by 2011. Without incorporating the effects of independent variables to determine specific state-level hazard rates, each of these states has the same likelihood (33%) of adopting a medical marijuana law in the next year.

Table 2-3. Cox Survivor Function Estimates for US States

Time	Beg.		Survivor Function	Survivor Error	Std. [95% Conf. Int.]	
	Total	Fail				
1996	51	1	0.9804	0.0194	0.8689	0.9972
1998	50	3	0.9216	0.0376	0.8044	0.9698
1999	47	1	0.9020	0.0416	0.7804	0.9580
2000	46	3	0.8431	0.0509	0.7107	0.9183
2004	43	2	0.8039	0.0556	0.6662	0.8893
2006	41	1	0.7843	0.0576	0.6445	0.8743
2007	40	1	0.7647	0.0594	0.6230	0.8589
2008	39	1	0.7451	0.0610	0.6019	0.8432
2010	38	3	0.6863	0.0650	0.5399	0.7946
2011	35	1	0.6667	0.0660	0.5198	0.7778

Table 2-4 identifies the estimated effect of each independent variable on the likelihood of a state adopting medical marijuana laws. In models 1, 2, 3, and 4, only Democratic political orientation proves statistically significant, though the models themselves are significant.

Table 2-4. Cox Proportional Hazard Regression Models

	1	2	3	4	5
Border	1.43	1.44	--	--	--
Population	.99	.99	.99	.99	.99*
PC Income	.99	.99	.99	.99	--
DEA Plants	1.31	--	--	--	--
White	.98	.98	.99	--	--
Education	1.08	1.08	1.07	1.06	--
Democrat	5.78*	5.77*	5.92*	6.49**	5.63**
Prob > chi2	.012	.006	.003	.001	.000

* = $p < .05$, ** = $p < .01$

The estimated direction of variables affecting medical marijuana law adoption is mostly as expected: border states are more likely to adopt similar policies as their neighbors, and states with high proportions of DEA-eradicated plants, more diverse populations, and higher education attainment are more likely to adopt medical marijuana laws—though the magnitude of these last two effects are negligible. The effect of per capita income is small as well, though it appears that the relationship is negative. In any event, the lack of statistical significance for all variables except political orientation is relatively striking. In model 5, which is restricted to population and political orientation, both variables are highly significant. The effect of population is insignificant. Democratic political orientation appears as the most prominent and consistent arbiter of medical marijuana policy adoption—in model 5, Democratic states are 4.5x more likely to adopt this type of policy than Republican states. Figure 2-4 and Table 2-5 present stratified survivor estimates based on political orientation. When controlling for political orientation, the likelihood of any one state adopting a medical marijuana law becomes much more clear. The chance of any Republican state adopting this type of policy in the next year is about 13.8%, while the rate for Democratic states is about 59%.

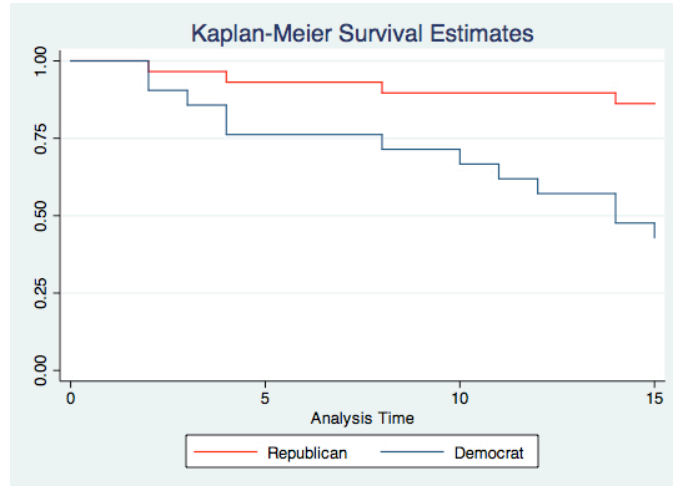


Figure 2-4. Kaplan-Meier Survival Estimates for Republican and Democratic States

Table 2-5. Survivor Functions for Republican and Democratic States

Time	Beg. Total	Fail	Survivor Function	Std. Error	[95% Conf. Int.]	
Republican States						
1998	29	1	0.9655	0.0339	0.7795	0.9951
2000	28	1	0.9310	0.0471	0.7514	0.9823
2004	27	1	0.8966	0.0566	0.7126	0.9654
2010	26	1	0.8621	0.0640	0.6731	0.9459
2011	25	0	0.8621	0.0640	0.6731	0.9459
Democratic States						
1996	22	1	0.9545	0.0444	0.7187	0.9935
1998	21	2	0.8636	0.0732	0.6344	0.9539
1999	19	1	0.8182	0.0822	0.5853	0.9276
2000	18	2	0.7273	0.0950	0.4910	0.8671
2004	16	1	0.6818	0.0993	0.4462	0.8338
2006	15	1	0.6364	0.1026	0.4029	0.7988
2007	14	1	0.5909	0.1048	0.3610	0.7621
2008	13	1	0.5455	0.1062	0.3207	0.7239
2010	12	2	0.4545	0.1062	0.2444	0.6433
2011	10	1	0.4091	0.1048	0.2085	0.6007

The difference between these two groups is pronounced, though it matches expectations about the palatability of marijuana in regards to specific political parties in the United States.

Discussion

The findings of this study suggest several new orientations on marijuana law enactment, while substantively confirming the importance of state-level Democratic political orientation as a consistent correlate with successful marijuana reform attempts. The QCA models demonstrate that single-issue ballot measures are necessary—regardless of the political orientation or historical policy innovativeness of a particular state—to have a chance of passing. Direct democracy efforts were—until the most recent election—also demonstrably ineffective tools for altering the criminality of recreational marijuana use. Medical marijuana voter initiatives appear to be the most consistently approved reform efforts, with relatively consistent success in Democratically controlled states and those with a history of policy innovation. In Republican dominated states, the passage of medical marijuana voter initiatives appears to hinge upon the inclusion of dispensaries—but their presence is not a sufficient attribute for success.

Three states—Colorado, Oregon, and Washington—voted on full marijuana legalization and two states voted on medical marijuana issues (Massachusetts and Arkansas) in November 2012. QCA modeling of the proposed initiative—which relies on historical patterns to determine necessary and sufficient causes of successful outcomes—concluded that none would pass in 2012. The successful outcomes in Washington and Colorado necessitate a revision to that model, though the largest criticism of the Oregon measure was its verbosity²¹. On the other hand, the QCA model successfully predicted the passage of Massachusetts’ medical marijuana law, and the subsequent defeat of the Arkansas measure.

²¹ <http://www.katu.com/politics/Ore-gambling-measures-loses-pot-measure-losing-177590511.html>

The EHA models suggest that several commonly cited state-level variables (bordering a state with medical laws, educational attainment, ethnic diversity, per capita income, and history of marijuana production) are not associated with the adoption of medical marijuana laws and have little effect on any particular state's hazard rate for adoption of these policies. Population, while significant, offers little explanatory or predictive power as well. Democratically dominated states are at much greater risk of passing medical marijuana laws, though only eight had not approved this type of policy change when the analysis was conducted. These states can be ranked in terms of their overall risk, though it is important to note that the independent variables in a multivariate context. That important caveat aside, the hazard risk order is: (1) Massachusetts, (2) Connecticut, (3) Maryland, (4) New York, (5) New Hampshire, (6) Pennsylvania, (7) Wisconsin, (8) Minnesota, and (9) Illinois. The first six states are most at risk due to their shared borders with other medical marijuana states. Following the election cycle of 2012, both Massachusetts and Connecticut legalized medical marijuana, which suggests that this approach has some explanatory validity. With such similar hazard rates, it would not be surprising if any of the remaining states were to adopt medical laws in the near future; if all seven were to do so and joined the other 18 states (and DC), over 51% of the US population would have access to medical marijuana in one form or another. For both prohibitionists and reformers alike, these states will be the key battlegrounds of marijuana policy for some time to come.

Which theoretical approach—pluralist or elite domination theory—best explains the rise of medical marijuana laws in the United States? Both theories contribute to our understanding of the phenomenon, but they also fail to capture important causal elements.

Small, uncoordinated grassroots organizations were responsible for placing the original medical use provisions on ballots in six states after local governments refused to take action on the issue (Ferraiolo 2007). In all six of those states, marijuana use for medical purposes was supported by a majority of adults²². Since then, the dominant method of passing these laws is through legislative action, and, as this study demonstrates, states with histories of policy innovation have led the way in this regard. In one sense, pluralist theory fails to account for the success or necessity of voter initiatives to pass these laws; contrarily, their subsequent legislative adoption suggests that political leaders are responding to the will of their constituents. The latter is debatable; of the six state legislatures (Illinois, Massachusetts, Missouri, New York, New Hampshire, and Pennsylvania)²³ considering such laws in 2012, only one was approved (Massachusetts). At the federal level, pluralist theoretical explanations are an incontrovertible failure, as over 70% of Americans support the legalization of marijuana for medical use (Gallup 2010) and the federal government has only become more recalcitrant in their enforcement of this prohibition as more states permit its use, production, and (in certain states) sales. Elite domination theory is not anymore coherent on the issue; however, its primary contribution is to provide a better understanding of the federal response to local decision-making. From this theoretical vantage point, maintaining prohibition is the current elite position; the mobilization of federal resources to combat marijuana producers in rogue states is an expression of their consensus and dominative power on the issue. On the other hand, the demonstrable lack of consensus among policy-planning organizations and

²² <http://www.mpp.org/assets/pdfs/library/State-Polling.pdf>

²³ <http://thinkprogress.org/justice/2012/06/13/498675/seven-more-states-may-legalize-medical-marijuana-in-2012/?mobile=nc>

the impossibility of controlling marijuana production/use in the US without exponentially increasing enforcement funding suggests that the elites are dominating this issue only as far as the law is concerned. The on-ground reality is obviously very different.

Conclusion

In this study, I inspected two interrelated components of policy diffusion amongst states to better understand the current trajectory of marijuana policy in the US. The findings suggest that Democratically dominated states are much more likely to pass marijuana reform laws, particularly those relating to medical marijuana access; additionally, I identified certain attributes of states and voter initiatives that lead to success and failure of direct democracy measures. Theoretical positions from pluralist and elite domination scholars were examined to identify possible causal routes of the medical marijuana movement, and a brief sketch of the two most important federal agencies involved in drug scheduling were offered. The evidence suggests that marijuana's classification as one of the US's most dangerous drugs is part of a larger battle amongst members of the intellectual class, who are attempting to maintain or expand their various forms of capital. Both theories contribute to our understanding of various marijuana legalization efforts, but effectively do so at different levels of analysis.

The federal prohibition of marijuana is in its 75th year, but a number of key political and judicial battles loom in the near future that may irreversibly alter the policy landscape regarding this drug. Public opinion polling has catalogued a rapid turn towards majority support for legalization (and overwhelming support for medical provisions), and has been confirmed by additional medical marijuana programs in new states and, for the first time in the history of this prohibition, two states legalized recreational use for adults

21 and over. For proponents and opponents of marijuana use alike (medical or otherwise), the findings presented in this study may offer insight into strategies for future ballot measures and identifies key medical marijuana battleground states. Marijuana will continue to be cantankerous political issue, deeply divided along partisan lines, but, for now, the tide appears to be turning.

CHAPTER III

PATCHES OF GREEN: EXPLAINING VARIATION IN MEDICAL CARDHOLDER RATES BETWEEN OREGON COUNTIES

Introduction

In November 1998, Oregon voters approved a ballot measure legalizing the cultivation, possession, and consumption of marijuana for qualified medical patients²⁴. Since its inception, the Oregon Medical Marijuana Program (OMMP) has experienced significant growth, starting with several hundred patients in 1998 and expanding to over 55,000 registered marijuana users today, of which over half grow their own supply of the drug²⁵. The explosive development of the program has surprised many, including legislators, law enforcement officials, and the state agency tasked with overseeing it. An interesting trend has emerged under this regime of rapid growth: despite relatively homogenous health statistics for the major afflictions covered under the OMMP, Oregon counties have widely divergent rates of participation in the program. As Figure 3-1 illustrates, the rate of cardholders in each county (relative to population) varies significantly. Using 2011 data to construct confidence intervals on cardholder rates leads to a data-driven tripartite division; 8 counties exceed the 95% confidence interval, 10 fall within it, and 18 fall below the 5% confidence interval. This division appears relatively consistent over time; data collection at the county level began in 2005, and since that time

²⁴ To qualify, patients must obtain a doctor's recommendation stating that marijuana may provide a benefit to them. Qualifying conditions include agitation related to Alzheimer's disease, cachexia, cancer, glaucoma, HIV or AIDS, nausea, severe pain, seizures, or persistent muscle spasms.

²⁵ Oregon Department of Human Services.

a small cadre of counties have consistently ranked ahead of their counterparts (Appendix 3-1 presents historical cardholder rates in Oregon counties).

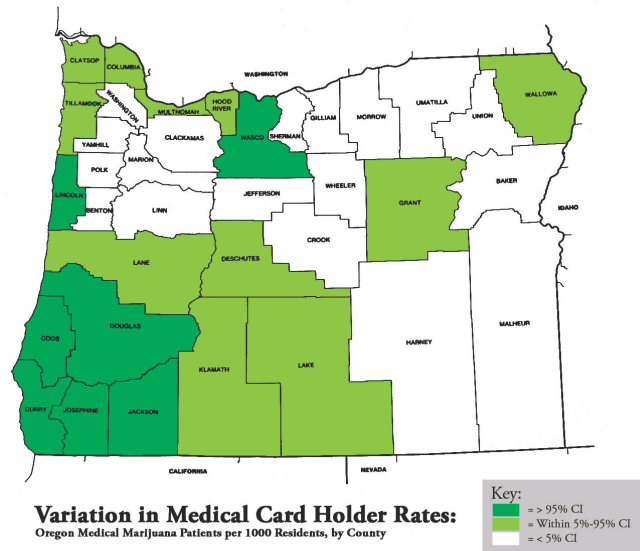


Figure 3-1. Oregon Cardholder Prevalence by County, 2011

Several southern Oregon counties (Josephine, Curry, Coos, and Douglas) emerge as the de facto flag-bearers for medical marijuana cards, while a handful of other counties (Tillamook, Lincoln, Jackson, and Wasco) also consistently score much higher than their counterparts. Looking at the most extreme example from recent data (see Appendix 3-1), top-ranked Josephine county has a cardholder rate more than 9x higher than last-ranked Umatilla county (34.98 patients / 1000 residents vs. 4.84 patients /1000 residents, respectively). Rates of cardholder growth in each county are also highly variable, though all counties in Oregon have experienced rapid expansion in the last few years, with an astonishing average growth rate of 41% between 2010 and 2011.

The startling differences in cardholder rates and the lack of any existing studies on medical marijuana prevalence drives the research question for this study: why do Oregon counties have such divergent rates of participation in the state medical marijuana program?

Literature Review

Who Uses Marijuana and Why?

Marijuana is the most widely used illicit drug in the United States, with 16.7 million US residents estimated to have used the drug in the last 30 days and 4 million using it 300 days per year or more (SAMSHA 2009: 13; 27). Males are nearly twice as likely to report using marijuana regularly as females, and individuals between the ages of 18 and 25 are the prime demographic group of consumers (21; 17). Despite the near-monopoly on use by young people, older adults are increasing their use of marijuana in the US as the baby-boomer generation ages (DeNitto and Chol 2011). With the exception of Asian Americans, non-whites are more likely to use marijuana than whites (SAMSHA 2009: 24). College graduates are less likely to be current users than those with lower educational attainment, though more likely to have tried marijuana (24). Additionally, individuals who are employed full time have lower rates of use than those who are either unemployed or working part time (25). Finally, rates of use increase monotonically with city/area of residence population size (26).

Investigations into the causal factors responsible for marijuana experimentation traditionally focused on attributes of individuals: i.e., “What characteristics predispose or otherwise condition people to use an illegal, psychoactive substance?” (Marcovitz and Meyers 1944; Gaskill 1945; Charen and Perelman 1946; Kaplan et al. 1986; Kandel 1986). More structural approaches have emerged in recent years, which attempt to chart the causal, explanatory power of a variety of social forces (family structure and attitudes, school characteristics, demographic attributes, city size, economic circumstances, etc.). Empirical studies of marijuana use are robust for adolescents (both initiating use and

continuing use), sparse for young adults, and relatively non-existent for those over 31 years of age. Since participation in the OMMP is almost uniformly reserved for individuals over the age of 18, a description of research on young adults and adults follows.

Young Adults

Mauss (1969) situates marijuana experimentation within the context of college preparation, arguing that many university-bound high school students begin use before matriculating to assist in the cultural assimilation process. Conversely, Brown (1974) finds that college students cease marijuana use following graduation, citing social pressures of work, family, and social integration as key causal factors. Yamaguchi and Kandel (1985) use cross-sectional event history analysis to demonstrate that marijuana use is negatively related to marriage and becoming a parent, yet positively related with separation/divorce. This research design was replicated and validated with longitudinal data by Yamaguchi (1997).

Jackson et al. (1986) rely on a survey of 15+ year olds to assess the validity of Differential Association (DA) theory, finding that individuals who excessively associate with “definitions favorable to crime and/or deviance tends to increase crime/deviance...but this effect is mainly indirect, through increasing motivation to engage in deviant acts” (335). Though the dependent variable in their study was a self-prediction of future deviant activity (with marijuana use included as one possible activity), the authors view these results as supporting a key tenet of DA theory—namely, that “association, through its effect on motive, consistently led to increases in self-predicted crime” (349).

Tittle et al. (1986), on the other hand, asserts that marijuana use does not follow the expectations of DA theory; rather, for marijuana smokers, they find that “(1) the reciprocal reinforcement between association and perceived acceptance of crime completely disappears; (2) association has a smaller positive effect on motive; and (3) tolerance increases perceived acceptance which, in turn, increases the motive to use marijuana” (423). These findings indicate that marijuana users move to this specific form of deviant behavior through two mechanisms: (1) “a weak and questionable immediate effect via motive” and (2) “a more indirect but more significant path in which association produces tolerance, which ultimately increases crime” (423).

Association, for both Jackson et al. (1986) and Tittle et al. (1986), is the key causal force predicting future use of marijuana for young adults; however, they differ in their explanations as to how association works—does it impact motive or produce tolerance, or both?

Adults

Research on adult marijuana use is largely restricted to substance abuse studies (see Stephens et al. 1993; McBride et al. 1994; Haney et al. 1999; Budney et al. 2001; McRae et al. 2003) or deleterious health effect examinations (such as Gong et al. 1987; Hall and Solowij 1999; Gruber and Yurgelun-Todd 2005). Ogborne et al. (2000) conducted a phone survey of Ontario, Canada residents to assess the prevalence of marijuana use (medical and recreational) among the adult population; their findings indicate that 8.7% of adults used marijuana in the previous year, with 1.9% of the users reporting that it was for various medical purposes. Age (18-25), gender (males), cigarette smoking, and heavy alcohol use were highly correlated with marijuana use.

Recent research indicates that marijuana use clusters together at multiple geographic scales (Ennett et al. 1997; Bobashev and Anthony 1998; Cerdá et al. 2012; Furr- Holden et al. 2011). This clustering phenomenon is present between states, within states, and neighborhoods. Cerdá et al. (2012) find that states with medical marijuana programs have higher rates of marijuana use than their non-medical counterparts. The causal implications of this finding are that states with higher rates of use are more likely to implement medical programs, rather than medical programs leading to higher rates of use (a point confirmed by Anderson et al. 2012). Bobasheve and Anthony (1998) identify clustering patterns of marijuana use in neighborhoods, though no causal mechanism for this phenomenon is presented. Similarly, Furr- Holden et al. (2011) employ a measure of “neighborhood disorder” (operationalized as the number of abandoned buildings within a city block) and find that it is highly correlated with marijuana use over time. Abandoned buildings, while not as robust an indicator as more comprehensive economic data, provide a starting point for examining structural differences that emerge within economically depressed communities. One can posit that other indicators, such as unemployment rates or the vitality of regionally specific economic activities, could be implemented as meaningful determinants of marijuana consumption. While such studies are useful in identifying users of *illegal* marijuana for recreational purposes and predicting future use by individuals, they do not address the quasi-legal consumption of medical marijuana, nor do they grapple with the additional qualification presented by the Oregon medical marijuana law allowing for personal production of the drug.

Medical Use

Reinarman et al. (2011) provides the lone scholarly attempt at identifying medical marijuana users. Using a sample of 1,746 patients from nine separate medical marijuana clinics in California, the authors find that Blacks and Native Americans use at higher rates than other ethnic groups, while Latinos and Asians have lower rates of use (Whites are near the average for all groups). Use is heaviest in the 25-44 year age range, and males made up 73% of the sample. Chronic pain suppression and improved sleep were the most commonly cited uses/benefits of marijuana reported by subjects (82.6% and 70.7%, respectively). Other conditions/uses of medical marijuana included relaxation (55%), muscle spasms (41%), headaches (41%), anxiety (38%), nausea (28%), and depression (26%).

Who Grows Marijuana and Why?

Due to the nearly worldwide prohibition and concomitant secrecy surrounding marijuana cultivation, few studies examine the demographic composition and rationales of growers. The application of criminologic theories to marijuana producers radically differs depending on the stated rationales of growers; after surveying Weisheit (1992) and Decorte's (2010) findings, the range of possible theoretical explanations is revisited.

Weisheit's (1992) qualitative study of arrested growers in Illinois offers the most detail and insight into this phenomenon, though it is limited by an admittedly small sample size and narrow geographic scope. Weisheit identified police cases involving the cultivation of 20 or more plants in Illinois ($n=74$) and attempted to interview the defendants; the growers interviewed ($n=31$) were overwhelmingly white, nearly all male, middle age (median: 38), simultaneously employed in other professions, often highly

educated, had not been arrested for other major crimes, and were long-term residents of their respective communities (159; 71-73). Building on the in-depth interviews, Weisheit constructs a typology of growers based on their stated rationales and the size of their growing operations (hustlers, pragmatists, and communal growers).

Hustlers are entrepreneurs involved in marijuana production “because it is a business challenge,” and are involved with large-scale, highly lucrative operations (as well as other legitimate businesses) (41). This type of grower acts as a coordinator of satellite employees, provides start-up money and plants, and, relying on connections with large dealers, serves as a purchasing agent for smaller growers; they are not involved in the day-to-day growing operations and are the most rare of cannabis producers (42). Due to the size of their operations, individual hustlers “may contribute significantly to the illicit marijuana trade” (75). As Weisheit notes, (between 1987 and 1989 in Illinois), criminal justice “cases involving 100 or more plants accounted for 15 percent of the cases but 92 percent of the plants” (76).

Pragmatists “enter the marijuana business out of economic necessity and approach the activity with no moral or philosophical righteousness” (43). As opposed to hustlers, pragmatists are not in the business to get rich; rather, they use marijuana production as a temporary means of survival. Some of the interviewed subjects who fell in this category were farmers (soybeans, corn, and wheat) who were attempting to mitigate the effects of depressed agricultural commodity prices (89). Additionally, this type of grower “demonstrate[s] that growing marijuana for profit requires no commitment to a drug lifestyle or even a ‘liberal’ or tolerant attitude toward drugs in general”; some do not use the drug and others are outspoken critics of its impact on society (45). The size of their

growing operations directly relate to their monetary needs, but are typically much smaller than the hustler's.

Communal growers “cultivate marijuana as part of a larger lifestyle,” which usually begins with regular cannabis use; they often graduate to growing “for their own consumption, either to defray the costs of their habit or as a hobby” (45). For these cultivators—who “probably represent the single largest category of growers”—marijuana production is variably regarded as a means of self-sufficiency, short-term economic stimulus, a “personal statement of independence or rebellion,” a way of validating self-worth, and a didactic opportunity to gain gardening/farming skills. Many of these growers are said to sell small amounts of marijuana, but also give it away to close friends; growing operations are typically small in size (45, 74). Where hustlers and pragmatists are profit-oriented (to varying degrees), the communal grower is driven by “the spiritual, the social, or the intrinsic rewards of growing” (88).

Spiritual rewards were those feelings of satisfaction expressed in almost transcendental terms. Social rewards included the pride that came from impressing fellow growers and users with a highly potent product or with a product with an unusual form of high. Finally, intrinsic rewards were the feelings of self-satisfaction that arose from the process of growing itself and were comparable to the feelings of many people who become deeply enmeshed in hobbies. The frequency with which growers reported feelings of pride and satisfaction from their operation suggested that understanding what motivates marijuana growers requires an appreciation of these intangible rewards (99-100).

In addition to revealing varying personal motivations of growers, Weisheit also finds distinct variations in marijuana garden seizures between regions within Illinois, with most occurring in the southern-most counties—despite the fact that northern counties are home to much of the agricultural production in the state. Furthermore, the number of garden seizures does not appear related to several commonly cited social and economic factors

(population density, percent below the poverty line, unemployment rate, crime rate, percent minority) (69). With these findings in mind, Weisheit states:

It is clear that whatever impact economic factors have is not direct. These economic and social factors may interact with other cultural features of these regions to shape the production of marijuana. Further study of these patterns may be useful in explaining patterns of marijuana growing in other states as well (69-70).

Though this information is quickly becoming historical (Weisheit's work is derived from research conducted in the late 1980s) and it focused on individuals growing 20 or more plants, more recent studies offer corroborating evidence.

Decorte (2010) implemented a web-based survey of cannabis cultivators in Belgium ($n=659$) and found similar results—though important differences emerged as well. Basic demographic information gathered on age (mean: 28.5), gender (88.5% male), marital or relationship status (77.5% unmarried, 66.5% in a “steady” relationship), and educational attainment (47.6% college graduates) indicate strong similarities to Weisheit's conclusions. On the other hand, the self-reported size of growing operations was much smaller (over 75% were growing 10 plants or less) and money was less of a motivating factor for growing (68% claimed to have never sold their marijuana). As Decorte notes,

On average, 67.2% of the cannabis harvested by our participants was intended for personal use, and another 22.8% was given away: mostly to friends (19.3%), and on occasion to acquaintances (2.4%), anyone who asks (0.4%), or for medical use (0.7%). Very little of the cannabis harvested by our respondents is sold (9.0%) to friends, acquaintances, or others (356).

Outdoor growing dominated the Illinois study, but only accounted for 53.2% of the Belgian grows (35.1% reported using artificial lighting in either greenhouses or indoor operations). This is not surprising given the shift from outdoor to indoor growing due to

stricter enforcement of marijuana prohibition in many industrialized countries and harsh crackdowns on large-scale international smuggling operations opening the door to high quality domestic cannabis production (Weisheit 2011). A final piece of relevant data gleaned from these surveys details the average weight obtained per marijuana plant harvested, with outdoor plants weighing in at 63.7 grams and indoor plants producing 48.8 grams.

The distinct rationales for growing proffered by marijuana producers suggests multiple theoretical explanations are necessary. Traditional theories of deviance (DA, social learning, labeling, and social control theories) are still applicable, but, to date, have not achieved significant descriptive power outside of users. More structurally oriented theories, such as social strain theory (Merton 1938), differential opportunity (Cloward and Ohlin 1960) and Marxist approaches to deviance (Spitzer 1975) appear most fertile for application to the subculture of deviant marijuana growers.

Merton (1938) assumes that deviant activity is generated from the tension of two social forces—cultural goals and institutional norms—acting upon individuals (673). Merton’s typology of individual orientations to cultural goals and institutional norms (see Figure 2) creates five groups: conformists and innovators (who accept dominant cultural goals), ritualists and retreatists (who reject dominant cultural goals), and rebels (developers of new goals and institutions). When an individual internalizes the dominant cultural goals of American society (material success), they either adhere to the institutionalized means of achieving “success,” or reject them in favor of illegitimate avenues (674). If someone rejects the dominant cultural goals, they either adhere to

institutional norms or reject them. The majority of society both accepts cultural goals and the institutional means to attain them.

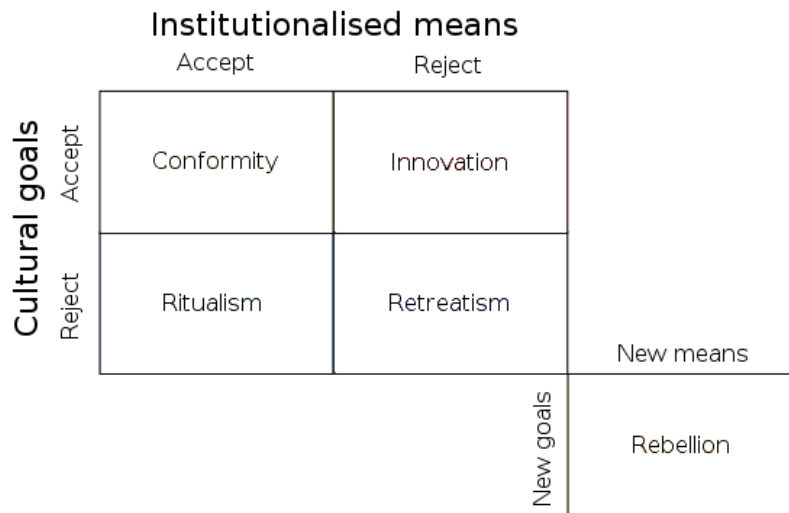


Figure 3-2. Merton’s Typology of Deviance

Growers who are predominantly profit seeking clearly fit as “innovators,” whereas those who operate with other goals in mind are not easily categorized. In Weisheit’s (1992) interviews, many growers indicated that marijuana either brought them extra money (since the majority were simultaneously employed in other professions) or offset the cost of buying on the black market (which seems to fit the innovative category); however, the largest group—communal growers—espoused a myriad of rationales for their activities. Where does marijuana cultivation as a political statement, validation of self-worth, didactic opportunity to learn farming skills, to provide for friends and family, or as spiritual practice fit in this typology? Knowing that many growers are educated, integrated in their communities, and legitimately employed in other professions (Weisheit 1992; Decorte 2010) also poses a significant analytical problem: are marijuana growers wholly defined by this particular act of deviance or can their aggregate constellation of social features allow them to be pot-producing conformists (Bourdieu 1984)?

Cloward and Olin (1960) expand strain theory by describing the role of differential opportunity structures available to individuals, positing that the specialized knowledge and social connections required to carry out particular illegitimate means is not equally accessed. This is particularly applicable to cannabis production, especially in the pre-internet days. Colloquially, the stories of retreatist hippies flocking to rural, west coast counties to “get back to the land” in the 1960s and 70s are well known (Schlosser 2003; Decorte 2011); areas of Northern California and Southern Oregon are widely cited by marijuana aficionados as “hot spots” of cultivation (King 2001). These areas are ideal cultural transmission centers, where specific knowledge of evading the law to carve out a living could be passed down from generation to generation, or to anyone else able to gain entry into the appropriate social circles. This type of hypothetical enculturation is very similar to the alcohol prohibition’s Appalachian moonshiners (Stewart 2011).

Spitzer’s (1975) Marxian approach to deviance illuminates some of the underlying paradoxes present in data collected about marijuana growers. Taking the monopoly stage of capitalism (Baran and Sweezy 1966) as the dominant historical condition shaping social relations, Spitzer argues that increasing competition amongst laborers (largely due to automation and other labor saving devices) and oligopolic market control by the largest firms has created persistent social turmoil in the form of class struggle. Large swaths of the laboring class are viewed by elites as problematic; Spitzer categorizes these groups as “social junk” (unneeded laborers with few marketable skills) and “social dynamite” (those critical of the capitalist system) (645). In the case of “social junk...controls are usually designed to regulate and contain rather than eliminate and

suppress the problem” (645). Social dynamite, on the other hand, pose significant risk when they:

“actively call into question established relationships, especially relations of production and domination. Generally, therefore, social dynamite tends to be more youthful, alienated and politically volatile. The control of social dynamite is usually premised on an assumption that the problem is acute in nature, requiring a rapid and focused expenditure of control resources. This is in contrast to the handling of social junk frequently based on a belief that the problem is chronic and best controlled through broad reactive, rather than intensive and selective measures. Correspondingly, social dynamite is normal processed through the legal system with its capacity for active intervention, while social junk is frequently (but not always) administered by the agencies and agents of the therapeutic and welfare state (646).

Data on marijuana producers suggests that many are educated, young, and male (Decorte 2010), and many espouse philosophical positions that are antagonistic towards capitalism and established political institutions (Weisheit 1992). The duality of many growers’ lives—both committing felonies and engaging in regular civic responsibilities—presents a problem for policy makers in the sense that these individuals are not actively challenging the underpinnings of capitalism (surplus accumulation), and, outside of large criminal enterprises, marijuana is not associated with significant levels of violence (Kepple 2012). Spitzer’s theoretical prescriptions for reigning in deviant behavior suggest that US policy makers can: (1) normalize the behavior (i.e. legalize marijuana production in some fashion), (2) convert marijuana growers into drug enforcement agents, (3) hope to contain growers by selectively enforcing the existing laws, or (4) surreptitiously support large criminal enterprises which undercut smaller growers’ usefulness (649).

Literature Conclusions

Geographically bounded pockets of marijuana users, such as those identified by this study within Oregon, are confirmed at several levels of analysis; however, no causal mechanisms for this unequal distribution are known, though social disorganization and economic malaise are suggested by other studies. Colleges and universities appear linked to higher rates of use because of the age and life-stage of attendees, and more accepting peer attitudes towards the drug. While no one has examined the political affiliations of users, attitudinal evidence suggests that Democrats have a more favorable view of the drug and areas with a higher prevalence of individuals from this party are likely to have higher rates of use.

Methods

I construct two classes of explanatory models using political, social, economic, and ecological variables at the county-level to disentangle the relationship between medical marijuana cardholder rates and the specified structural forces at work in Oregon. The first models are cross-sectional OLS regression analysis applied to 2008 data, while the second are Prais-Winsten panel-corrected standard errors time-series models (AR(1)) utilizing Feasible Generalized Least Squares (FGLS), applied to 2005-2011 data (Chatfield 2004). In all models, the dependent variable is “cardholder count,” which is operationalized as the number of registered medical marijuana patients in each county. Cardholder data for each county is derived from the Oregon Department of Human Services and covers 2005-2011, using published figures from January 1st of each year²⁶.

²⁶ Data for certain counties is excluded from public dissemination by ODHS due to patient confidentiality issues; any county with less than 50 registered medical marijuana patients in a particular year is treated as missing.

To maintain appropriate time-order, I then lag cardholder counts by one year, essentially using the January data as a cumulative indicator for the previous year (i.e. 2006 card rates are used as the dependent variable for year 2005); this is appropriate since the independent variables used in this analysis are derived from aggregated year-end data as well. Independent variable operationalization and data source explication follows.

Political

Public opinion polling consistently demonstrates that Democratic political party affiliation strongly correlates with positive views on marijuana legalization and medical marijuana applications, though this explanatory variable is heavily mediated by geography and time (the West is home to the highest support levels, while positive views of legalization has increased consistently in the last 30 years). While Oregon—like many states—has a significant rural/urban political divide, county-level cardholder rates appear to defy this traditional dichotomy; for example, the de facto leader in the county cardholder rate race—Josephine—is primarily rural, Republican, and heavily dependent upon resource extraction, yet it is home to a 3.6x higher rate of cardholders than the urban, Democratic, and multifaceted economy of Multnomah county. Additionally, county cardholder density appears unrelated to county-level voting on the original medical marijuana ballot initiative. These confounding inconsistencies aside, I hypothesize that Democratic party membership is positively related to cardholder rates in Oregon counties. I operationalize political party affiliation as the number individuals registered with the Democratic party in each county. Voter registration data from January 2005-January 2011 is derived from the Oregon Secretary of State publications (Elections Division 2011).

Social

On its face, the primary differences between previous studies of marijuana use and this project stems from the legality of cannabis consumption and the unit of analysis. While many of the commonly cited social variables undoubtedly help to explain why individuals participate in the OMMP, they are not amenable to higher levels of analysis. Additionally, the basic requirement for obtaining a medical marijuana card in Oregon is medical necessity—cardholders must demonstrate that they suffer from one of the included conditions and receive a recommendation from a licensed doctor indicating that marijuana may be beneficial to them. Unfortunately, county-level epidemiological data on qualifying conditions does not exist; this is unfortunate, as current figures on the conditions reported by participants in the OMMP program suggest that the overwhelming majority suffer from “severe pain,” and Hoffman et al. (2002) identify a discrepancy in chronic pain incidence between urban and rural residents. Consequently, the most appropriate social variable—affliction prevalence—is not used in this study.

Following findings of related literature, social variables include county-level population (obtained from the Population Research Center at Portland State University), land area (reported in the Oregon Blue Book (2010)), the presence of a state university within the county (operationalized as a dichotomous measure), and the presence of a Metropolitan Statistical Area (MSA) in the county (also operationalized as a dichotomous measure—MSA data obtained from the US Census Bureau’s 2010 census). Additionally, educational attainment, operationalized as the percent of county residents holding a bachelor’s degree or higher (derived from US Census Bureau data).

Economic

Due to its prohibition in the United States, marijuana commands a high price relative to many other agricultural commodities. Prices range from \$1800 to \$7000 per pound, depending on where and in what quantity the marijuana is sold (DEA 2005). In addition to providing in-state legal protection for authorized consumption of marijuana, the Oregon Medical Marijuana Act licenses individuals or their registered growers to produce cannabis. While the scale of allowed production is small, a registered cardholder could, depending on their horticultural skills, illegally sell their produced marijuana for a small profit.

This economic reality is the basis for claims by law enforcement officials in Oregon (Fattig 2010) that the medical marijuana program simply serves as a legal shield for profit-oriented cultivators—or “pragmatists,” following Weisheit’s (1992) typology. If this is the case, it is reasonable to expect that certain economic indicators-- unemployment counts and rates are used in this study—within a county should be positively related with cardholder rates. Contrarily, Weisheit (1992) and Decorte (2010) both found that the majority of the growers interviewed were simultaneously employed in another occupation while producing cannabis; however, the current economic contraction in Oregon has produced both higher jobless rates and fewer hours worked by those with jobs (US Bureau of Labor Statistics 2010). For both pragmatists and communal growers, marijuana production is regarded as an economic buoy to maintain an accustomed standard of living. While incorporating the number of hours worked by those employed would be a sensible strategy, county-level data on this measure does not exist. Instead, I use unemployment figures (counts of unemployed workers in each county) for January

2005-January 2011 (unadjusted), obtained from the Oregon Labor Market Information System, as an independent variable in both regression models.

Keeping with previous research on the positive relationship between marijuana consumption and economic malaise in a region, I also examine timber harvests in Oregon. Timber harvests were a harbinger of economic health in Oregon for the better part of a century; recently, more efficient mills—combined with lower timber harvests and loosened international trade regulations—have decimated forest products employment in the state. Foster (2002: 121) provides the definitive summary of the political economy of northwest timber production in recent years:

In the 1980s, forest product workers in the Northwest were hit by a process of industrial restructuring that seriously undermined their economic positions and their capacity to engage in effective class struggles. These included: (1) a drastic drop in housing starts; (2) increased exports of unprocessed logs coupled with rising excess capacity in Northwest mills; (3) a vastly stepped-up rate of imports of lumber from Canada (which had the effect of creating deep fissures between Canadian and U.S. workers within the International Woodworkers of America); (4) rapid declines in employment due to mechanization; (5) wage competition from Southern wood workers (who earned almost \$3 an hour less on average in 1986 than their Northwest counterparts); and (6) a general shift of the industry from the Northwest to the Southeast, where faster growing pine plantations and right to work laws provide a greater ‘comparative advantage’ in timber production. Of all of these factors affecting Northwest timber employment, automation has been the most important. In 1987 it took only eight workers to process one million board feet of timber, compared to ten workers a decade earlier. In 1976, a total of 15 bbf of timber was harvested from all sources in Oregon and Washington, giving employment to 150,900 workers in the lumber and wood products and paper and allied products industries. In 1989, the same total harvest level employed 135,700 or about 10 percent fewer workers. In Oregon, the state with the largest old-growth forests, employment in the lumber and wood products industries declined by 21.9 percent between 1978 and 1990, with 71 percent of this decline occurring between 1978 and 1988, before the northern spotted owl became a major issue.

The debate on appropriate timber harvest levels, forest products employment issues, species protection, and ecosystem preservation still rages in Oregon, though, as Foster illustrates, the debate needs to be reframed from the oft-cited industry vs. environmentalist dichotomy to one of capitalist vs. laborers—and must consider the role of efficiency advances as well. Due to the major economic role of forest products in many Oregon counties, I include the total timber harvest data (2005-2011, in millions of board feet) for each county (an aggregation of harvests from private industry land, other private lands, Native American, State, BLM, Forest Service, and other public lands, measured in thousands of board feet)—this data is derived from Oregon Department of Forestry publications.

Ecological

Cannabis indica is day-length sensitive annual that matures in Oregon between September-November. It thrives in a warm climate (70F-90F), low relative humidity (40%-60%), minimal variation in day/night temperatures (+/- 10F), and rich, well-drained soil (Hillig 2005; Cervantes 2006). While most locations in Oregon are suitable for marijuana cultivation, certain areas offer distinct advantages. Southwestern Oregon, the Willamette Valley, and areas along the Columbia River Gorge have long, predictable growing seasons coupled with relatively dry summers—though cannabis production has some agriculturally unique considerations to account for.

Due to prohibition and aggressive eradication efforts by government agencies (federal, state, and local) in the 1980s, many growers turned to indoor cultivation. To facilitate this dramatic change in environment, marijuana growers/breeders introduced broad leaf *cannabis indica* into the long-flowering, narrow leaf *cannabis indica* gene

pool; the result is a faster and denser flowering plant that remains relatively short in stature (Clarke 1993). However, this creative breeding strategy fomented a number of unforeseen latent consequences. Shorter internodal distances between branches provide a fertile breeding ground for voracious spider mite colonies. Denser flower clusters make plants more susceptible to a number of pathogens (*botrytis* and powdery mildew), particularly in late flower stages. The quick-maturation genes make many modern cannabis cultivars extremely sensitive to changes in day-length and prone to inopportune early flowering²⁷ (Cervantes 2006).

In Oregon, the main determining factors in successful outdoor marijuana production is prolific sunlight, appropriate temperatures, and minimal late season rainfall. In agricultural research, growing degree-day figures—a measure of temperature degrees above the minimum and below the maximum for a specific crop over time—are often employed as composite measures for sunlight and temperature. In this study, I operationalize a degree-day measure using *cannabis*-specific thresholds (50F minimum, 100F maximum) over the normal outdoor growing season (April 1st-October 31st) in each county (Clarke 1993). Degree-day data is derived from meteorological station readings throughout Oregon, and aggregated by the Oregon State University Climate Research Service; stations were selected based on their proximity to population centers within respective counties and, in several instances, more remote stations are utilized due to data gaps in the primary climate station data. Though this form of ecological measurement is only applicable to outdoor marijuana cultivation, I expect a positive

²⁷ Early flowering is generally viewed as a benefit, as it leads to quicker harvests; however, light-cycle sensitivity can trigger premature early-season flowering that dramatically reduces the quality and quantity of yields.

relationship between cumulative degree-days and cardholder rates. Inclusion of late-season rainfall data was attempted, but not included due to serious gaps in weather station data for the years included in this study.

Results

To test the hypotheses proposed above, I construct two classes of regression models: (1) cross-sectional OLS regression models using 2008 data, and (2) Prais-Winsten time-series models with 2005-2011 data. Primary results are presented in Tables 3-1 and 3-2. The cross-sectional models appear in Table 3-1.

Table 3-1. Cross-Sectional (2008) OLS Regression Models (Std. Error)

DV: Cardholders	Model 1 (N = 27)	Model 2 (N = 27)	Model 3 (N = 27)	Model 4 (N = 27)
Unemployment	-.01 (.02)	-.03* (.01)	-.03** (.01)	-.05*** (.01)
Timber Harvests	1.23 (.59)	.99 (.49)	.84 (.46)	---
Degree Days	.16 (.10)	.15 (.09)	.14 (.09)	---
Democrat	-.06 (.10)	-.14* (.06)	-.16** (.05)	-.16** (.05)
Land Area	-.02 (.04)	-.02 (.03)	---	---
State University	233.72 (189.15)	---	---	---
MSA	65.56 (207.62)	---	---	---
Education	-24.8 (17.62)	-5.93 (8.01)	---	---
Self Employment	69.07 (32.84)	51 (28.8)	39.28 (25.12)	---
2008 Obama Vote	9.29 (13.34)	---	---	---
Poverty	32.10 (28.14)	18.77 (22.41)	---	--
Population	.006 (.004)	.01*** (.00)	.01*** (.00)	.01*** (.00)
Constant	-1865	-1232	-890	90
Adj. R ²	.86	.87	.88	.87

* = $p < .05$, ** = $p < .01$, *** = $p < .001$

In model 1, a wide variety of theoretically appropriate independent variables are included, but no statistically significant findings are present. The direction of

relationship between several variables of interest are as hypothesized; degree days, presence of a state university and a metropolitan statistical area, carrying President Obama in the 2008 election, poverty rates, self-employment rates, and population are all positively related with county cardholder counts. Most variables with negative coefficients, however, undermine several key hypotheses: unemployment, Democratic party affiliation, and land area have a negative impact on cardholder counts within Oregon counties. Education attainment, as predicted, is negatively related as well. Timber harvests—which were hypothesized to be negatively related—are, instead, positively related to cardholder counts. Standard errors for four variables (state university presence, metropolitan statistical area presence, voting for Obama, and poverty rates) are problematically large, so they are dropped in later iterations of the regression model. Model 2 provides several statistically significant findings that hold in Models 3 and 4, but the magnitude of effect is relatively limited. Unemployment, Democratic party affiliation, and total population are significant at the .01 level. Specifically, cardholder counts in each county: (1) decline by .03-.05 with each unemployed person; (2) decline by .16 with each registered Democrat; and (3) increase .01 with each person. All of the cross-sectional models possess strong explanatory power (Adj. R^2 range .86-.88), likely due to the strong relationship between population and cardholder counts (which accounts for 74% of the variation about the mean on its own).

Time-series findings (Table 3-2) indicate that changes in timber harvests, number of registered Democrats, and population are statistically significant correlates with changes in medical marijuana cardholder counts in counties across Oregon. The direction of relationship for counts of registered Democrat, presence of a state university,

presence of a metropolitan statistical area, timber harvests, and unemployment run counter to the proposed hypotheses. Degree days, land area, and population are positively related (as expected); however, neither of the first two factors appear significant in this analysis.

Table 3-2. Prais-Winsten PCSE Regression Models, 2005-11

DV:	1 (N = 156)	2 (N = 156)	3 (N = 192)
Cardholders			
Unemployment Rate	63.90*** (11.22)	60.75*** (9.90)	78.91* (33.81)
Timber Harvests	1.11*** (.15)	1.08*** (.14)	.99*** (.19)
Degree Days	.18** (.06)	.17* (.07)	---
Democrat	-.18*** (.03)	-.18*** (.02)	-.18* (.08)
Land Area	-.01 (.01)	---	---
State University	103.44 (62.17)	---	---
MSA	78.14* (39.34)	---	---
Population	.003*** (.00)	.007*** (.00)	.008*** (.00)
Constant	-923.19 (228.85)	-870.59 (206.36)	-695.99 (355.29)
Adj. R ²	.77	.77	.66

* = $p < .05$, ** = $p < .01$, *** = $p < .001$

In all three models, changes in the unemployment rate, timber harvest levels, and population are positively related with changes in medical marijuana cardholder rates, while changes in the count of Democratic party members is negatively related. Overall, each 1% increase in a county's rate of unemployment coincides with an increase of 60-79 cardholders. Timber harvest coefficients suggest that an additional .99 to 1.11 million board feet harvested is associated with 1 additional cardholder in any Oregon county. Similarly, model 3 indicates that a county will lose approximately 1 cardholder for every 5 people registered with the Democratic party. Finally, model 3 predicts that 1

cardholder will be added to the rolls for every 125 people present in a county. While not as robust as the cross-sectional models, Adj. R² values suggest that approximately 66%-77% of the variation about the mean is captured by these explanatory variables.

Examining individual counties provides a more specific lens to examine the relationship between several key variables, particularly timber harvest levels, unemployment rates, and population. This set of individual, county-level time-series model results provide the most interesting findings, in that they isolate specific counties where unemployment rates and timber harvest levels explain significant variation in cardholder rates. The most common result is a positive relationship between unemployment rates and cardholder counts, and a negative relationship between timber harvest levels and cardholder rates, though county-level coefficients vary amongst counties with statistically significant findings for both variables (Table 3-3).

Table 3-3. County-Specific Prais-Winsten Time-Series Models

County DV = Cardholders	<i>n</i>	Unemployment Rate	Timber Harvests	Population	Constant	Adj. R ²	DWS (t)
Baker	5	-4.12 (26.22)	-5.14 (14.99)	.04 (3.72)	-614	.83	2.33
Benton	5	20.15 (12.40)	-2.55* (.80)	-.01 (.01)	1122	.96	2.12
Clackamas	6	80.89* (8.73)	-13.51** (1.23)	-.00 (.00)	4496	.99	2.49
Clatsop	7	8.32 (5.12)	-.39* (.09)	.08* (.01)	-2828	.97	2.63
Columbia	7	17.11 (6.09)	-1.67* (.43)	.03 (.02)	-1023	.95	1.88
Coos	7	-12.94 (7.48)	-2.43 (.22)	-.43 (.07)	28486	.99	1.59
Crook	0	---	---	---	---	---	---
Curry	7	-4.64 (5.20)	-2.14* (.51)	-.13 (.07)	3405	.95	2.40
Deschutes	7	31.88 (21.85)	-23.12 (9.63)	.01 (.00)	-2092	.96	2.75
Douglas	7	40.63* (7.38)	-1.28** (.19)	-.06 (.02)	7845	.99	2.34

Gilliam	0	---	---	---	---	---	---
Grant	0	---	---	---	---	---	---
Harney	0	---	---	---	---	---	---
Hood River	7	5.67 (6.34)	-.76 (1.28)	.12* (.02)	-2684	.97	2.18
Jackson	6	196.18*** (6.44)	-41.72*** (1.01)	-.03* (.00)	10405	.99	2.88
Jefferson	0	---	---	---	---	---	---
Josephine	7	200.40* (55.35)	-78.31 (28.16)	-.67 (.30)	56300	.89	2.25
Klamath	7	42.81 (30.58)	-3.99 (2.52)	-.33 (.38)	22589	.42	1.28
Lake	---	---	---	---	---	---	---
Lane	7	155.05* (46.99)	-3.81 (1.37)	-.00 (.04)	5020	.96	2.22
Lincoln	7	7.12 (12.28)	-1.69* (.54)	.05 (.21)	-1792	.95	2.17
Linn	6	20.23* (3.35)	-1.69** (.15)	.03* (.00)	-2768	.99	3.52
Malheur	0	---	---	---	---	---	---
Marion	7	39.54 (55.52)	-5.38 (5.93)	.02 (.03)	-7458	.56	1.19
Morrow	0	---	---	---	---	---	---
Multnomah	7	134.24 (181.42)	-63.47 (55.94)	.07 (.03)	-53933	.72	1.42
Polk	7	13.05 (5.16)	-1.90* (.34)	-.01 (.01)	1469	.98	1.87
Sherman	0	---	---	---	---	---	---
Tillamook	7	13.09*** (.85)	-.41** (.05)	.01 (.00)	-33	.99	2.20
Umatilla	6	1.93 (6.05)	-2.80 (.98)	.33* (.06)	-23699	.98	3.19
Union	7	1.38 (.48)	-1.67*** (.08)	.03* (.00)	-561	.99	1.61
Wallowa	0	---	---	---	---	---	---
Wasco	7	17.29** (2.26)	-1.93* (.49)	.47** (.05)	-11444	.99	3.05
Washington	7	164.81 (55.43)	-9.66 (4.02)	-.01 (.01)	6918	.94	1.93
Wheeler	0	---	---	---	---	---	---
Yamhill	7	16.29 (9.02)	-1.84* (.55)	.03 (.01)	-2640	.92	1.63

* = $p < .05$, ** = $p < .01$, *** = $p < .001$

This particular modeling approach is effective at contextualizing the role of unemployment rates and timber harvests in counties with higher than average cardholder figures, but is problematic when applied to others. The emerging picture among high cardholder counties is that cardholder counts rise with the unemployment rate, while timber harvests have a negative effect on cardholder counts. The available data does not allow for an inference of the cause of this relationship; however, it does present an interesting point for researchers and policy makers to ponder, suggesting that marijuana could serve as an economic buoy to counties that are historically timber-dependent.

Discussion

This analysis demonstrates that many commonly cited predictor variables for marijuana use do not correlate with medical marijuana cardholder counts, nor do the proposed ecological measures. In the aggregated cross-sectional and time-series models, Democratic party registrants appear to pull down cardholder counts, while increases in timber harvests and unemployment rates are associated with higher cardholder numbers. Political party orientation could be an appropriate predictor of individual attitudes and beliefs (i.e. support for medical marijuana or participation in the program), but, as an aggregated variable at a higher level of analysis, it has the opposite effect as hypothesized. The strong association between unemployment rates and cardholder counts suggests that marijuana production could serve as an alternative source of income for the economically displaced—this is particularly true in high cardholder rate counties. When counties are separated (individual county time-series models), a slightly different view is offered: high cardholder counties—who were the traditional powerhouses of timber production in the state—have a negative relationship between timber harvests and

cardholders. Unfortunately, the results of these regression models—cross-sectional and time-series—offer conflicting accounts of the differences between cardholder rates among Oregon counties. It appears, at least in the case of medical marijuana use and production, a new theoretical framework is necessary to explain the variations in participation between regions.

While this study successfully isolates explanatory forces at work in counties with high rates of cardholders, it is not able to identify the factor(s) responsible for creating the significant variation between counties. Other explanatory variables suggested by reviewers—particularly baby-boomers’ percentage of the population and the number of Vietnam War veterans in a county—were modeled, but did not provide any elucidating findings. It appears likely that there is a cultural difference at play between these counties that cannot be captured through statistical analysis. There is a strong history of marijuana cultivation in southern Oregon (and northern California) dating back to the early 1970s (King 2001). This cultural proclivity towards cannabis cultivation—legally sanctioned or otherwise—probably outweighs any of the other commonly cited variables—though they are probably working in tandem. When economic uncertainty is on the rise, a certain set of people who have been exposed through their parents or community to this alternative means of subsistence react by participating in marijuana cultivation. Additionally, individuals may be more amenable to this lifestyle if they know others involved in it; this phenomenon can best be described as the normalization of behavior considered deviant in other parts of the state. Regardless, it appears that the surge in medical marijuana cardholders in particular regions of the state is driven—at

least in part—by economic necessity (unemployment) and shifting production forces (timber harvests).

If economic necessity were truly driving the surge in medical marijuana cardholder rates, these findings would support the claims of law enforcement officials in the state who believe that some medical marijuana patients are using the law to illegally profit from the sale of legally grown marijuana. The extent of this phenomenon, however, is unknown—and we can do no more than speculate at this point. Findings by researchers on non-medical marijuana growing (Weisheit 1992; DeCorte 2010) indicate that those who grow for profit are usually simultaneously engaged in other, legal occupations. This suggests that for-profit growing often provides supplemental income rather than a livelihood. DeCorte’s (2010) presentation of self-reported production amounts by growers in Europe lends credibility to this argument as well, while offering a baseline estimate of the potential financial returns for growers. If we assume DeCorte’s data is correct and applicable to Oregon, the average grower produces 49 grams per indoor plant and 64 grams per outdoor plant, with three indoor harvests and one outdoor harvest per year (Cervantes 2006), which would yield ~1,266 grams (or 44.5 ounces) of useable cannabis each year for the average Oregon medical marijuana grower. Prices per ounce vary by quality of product, geographic location, quantity of total amount bought/sold, and demand constraints and, historically, any attempt to quantify them are rife with controversy (Clements and Zhao 2009). The most recent average prices reported by the US DEA for Oregon is \$300 per ounce (personal communication, National Drug Intelligence Center). At this price, the average grower could yield an annual *gross* income of \$13,350 from illicit marijuana sales, assuming that all marijuana

produced was destined for the black market. With Oregon's median household income standing at \$48,325 in 2010 (as reported by the US Census Bureau), the potential gross income increase from illicit marijuana sales seems to fit with previous findings: if illegal sales are happening, they are most likely supplemental to other sources of legitimate income.

Since this study's findings suggest that medical marijuana could be grown and/or sold to supplement certain households' incomes within the state, it may be appropriate for the state of Oregon to investigate a system of licensure and regulation regarding cannabis sales for medical use. Under the Oregon Medical Marijuana law, sales are not permitted in any circumstance—even to fellow medical patients. If regulators could arrive at an equitable and enforceable policy framework for the legal sale and distribution of medical marijuana, it may be possible to stunt sales of medical marijuana for non-medical use, while also creating a significant revenue stream for the state.

Conclusion

Though this analysis provides clear findings regarding the relationship between several variables and medical marijuana cardholder rates in key Oregon counties, the results also suggest that there is something else afoot within the state—possibly driven by cultural differences. Oregon, like many states, is often bifurcated by researchers under a traditional rural/urban dichotomy; however, this study highlights a particular facet of social mores, which may transcend this oft-cited analytical strategy. This area of research may benefit from comparative in-depth qualitative interviews or some form of purposeful sampling followed by a survey, which contrasts the cultural conditions in place in counties with high rates of cardholders with those of counties with lower rates.

Additionally, it suggests that Oregon policy makers may need to take a closer look at the regulatory environment currently in place for medical marijuana—particularly at a time when few government programs have successfully created jobs or generated much needed tax revenue.

Finally, with the rapid expansion of state-level medical marijuana programs across the US, more research and investigation into this phenomenon is necessary. The discrepancies in cardholder counts between counties may be attributable to other factors, such as early adoption

CHAPTER IV

REVISITING THE OUTSIDERS: INNOVATIVE RECRUITMENT OF MARIJUANA USERS USING WEB-BASED RESPONDENT DRIVEN SAMPLING

Introduction

Aside from using marijuana, are there any substantial differences between regular marijuana users and the general population? Does the composition of marijuana users' friendship networks affect their use of the drug? What do these friendship networks suggest about relations with non-users? Are there any differences between illegal marijuana users and licensed medical marijuana users? Finally, can individual-level factors explain the varying rates of medical marijuana patient participation between geographic areas? This study addresses these questions using a survey of marijuana users in Oregon—a location ripe for investigation along these lines. Oregon has one of the highest rates of marijuana use in the US, with the most recent estimate indicating that 14.09% of individuals over 12 years old have used marijuana in the last year (compared to the US average of 10.2%) (SAMHSA 2009). Oregon is also home to one of the oldest medical marijuana programs in the US, established in 1998, just two years after the first was created in California, and publishes county-level counts of medical users dating back to 2005. Oregon consistently ranks in the top ten states for plants seized by the Drug Enforcement Administration, with estimates of production valued at \$473 million in 2005, making it the state's largest agricultural commodity (Gettman 2006). Even with a firmly entrenched federal prohibition on marijuana, there is a strong possibility that Oregon's quasi-legalization (through its medical program) makes the likelihood of more candid responses from respondents possible.

The sample for this study is gathered using a Respondent-Driven Sample (RDS) procedure (Heckathorn 1997). After assembling the sample, respondents answered questions relating to their social characteristics, health concerns/problems, political ideology, drug abuse potential, and their community's acceptance of marijuana use. In this study, I provide an overview of pertinent literature and theoretical expectations, outline the methods used to assemble the sample and analyze collected data, discuss the findings, and describe possible future research directions.

Marijuana Users

Marijuana is the most widely used illicit drug in the United States, with 16.7 million US residents estimated to have used the drug in the last 30 days and 4 million using it 300 days per year or more (SAMSHA 2009: 13; 27). Males are nearly twice as likely to report using marijuana regularly as females, and individuals between the ages of 18 and 25 are the prime demographic group of consumers (21; 17). Despite the near-monopoly on use by young people, older adults are increasing their use of marijuana in the US as the baby-boomer generation ages (DeNitto and Chol 2011). With the exception of Asian Americans, non-whites are more likely to use marijuana than whites (SAMSHA 2009: 24). College graduates are less likely to be current users than those with lower educational attainment, though more likely to have tried marijuana (24). Additionally, individuals who are employed full time have lower rates of use than those who are either unemployed or working part time (25). Finally, rates of use increase monotonically with city/area of residence size (26).

Theoretical Overview

Becker originally detailed the cultural assimilation process that must occur for individuals to become initiates of a marijuana user community (1953; 1963). Potential community members must first learn how to properly consume marijuana, learn to perceive its effects, and, finally, learn to enjoy the effects. Once a user moves to this third stage, they have the potential to continue use—though this possibility is mediated by a number of social control mechanisms. These mechanisms include: “(a) control through limiting of supply and access to the drug; (b) control through the necessity of keeping nonusers from discovering that one is a user; (c) control through definition of the act as immoral” (61). Due to its illegality, an individual must have connections to elements of society where marijuana is readily available. At first, this means simply using with others who have access; however, as a person progresses into a “more regular and systematized mode of use, he can do it only by finding a more stable source of supply than more-or-less chance encounters with other users, and this means establishing connections with persons who make a business of dealing in narcotics” (63-64). The veil of secrecy surrounding one’s marijuana use is important to ward off “repudiation by people whose respect and acceptance he requires both practically and emotionally” (66-67). To combat the dominant meme that marijuana users are immoral (unable to be responsible for their own welfare or rationally mediate their behavior, particularly relating to impulse control around use), frequent users must acquire a “more emancipated view of the moral standards implicit in the usual characterization of the drug user” (73). This is generally accomplished by acquiring “a series of rationalizations and justification with which he may answer objections to occasional use,” such as comparing the activity

to more harmful, socially accepted behaviors (alcohol and nicotine use) or generating positive narratives about the drug's effects (74).

The core of labeling theory (Becker 1963) revolves around the differentiation between primary and secondary deviance; primary deviance is an initial deviant act by an individual (whether intentional or unintentional) that is observed by someone else with the power to castigate or rebuke. Once this primary act is observed, the deviant label can be applied to the offending individual; the likelihood of the label becoming affixed to an individual is influenced by their position within society (more powerful people have less chance of receiving the formal label). Secondary deviance refers to any action that results from someone being labeled "deviant"; once labeled, individuals may have a propensity towards further deviant behavior or will have their opportunities limited to participating in deviant groups. Under this framework, the application of rules, mores, and norms are not viewed as occurring in a vacuum; "moral entrepreneurs" actively pursue agendas to outlaw specific activities that they deem inappropriate or deleterious to society (1963: 152). Once enacted, the laws are upheld by "rule enforcers" (usually law enforcement officers), who face the dual problem of demonstrating their proficiency at stomping out acts of deviance and pointing to the deviant acts as a continuing scourge (which is particularly apparent in the marijuana realm).

Sutherland's differential association theory (DA) (Sutherland and Cressey 1974) posits a bifurcation in society between criminal and non-criminal activities, and attributes the engagement of individuals in criminal behavior to socialization processes occurring in close relationships. DA began with nine propositions explaining the process of learning and committing criminal/deviant behavior (Sutherland and Cressey 1974):

is due, in large part, to the history of funding by federal agencies (National Institute on Drug Abuse, National Institutes of Health, and Substance Abuse and Mental Health Services in particular), which tend to direct research dollars towards adolescent drug use prevention strategies and studies, and, if adult research is funded, is focused on substance abusers (with anyone using marijuana receiving that label).

Social learning theory (Burgess and Akers 1966; Akers et al. 1968; Akers 1973) offers a reformulation of DA theory; Akers et al. (1979) propose the following pattern of social processes leading to (or away from) deviant behavior:

The primary learning mechanism in social behavior is operant (instrumental) conditioning in which behavior is shaped by stimuli which follow, or are consequences of the behavior. Social behavior is acquired both through direct conditioning and through *imitation* or modeling of others' behavior. Behavior is strengthened through reward (positive reinforcement) and avoidance of punishment (negative reinforcement) or weakened by aversive stimuli (positive punishment) and loss of reward (negative punishment). Whether deviant or conforming behavior is acquired and persists depends on past and present rewards or punishments for the behavior and the rewards and punishments attached to alternative behavior—*differential reinforcement*. In addition, people learn in interaction with significant groups in their lives evaluative *definitions* (norms, attitudes, orientations) of the behavior as good or bad. These definitions are themselves verbal and cognitive behavior which can be directly reinforced and also act as cue (discriminative) stimuli for other behavior. The more individuals define the behavior as good (positive definition) or at least justified (neutralizing definition) rather than as undesirable (negative definition), the more likely they are to engage in it (637-8).

Reinforcers of behavior are most often important groups—peer-friendship groups, schools, parents, and churches—but also include nonsocial aspects, such as physical reactions to ingested drugs. In simple terms, a person associates with peers who engage in deviant behavior, learns to define the behavior favorably, then engages in the behavior. Maintaining deviant behavior is often only possible when an individual, on

balance, receives more confirmatory messages than approbation regarding the specific act. In the case of drug use, Akers et al. (1979) specifically state that:

After the initial use, imitation becomes less important while the effects of definitions should continue (themselves affected by the experience of use). It is at this point in the process that the actual consequences (social and nonsocial reinforcers and punishers) of the specific behavior come into play to determine the probability that use will be continued and at what level. These consequences include the actual effects of the substance at first and subsequent use (the perception of which may, of course, be modified by what effects the person has previously learned to expect) and the actual reactions of others present at the time or who find out about it later, as well as the anticipated reactions of others not present or knowing about the use (638).

The effect of a particular drug on a user—the subjective experience—is argued to be a powerful determinant of continued use, a point well established in Becker's (1963) and Goode's (1970) respective studies of marijuana users. Perceived reactions from affiliates also take on a more powerful determinative force in continued use.

In opposition to both DA and social learning theories, Hirschi's (1969) social control theory proposes that deviant activity is not a response to learned behavior; rather, it emerges from a lack of social bonds (attachment, commitment, involvement, and belief). This approach implicitly assumes that deviance exists in societies and seeks to identify the causes (controls) at work in the absence of deviance. In Hirschi's framework, attachment signifies emotional connections with others, which leads to actions that conform to the expectations of those we care about. Commitment refers to the level of integration an individual feels towards conventional social institutions, roles, and processes, such as education, family, and occupation. Involvement refers to the rational calculation of time available to each person; if someone is working a full time job, raising a family, participating in community activities, and spending time with

friends, they are much less likely to engage in deviant behavior simply due to time requirements of leading a “straight” life. Belief describes the intensity of acceptance an individual has towards the dominant values, rules, and norms of their society; the more someone accepts the official rules as right and proper, the less likely they are to commit acts in antagonism towards the status quo. Social control theory operates under the assumption that individuals understand the consequences of their behavior and will consistently act in a rational way to preserve their feelings, position amongst close associates, and level of integration in society—which is a significant point of contention for some (Sampson and Laub 1995).

Studies of marijuana users corroborate the assembled theoretical model offered by Becker (1963), finding that individual attitudes towards the harmfulness of the drug are consistent predictors of both initial and continuing use (Derzon and Lipsey 1999), and that peer networks provide a key influence in the development and maintenance of these requisite attitudes (Goode 1970; Kandel 1978). The logical extension of this idea is that frequency of use is directly related to the proportion of friends who use and the perceived acceptance of marijuana use among a person’s peer group; I expect that individual marijuana use will increase with the number of friends who use, as well as self-reported peer-group acceptance of marijuana use.

H₁: Individual marijuana use will increase with the number of friends who use marijuana

H₂: Individual marijuana use will increase with peer-group acceptance of marijuana use

Mauss (1969) situates marijuana experimentation within the context of college preparation, arguing that many university-bound high school students begin use before matriculating to assist in the cultural assimilation process. Conversely, Brown (1974) finds that college students cease marijuana use following graduation, citing social pressures of work, family, and social integration as key causal factors. Yamaguchi and Kandel (1985) use cross-sectional event history analysis to demonstrate that marijuana use is negatively related to marriage and becoming a parent, yet positively related with separation/divorce. Since this study's sample will consist entirely of marijuana users, I expect that the average level of education will be higher than the general population, and that more individuals will be single (or divorced) and childless than the general population.

H₃: Marijuana users are more educated than the general population

H₄: Marijuana users are more likely to be single than the general population

H₅: Marijuana users are more likely to be childless than the general population

Do licensed medical marijuana users differ from their illegal counterparts in their rationalizations for using the drug? The universe of possible reactions to marijuana are multifaceted and, often, mutually contradictory; Goode's (1970) qualitative study of users (all illegal) illustrates this phenomenon well (see Appendix 4-1). Reinerman et al. (2011) provide the lone scholarly attempt at identifying characteristics of medical marijuana users. Using a sample of 1,746 patients from nine separate medical marijuana clinics in California, the authors find that Blacks and Native Americans use at higher rates than other ethnic groups, while Latinos and Asians have lower rates of use (Whites are near the average for all groups). Use is heaviest in the 25-44 year age range, and males made

up 73% of the sample. Chronic pain suppression and improved sleep were the most commonly cited uses/benefits of marijuana reported by subjects (82.6% and 70.7%, respectively). Other conditions/uses of medical marijuana included relaxation (55%), muscle spasms (41%), headaches (41%), anxiety (38%), nausea (28%), and depression (26%). Studies of non-medical use suggest two dominant views by users: (1) the drug is perceived to stimulate creative thinking, particularly among artists, musicians, and writers (Becker 1963; Goode 1970), and (2) users consume it to relax and experience euphoria. Weil et al. (1968), in the first controlled study of marijuana use, found that self-reported feelings of well-being were improved with consumption of the drug, and that the intensity of these feelings were dose-dependent. Zablocki et al. (1991) also document the feelings of euphoria that accompany use, though they find that these feelings are more commonly reported by individuals who score low on scales of introspectiveness (75). Further, a strong experiential dichotomy is present between introspectives/non-introspectives, where the former associate their experience with marijuana “in self-oriented cognitive and emotional terms,” and the latter focus on “distortions of normal sensorimotor functioning and disruptions or modifications of normal everyday activities” (75). For the highly introspective individual, the experience seems to:

stimulate global self-evaluations and sharpen the contrast between the ideal and the perceived self. Rather than being distracted from personal problems of unusual sights, sounds, or tastes, such persons may experience marijuana as a confrontational drug, which focuses attention on the very aspects of self that are currently most troublesome (75).

This type of experience is exemplified in one of the more famous explications of non-medical use; Allen Ginsberg (1966) describes the mind-manifesting perception changes that result from marijuana consumption:

Marijuana is a useful catalyst for specific optical and aural aesthetic perceptions. I apprehended the structure of certain pieces of jazz & classical music in a new manner under the influence of marijuana, and these apprehensions have remained valid in years of normal consciousness. I first discovered how to see Klee's Magic Squares as the painter intended them (as optically three-dimensional space structures) while high on marijuana. I perceived ("dug") for the first time Cezanne's "petit sensation" of space achieved on a two-dimensional canvas (by means of advancing & receding colors, organization of triangles, cubes, etc. as the painter describes in his letters) while looking at *The Bathers* high on marijuana. And I saw anew many of nature's panoramas & landscapes that I'd stared at blindly without even noticing before; thru the use of marijuana, awe & detail were made conscious. These perceptions are permanent—any deep aesthetic experience leaves a trace, & an idea of what to look for that can be checked back later. I developed a taste for Crivelli's symmetry; and saw Rembrandt's *Polish Rider* as a sublime Youth on a Deathly horse for the first time—saw myself in the rider's face, one might say—while walking around the Frick Museum high on pot. These are not "hallucinations"; these are deepened perceptions that one might have catalyzed not by pot but by some *other* natural event (as natural as pot) that changes the mind, such as an intense Love, a death in the family, a sudden clear dusk after rain, or the sight of the neon spectral reality of Times Square one sometimes has after leaving a strange movie. So it's all *natural*.

While there is pointed evidence indicating that the drug affects individuals in varying manners, the subjective experiences described by users also points to a methodological problem unaddressed by previous research: different varieties of marijuana (“strains”) tend to elicit different results. Hillig and Mahlberg’s (2004) review and analysis of 157 different *cannabis* accessions lends credibility to the anecdotal evidence reported by users; genomically, drug cultivars of *cannabis* are limited to two subspecies of *cannabis indica* (narrow and broad-leaf varieties), with narrow leaf plants generally producing soaring mental euphoria in users and broad-leaf plants inducing a more lethargic, body-

numbing effect. The wide variation in effect is attributed to different ratios of two key cannabinoids in these plants—THC and CBD—with low amounts of CBD in narrow leaf varieties and high amounts in broad-leaf plants.

Plant-induced variations in experience aside, current evidence suggests that medical users of the drug will focus on symptom alleviation in an attempt to rationalize their use; non-medical users should report using for either creative stimulation/personal insight or simply to numb themselves from reality (i.e. getting “stoned”).

H₆: Medical users will use primarily to alleviate acute physical symptoms

H₇: Illegal users will use to stimulate creativity, generate personal insight, or to numb themselves from reality

In the following sections, I describe the methods used to assemble the sample for this study, provide a description of the results, and discuss the implications of my findings.

Methods

Accessing hidden populations—a status marijuana users, producers, and sellers are relegated to in the United States—poses two unique challenges to investigators; as Heckathorn (1997) notes,

First, no sampling frame exists, so the size and boundaries of the population are unknown; and second, there exist strong privacy concerns, because membership involves stigmatized or illegal behavior, leading individuals to refuse to cooperate, or give unreliable answers to protect their privacy (174).

To address these concerns, researchers have traditionally relied upon snowball sampling, key informant sampling, and targeted sampling to investigate hidden populations. The shortcomings of each approach are detailed elsewhere (Heckathorn 1997), but the primary concern is derived from the lack of independence between observations, which is

an unassailable artifact of snowball and targeted sampling. Heckathorn's (1997; 2002; 2007; Volz and Heckathorn 2008) Respondent-Driven Sampling (RDS) offers an elegant addendum to chain referral procedures by limiting the number of potential recruits that each respondent can bring into a research program and incorporating both primary and secondary incentive structures into the recruitment process. Respondents are rewarded for participating in the study (i.e. completing a survey or interview), but also receive rewards for referring others to the research program. This approach is successfully implemented in the study of intravenous drug users (Heckthorn 1997; Heckathorn et al. 2002), AIDS patients (Heckathorn et al. 1999), men who have sex with men (Ramirez-Valles et al. 2005), sex workers (Johnston et al. 2008), and studies of jazz musicians (Heckathorn and Jeffri 2001).

When combined with controls to verify that a prospective respondent is a member of the targeted population, the collection of successive waves of respondents leads to “an equilibrium mix of recruits...that is independent of the characteristics of the subject or set of subjects from which recruitment began,” allowing for the calculation of unbiased population estimates (Heckathorn 1997: 183; see also Salganik and Heckathorn 2004; Wejnert and Heckathorn 2008; Wejnert 2009). RDS operates under four assumptions: (1) respondents accurately describe the size of their personal network within the sample population; (2) recruitment of additional respondents involves random selection by recruiters from their personal networks; (3) friendship ties are reciprocal; and (4) recruitment operates as a Markov process in that the transition probabilities of the last individual recruited converges towards an equilibrium (achieved when that individual's probability of selection is proportional to their personal network size) (Volz and

Heckathorn 2008: 82, 84). In the process of achieving equilibrium, key variables of interest (race, gender, or other theoretically specified statuses) are monitored throughout the recruitment process.

Previous studies relying on RDS required interviewers, a physical location to operate from, printed recruitment coupons, and a coupon tracking system; while the face-to-face interaction helps to explain why referral rates are so high in these studies, significant limitations arose when assembling samples. Researchers, regardless of their constitution and efficiency, can only interview so many people in one day, interview locations are not available at all times, and respondents' schedules do not always correspond with researchers'. Web-based RDS (webRDS) eliminates many of the logistical problems (though introducing new and complicated replacements), and tends to increase the speed of sample gathering (Wejnert and Heckathorn 2008; Bengtsson et al. 2012; Bauermeister et al. 2012).

Wejnert and Heckathorn's study (2008) of cross-racial friendship affiliations among college students demonstrates that large samples can be assembled in very short time periods (72 hours) if respondents view the study as important, the web interface is easy to use, and respondents' personal networks contain one or more individuals who possess the targeted attributes. A primary drawback of webRDS, however, is that researchers are not able to meet with respondents face-to-face to confirm their status as attribute possessors (such as track marks for intravenous drug users) or to weed out respondents who provide fake responses in lieu of recruiting real people (to collect the recruitment reward)—though Bauermeister et al. (2012) telephoned each prospective recruit to verify their existence and to protect from virtual ballot stuffing. To counteract

the selection of fraudulent respondents, Wejnert and Heckathorn (2008) suggest keeping recruitment rewards small and tracking internet protocol (IP) identification numbers so that multiple responses cannot emanate from the same computer.

Bauermeister et al. (2012) encountered both recruiting and tracking issues in their study of young adult drug use (the single webRDS examination of this potential population to date). 22 initial seeds were recruited via Facebook, took an online survey, and were asked to enter the email addresses of two friends—automated emails were sent to prospective recruits from the researchers (835). Unfortunately, even with a \$20 incentive for completing the survey and \$10 incentives for each chain referral, only two additional respondents elected to participate in the second wave (835). The researchers altered their protocol: first, a link to the survey was emailed to the original seeds with instructions to forward the message to their friends, to “(a) reduce threats to a potential young adult’s confidentiality and privacy and (b) reduce concerns that referral chains were being broken as a result of filtering of...email invitations” (835). There is no accounting of how successful this augmentation was, except that another alteration was required. This time, the authors “telephoned seeds and asked them about their experiences using the referral emails,” finding that most seeds “had never forwarded the email and had not told their referrals that they had invited them to participate” (835). Referral restrictions were loosened, allowing participants to recruit up to five respondents through a variety of social media (email, Facebook, text message, instant messenger). This alteration, while successful in rapidly increasing the sample size, led to recruiters forwarding the unique recruitment announcements to multiple individuals in hopes of capitalizing on the increased incentives. While their approach yielded an impressive,

diverse sample in a short amount of time compared to traditional RDS procedures ($n=3,448$ in 2.5 months), it is questionable that accurate RDS network calculations were achieved due to the use of individual IDs by multiple respondents—in other words, it is not plausible that recruitment wave origination was traceable after recruitment forwarding restrictions were liberalized. The authors mention that “survey data were checked daily to screen out duplicate and fraudulent cases ($n=675$),” so it is possible that the RDS qualities of the network were preserved; however, this unknown without a presentation of the actual chain referral network (835). Their study demonstrates the importance of proper controls to limit the use of unique IDs to one person; implementing such controls is relatively easy in a web-based survey environment.

Though unaddressed by Wejnert and Heckathorn (2008) due to the nature of their study, webRDS poses an additional complicating feature with hidden populations, particularly those who are security conscientious—that of providing anonymous financial incentives. Bauermeister et al. (2012) confront this by issuing “Visa e-gift” cards via email to respondents upon completion of their initial survey and reloading them after their chain referred recruits complete the survey (835). This appears to be one of the more secure options available to researchers, but it does not fully protect participants in the case of compelled disclosure (i.e. subpoena), as the original “loading” of the cards is linked to researchers and recipients are required to provide a name and address before using the cards. Such a disclosure may seem like a minor consideration when studying use prevalence of multiple drugs in a large sample, but the issue is much more salient as sensitivity and security concerns become more of an issue—as is the case with drug producers or sellers. Limiting or completely eliminating monetary incentives to

participants is one method of maintaining anonymity; however, no one has attempted a RDS study of this nature. This study, in addition to investigating marijuana users in Oregon, attempts the first non-monetary primary incentive RDS implementation.

WebRDS Investigation of Marijuana Users in Oregon

To answer the research questions posed in this study, I developed a webRDS protocol and web-based survey to examine a sample of marijuana users in Oregon. To investigate the role of different secondary incentive types in the success of RDS studies and to protect respondents' anonymity, I chose to forego all monetary payments. Instead, multiple non-monetary secondary incentives were implemented: (1) prospective respondents were appealed to based on the potential political and economic importance of examining their population; (2) live updates and total network referral counts for each respondent were posted on a web site to encourage competition among participants to recruit others; and (3) respondents were granted access to near-live aggregate data and summary statistics as the project developed.

Respondents were eligible to participate if they were Oregon residents, over the age of 18, used marijuana in the last year, and received a unique study ID from a previous participant in the study. The web-based survey instrument included a question that tracked study IDs; any previously used IDs were barred from reuse. After completing the survey, respondents were redirected to another web page with instructions about the referral process, as well as links to five additional recruitment letters (in PDF format) that could be downloaded and shared with prospective recruits by email, Facebook, or instant message.

I identified a single “super seed” with a very large number of friends who are users, producers, and sellers of marijuana ($n=44$) in several counties identified in Chapter III as “areas of interest” within Oregon (Benton, Josephine, and Multnomah). The super seed was fully briefed on the project, the referral process, and the importance of collecting chain referrals by following up with prospective respondents. The seed successfully recruited 26 respondents in the second wave from ten Oregon counties. However, the lack of monetary incentives and the format of the recruitment letters appear to have quickly affected recruitment rates compared to previous RDS studies (web-based and traditional), as the referral process died out with only 72 respondents (five waves). The implications of this finding are discussed later.

Survey Instrument

The survey instrument (Appendix 4-3) collected self-reported information on: (1) individual characteristics, such as gender, age, height, weight, frequency of exercise, county of residence, ethnicity, political party membership, education level, employment status, relationship status, occupational category, health insurance coverage, number of close friends, and income; (2) marijuana-related questions, including frequency of use, reasons for use, medical license status and roles, number of close friends who use, reasons for growing, number of plants growing, method of growing, source and reimbursement rate for obtained marijuana, amount consumed, and the perceived acceptance of marijuana use by immediate social circle and local community; and (3) a detailed political orientation index (using a replication of the 2011 Pew Political Research political typology questionnaire).

Variables of interest for hypothesis testing in this analysis include frequency of marijuana use, amount of marijuana used per month, number of close friends who use marijuana, perceived peer-group acceptance of marijuana use, use status (medical/non-medical), level of education, relationship status, number of children, and reasons for using marijuana. Frequency of marijuana use (ordinal) is operationalized as six options presented to respondents (less than once a month, once a month, 2-3 times a month, once a week, 2-3 times a week, and daily or near daily). Amount of marijuana used per month (ratio) is self-reported and measured in grams (0-100). The number of close friends who use marijuana is a ratio measure, with a minimum of zero and maximum of 20. Perceived peer-group acceptance of marijuana use (ratio) is operationalized as the estimated percentage of friends, relatives, and coworkers who approve of marijuana use. Level of education (some high school, high school graduate (or GED), associate's degree, bachelor's degree, and master's degree or above) and relationship status (single, married or in a civil union, in a stable relationship (but not married or in a civil union)) are measured categorically. Presence of children in the home is a dichotomous, nominal variable (yes/no). Reasons for using (ordinal) include euphoria, sleep aid, pain management, appetite stimulant, relaxation, spiritual aspects, to be social, to dull reality, to forget problems or worries, stimulate creativity, depression, other medical reasons, to get "stoned," and other—any selected reasons are then rank-ordered.

Results

It appears that the lack of monetary incentives severely hampers the recruitment process, as the final sample consisted of 72 respondents and took approximately 2 months to gather from the initial referral. This finding is an important addition to the growing

RDS literature on its own. The small sample size approached equilibrium, but did not achieve it—this impinges on the generalizability of the findings collected in this study. Even with these limitations, the results offer some insight into the population of Oregon marijuana users (though not statistically valid for generalizing to the population of marijuana users in Oregon or elsewhere).

The majority of responses were gathered in the first month of data collection. Figures 4-1, 4-2, 4-3, and 4-4 provide a visual representation of recruitment at key cross sections of the referral process. The most robust network growth occurred in the first two weeks after survey deployment, with over half of the total sample collected by the end of week one ($n=37$) and nearly two-thirds assembled by week two ($n=49$). The pattern of growth corresponds with diminishing response rates through the five waves of recruitment: 26 respondents are present in the second wave, 35 in the third wave, 9 in the fourth wave, and 2 in the fifth wave. Though speculative, it appears as if recruitment was relatively successful through the third wave and that properly structured non-monetary incentives can work through this level of the referral process; however, the precipitous drop off in waves four and five indicate that any mechanisms at work in earlier waves lost their participation-inducing character. Those wishing to implement a non-monetary RDS recruitment process could likely attain equilibrium if enough initial seeds are selected and they are properly trained, but it is important to note that very few seeds are likely to enter the sample after the third wave.

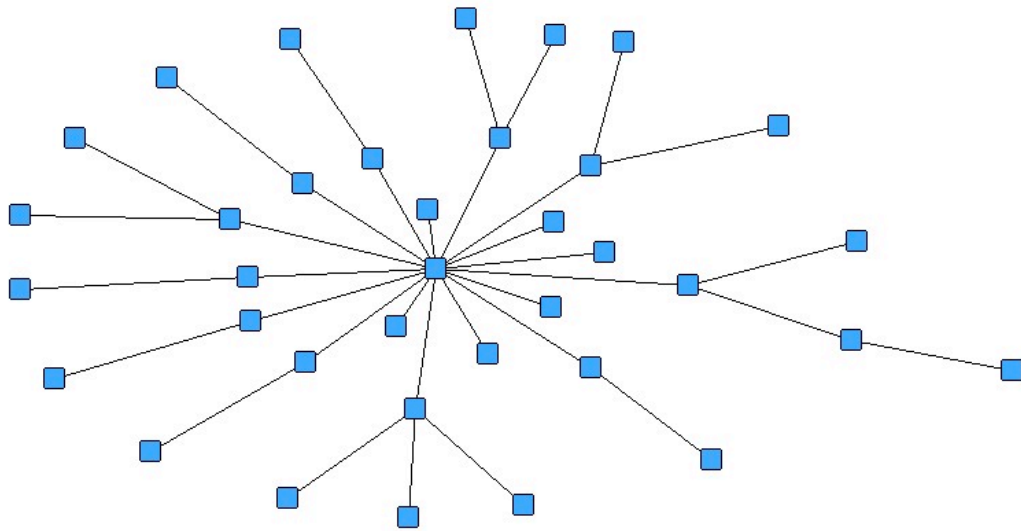


Figure 4-1. RDS Sample At End of Week 1

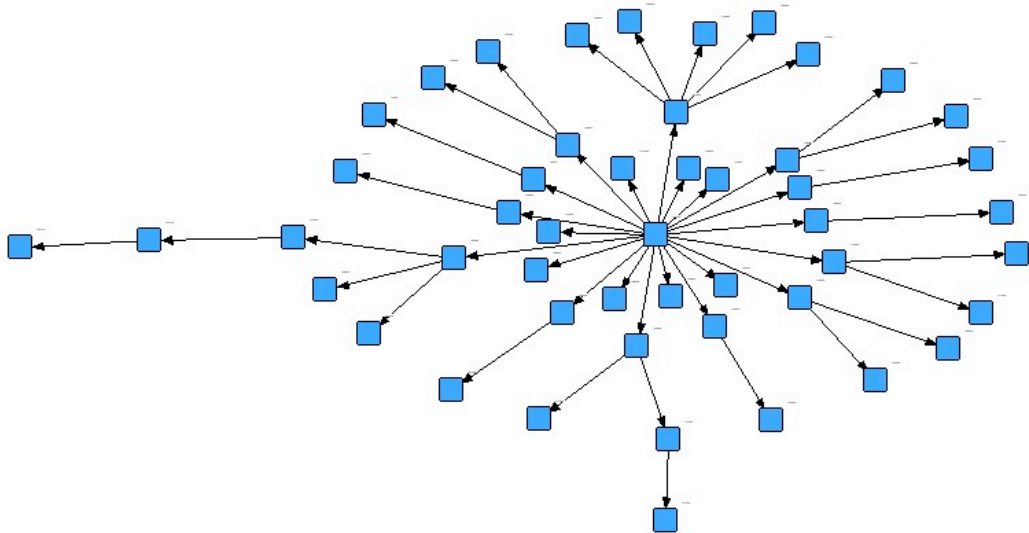


Figure 4-2. RDS Sample At End of Week 2

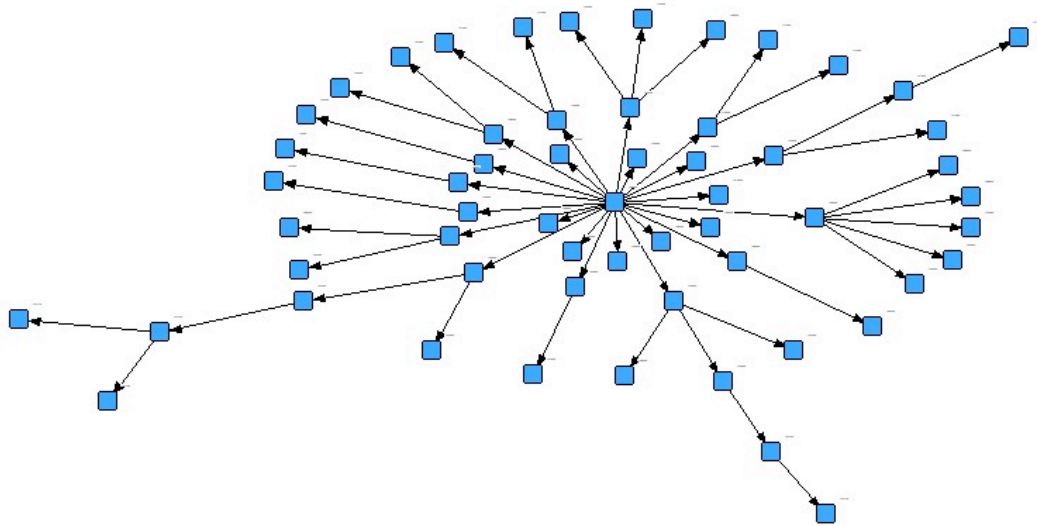


Figure 4-3. RDS Sample At End of Week 4

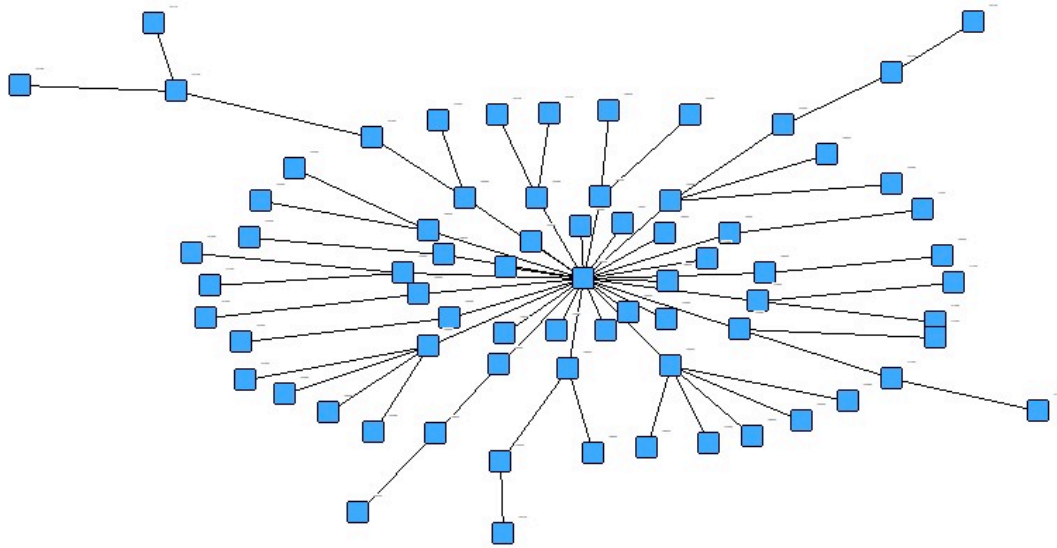


Figure 4-4. RDS Sample At End of Week 8

The assembled sample (see Table 4-1) is predominantly male (63.9%), white (90.3%), well-educated (69.4% with a bachelor’s degree or above), in a stable relationship of some sort (77.6%), are employed (89.8%), illegally use marijuana (75%), and are very frequent users of the drug (47.8% daily or near daily use). Despite an inability to generalize these findings to the marijuana-using population, most of this data corresponds with national surveys of drug use. A glaring difference is present in frequency of use figures.

Estimates for Oregon indicate that 10.27% of individuals 26 or older have used marijuana in the last year, and 6.58% used in the last month; for persons in the 18-25 age category, 36.96% used in the last year and 21.9% used in the last month (SAMHSA 2009). For this sample (all used in the past year), past month usage is 78.5% for the 26 and older group ($n=14$) and 87.5% in the 18-25 year old category ($n=48$). Daily or near daily use accounts for 57.1% (26+) and 43.7% (18-25) of respondents in these age groups.

Table 4-1. Description of RDS Network Sample

Variable	%	<i>n</i>
Gender		
Male	63.9	46
Female	36.1	26
Race		
White	90.3	65
Black	1.4	1
Latino/a	2.8	2
Asian American	1.4	1
Native American	1.4	1
Other	2.8	2
Education		
Some high school	0	0
High school graduate	19.4	14
Associate’s degree	11.1	8
Bachelor’s degree	47.2	34
Master’s degree or above	22.2	16

Frequency of Use		
Less than once a month	14.5	10
Once a month	4.3	3
2-3 times a month	10.1	7
Once a week	10.1	7
2-3 times a week	13.0	9
Daily or near daily	47.8	33
Use status		
Licensed medical user	25	18
Illegal user	75	54
Relationship status		
Single or divorced	22.4	13
Married (or civil union)	39.7	23
Stable unmarried relationship	37.9	22
Employment status		
Unemployed	10.2	7
Employed	89.8	62
Political party		
Republican	2.7	2
Democrat	44.4	32
Independent	18.0	13
Libertarian	1.4	1
Green	2.7	2
Other	2.7	2
Not registered	27.7	20
Exercise frequency (per week)		
0	1.5	1
1	8.9	6
2	7.4	5
3	11.9	8
4	25.3	17
5	31.3	21
6	10.4	7
7	2.9	2
Body mass index range		
Healthy	61.1	44
Overweight	27.7	20
Obese	11.1	8

Respondents are much fitter and exercise more often than average Americans, with 61.1% reporting “healthy” body mass indexes and averaging four days of aerobic activity

per week. However, this could be a sampling artifact brought on by overrepresentation of younger respondents (mean age: 31). The majority of respondents are registered as Democrats (44%) or Independents (18%), with a sprinkling of minor party representation as well; surprisingly, 27.7% are not registered with any political party. Political ideology measures suggest that marijuana users are relatively left-leaning overall, though conservative outliers are present (Figure 4-5). Marijuana users' mean yearly incomes are higher than Oregon's average (\$32,962 vs. \$26,171), but, with a standard deviation of \$27,424, are also highly variable. Finally, the majority of respondents have never been arrested (76.3%); of those who have ($n=17$), eight have been arrested for marijuana related charges.

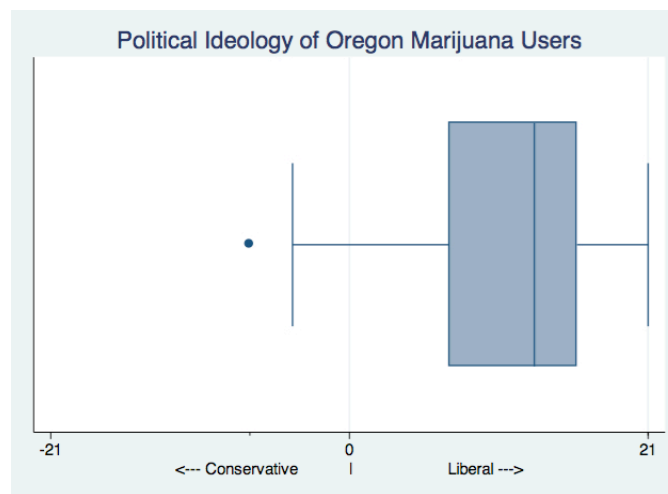


Figure 4-5. Political Ideology of Oregon Marijuana Users

Why do marijuana users—particularly those who use without a medical license—break the law and consume this drug? As Table 4-2 highlights, respondents' most widely cited reasons for using marijuana are to relax, stimulate creativity, alleviate pain, induce sleep, and to experience euphoria. Of the specific rationalizations offered in the survey, users also rank these five as their most important reasons for consuming marijuana (in order: sleep, relaxation, pain suppression, creativity stimulation, and euphoria).

Differences emerged between licensed medical users ($n=18$) and their illegal counterparts ($n=54$) as well. Medical use is primarily engaged in to alleviate pain and induce sleep; illegal users seek relaxation and creativity stimulation, although medical users also report using the drug for relaxation. Very few associate their use with a desire to get “stoned,” dull reality, or forget problems, and when they do, these rationalizations are ranked low in importance. The terms selected to describe use, in general, frame the drug as a positive contribution in users’ lives.

Table 4-2. Counts and Ranks of Reasons for Use

Reason	<i>n</i>	Mean rank	<i>n</i> ranked as #1	
			Medical	Illegal
Sleep	23	1.97	4	2
Relax	43	2.34	1	14
Other	7	2.44	0	0
Pain	24	2.79	7	3
Creativity	28	3.25	0	5
Other medical	3	3.66	0	0
Euphoria	23	3.73	0	1
Being social	18	3.77	1	1
Spirituality	13	3.84	1	2
Appetite	11	4.36	0	0
Dull reality	6	4.50	0	0
Forget problems	9	4.66	0	1
Get “stoned”	13	4.84	0	2
Depression	7	5.85	0	0

n=72

The number of close friendships (mean: 10.86) reported by respondents in this sample is similar to those reported in previous studies of general populations (Roberts and Dunbar 2011) (see Table

4-3). This contradicts popular conceptions—though never investigated in a systematic way—of marijuana users as reclusive, anti-social, or otherwise socially maldeveloped. Figures 4-6 and 4-7 provide visualizations of the sample with their

reported friendship ties included. Figure 4-7 and Table 4-4 highlight the high level of homophily present in the sample’s friendship networks; 69% of close friends are also reported to be users of marijuana. The total sample size obviously hampers generalizability of this intriguing finding; this is especially true of the fourth and fifth waves of respondents. There is a possibility that an individual’s frequency of use is a causal determinant of friendship composition, and that the abnormally large number of “every day” users present in this sample has skewed the average percentage of close friend users (though univariate regression suggests otherwise).

Table 4-3. Mean Friend Counts by Recruitment Wave and Use Status

Wave	<i>n</i>	Close Friends (mean)	Close Friends Who Use (mean %)
2	27	12.5	68.3
3	34	10.0	67.1
4	6	10.1	72.8
5	3	10.6	86.6

n=71

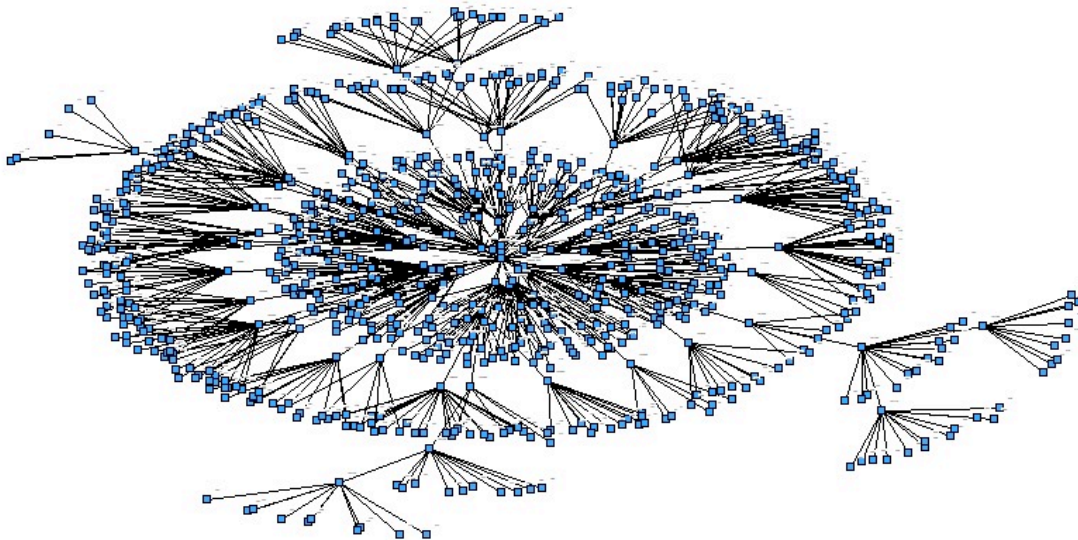


Figure 4-6. Sample Network with Reported Friendships Imputed

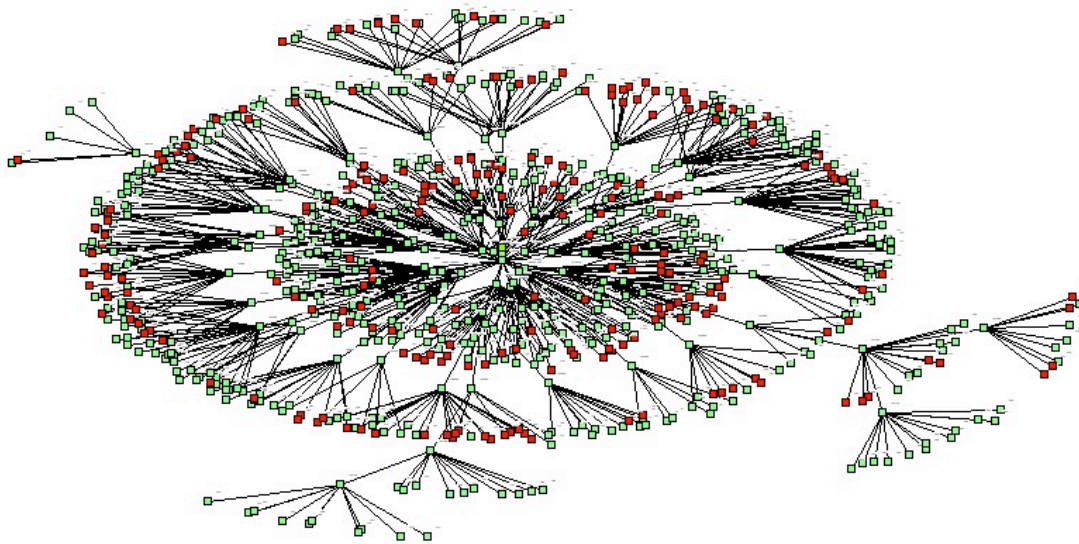


Figure 4-7. Sample Network with Reported Friendships Imputed (users in green)

Hypothesis Testing

Due to the lack of RDS equilibrium in this sample, all hypothesis tests must be viewed as tentative and not fully supported by accurate population data—all findings and statements only apply to this particular sample of Oregon marijuana users. That said, the collected data suggests that individual marijuana use—both frequency and amount—is not related to either the number of friends who use (H_1) or peer-group acceptance of marijuana use (H_2) (Figures 4-7, 4-8, 4-9, and 4-10 in Appendix 4-2). As illustrated above (Table 4-1), marijuana users are friends with other marijuana users at a much higher rate than could be expected under a random distribution, and are, on average, significantly more educated than the general population (H_3). Are marijuana users more likely to be single than the general population (H_4)? Nationally, 43% (96.6 million) of Americans over the age of 18 are “single” (unmarried) (US Census Bureau 2010)²⁸. In this sample, 12 respondents were single, while 22 were married, and 22 were in a stable

²⁸ http://www.census.gov/newsroom/releases/archives/facts_for_features_special_editions/cb10-ff18.html

relationship. Compared to the national data, marijuana users appear less likely to be married; however, there were some missing responses to this particular question ($n=16$), and, overall, marijuana users are more likely to be in a stable relationship (78% married or otherwise) than single (a distinction not made in US Census data). Missing data (valid $n=58$) is also an issue in determining if marijuana users are less likely to have children in the home than the general population average (33.5%) (H_5). At 29%, marijuana users appear to have slightly below slightly less likely to have children in the home than the general population. Medical users appear—as highlighted by the data present in Table 4-3—to use the drug to alleviate acute physical symptoms (H_6) with generalized pain indicated as the primary rational for using. Illegal users consume the drug to relax and stimulate creativity, but rank “numbing reality” (“getting stoned” and “dull reality”) very low compared to other rationalizations (H_7).

Discussion

Despite not achieving RDS network equilibrium in this sample, the findings contribute in an important way to previous RDS studies and, in regards to marijuana users, warrant further investigation; the ramifications of daily or near daily use by a significant percentage of the marijuana using population are far reaching from multiple (health, criminal justice, economic, and cultural) perspectives. The basic demographic information collected on members of this particular drug using population suggest that marijuana users are not dramatically different from their non-using counterparts in many ways, but, in areas where they deviate from the norm, they tend to attain socially desirable attributes. Users are similar to average Americans in their number of close

friends, employment status, arrest history²⁹, and just slightly less likely to have children in the home; however, users' incomes are slightly higher than average, they exercise more regularly and maintain healthier overall weights, are more likely to have health insurance and be in a stable relationship, and are much more educated than the rest of the population. Users in this study are employed in diverse occupations: teachers (16%), health care fields (23%), managers (11%), chefs or cooks (11%) are the most cited categories, but the sample also includes lawyers, architects, artists, farmers, and construction workers. While incomes are higher than average, they are lower than would be predicted for such high educational attainment.

The distinctly liberal political ideology of users raises questions. Without broaching the subject of causality (i.e. Does marijuana use make you liberal or does being liberal make you use marijuana?), does the character of a drug lend itself to a particular ideology or worldview? While this question is not answerable with the collected data, the strength of the findings suggests further research.

The high frequency of use reported could be an artifact of sampling bias, with frequent users recruited by previous participants more often or simply more willing to participate in a non-monetarily incentivized study. On the other hand, the paucity of investigations of this particular population makes such a conclusion difficult to justify, particularly as the drug becomes more acceptable to society at large—more detailed data seems necessary. If the average user ingests the drug regularly (multiple times per week)

²⁹ One troubling aspect of this study's results is that the eight respondents arrested on marijuana related charges are well educated (four hold a bachelor's degree, four hold a master's degree or above); commenting without knowing the details of each situation would be inappropriate, but—on the face—such a circumstance raises the oft-cited specter of marijuana illegality causing more harm than good (Nutt et al. 2010).

and does so using traditional means (i.e. smoking), public health mitigation strategies could direct users to less damaging alternatives (i.e. vaporization) that would reduce economic losses due to respiratory ailments. Similarly, high frequencies of use would suggest that additional investigations of marijuana-induced driving impairment are required, as well as appropriate methods of assessing impairment levels.

The composition of users' friendship networks also raises important considerations, particularly as the drug moves into the realm of quasi-legality in several states and others attempt to identify successful electoral strategies to achieve similar results. If marijuana users' in-network friendship selection is as strong as suggested by this study (67%), the likelihood of a non-user being friends with a user should be small. The effect of limited close friend relationships between non-users and users could have significant implications for the non-using population's perceptions of the drug and its acceptability in social contexts, since individuals may have a difficult time accepting that marijuana users come in all shapes, sizes, and abilities when they are close friends with only one or two. Additionally, this finding provides another confirmation of the homophilic tendencies of status groups (McPherson et al. 2001) and suggests that marijuana users represent a distinct sub-population of our society.

While initial use and initiation into the methods of use (knowing how to obtain and ingest the drug) are accurately described by social learning and differential association theories, prolonged use extending into and through adulthood—especially when conducted in non-social situations—is not adequately explained. The data collected in this study suggests that adult marijuana use is best viewed through Akers' social learning theory, particularly the more nuanced version that attributes continued use

of drugs to the biopsychological effects produced their consumption (1979). For Hirschi's social control theory (1969) to provide a valid explanation of continued adult marijuana use, users must lack a combination of social bonds that non-users possess. If anything, that data suggests that this study's respondents are social bond exemplars in many regards. While this study does not offer a rigorous test of these theories (due to a lack of statistical significance) and cannot fully reject their applicability to adult marijuana use, the face validity of both social control and differential association theories is questionable. To this point, no theory of deviance or social control has examined the causal forces at work before and after a punctuation in the social norm equilibrium—marijuana legalization (in various forms) offers us an immediate and tangible opportunity to explore this phenomenon.

Conclusion

This study contributes to the emerging RDS methodology literature by demonstrating that non-monetary primary incentives are not effective recruiting tools, especially after the third wave of recruitment. WebRDS sampling procedures are viable as a methodological strategy to investigate this particular hidden population, but monetary inducements appear necessary to achieve appropriate sample sizes. The results suggest that non-monetary primary incentives may work, but studies using them should include large initial seed pools and adequate seed training.

The study also suggests that Oregon marijuana users are not significantly different from the general population in many substantial ways, though their deviations—outside of marijuana use—are in socially acceptable and rewarding ways. Additionally, Oregon marijuana users are liberal in political orientation, associate with other marijuana users at

higher rates than could be expected from random chance, and use the drug far more often than previous research projected. The findings presented in this study demonstrate the necessity for further research on marijuana users, particularly as the drug moves into mainstream acceptance (with legalization of recreational use in Washington and Colorado). If a “before and after” study of friendship networks was conducted in a state where the drug becomes legal, we could gain significant insight into the causal effect of laws on the formation of status groups in a particular society.

CHAPTER V
ESTIMATING THE QUASI-UNDERGROUND: OREGON'S INFORMAL
MARIJUANA ECONOMY

Introduction

How much marijuana is produced, consumed, and sold in Oregon? How do users obtain their drug? How much does marijuana contribute to Oregon's economy? If legalized and taxed, how much revenue could the state reasonably expect to earn from the sale of marijuana? This study estimates the size of Oregon's informal marijuana economy³⁰, drawing upon Respondent-Driven Sampling (RDS) procedures and survey methods to investigate this quasi-underground activity. By examining users and producers of marijuana, this analysis offers a unique contribution to our understanding of both informal economic participation and marijuana market structure in a key marijuana producing state.

Oregon has one of the highest rates of marijuana use in the US, with the most recent estimate indicating that 14.09% of individuals over 12 years old have used marijuana in the last year, with the average US rate approaching 10.2% (SAMHSA 2009)³¹. Oregon is also home to one of the oldest medical marijuana programs in the US, established in 1998, just two years after the first was created in California, and publishes county-level counts of medical users dating back to 2005. Oregon consistently ranks in the top ten states for plants seized by the Drug Enforcement Administration, with

³⁰ The terms “shadow,” “underground,” “illegitimate,” “unseen,” “unofficial,” “undocumented,” and “black market” are used by others to describe this segment of the economy; for clarity, I refer to it as the “informal economy” or the “informal sector”.

³¹ <http://oas.samhsa.gov/2k8state/AppB.htm>

estimates of production valued at \$473 million in 2005, making it the state's largest agricultural commodity (Gettman 2006). Even with a firmly entrenched federal prohibition on marijuana, there is a strong possibility that Oregon's quasi-legalization (through its medical program) makes the likelihood of more candid responses from respondents possible; additionally, the lack of an established legal means of selling medical marijuana in Oregon suggests that traditional models of distribution may still be in effect—therefore, the results should be extrapolatable to non-medical states.

With three states pursuing full legalization of marijuana in the November 2012 election³² and repeated calls from anti-prohibitionists to tax and regulate marijuana production, distribution, and consumption, it is very important to have a more thorough understanding of marijuana market dynamics—particularly the roles that various actors play within marijuana distribution networks. This study describes the literature surrounding informal economies and methods of measuring them, assesses what we know about marijuana market structure, and details the methods used to collect and question a sample of marijuana users in Oregon.

Literature Review

The term “informal economy,” first introduced by Hart (1973), defines the set of economic transactions outside of state regulation. Much of the same activity would be part of the formal economy if its actors registered their business, sales, or services and paid state licensing fees, insurance costs, and taxes. Informal economic activity—alternately referred to as the shadow or underground economy—consists of a wide range of types, such as unpaid or off-the-books labor, bartering, manufacturing and distribution

³² Washington and Colorado voters passed the legalization measures, while Oregonians rejected theirs

of drugs, weapons, counterfeit goods, and information, as well as a multitude of illegal services (sex, financial arrangements, waste disposal, security, etc.). Informal economies are widely viewed as the dominant mode of production in developing nations, but viewed as a place of last resort for those marginalized within developed countries—although reality is much more complicated than a simple dichotomy. Recent studies have demonstrated that shadow economies are growing in size in many nations, though for a multitude of reasons specific to individual countries (Schneider and Enste 2000). With their existence derived from, and shaped by, the formal economy, shadow economies offer interesting opportunities to understand the dynamics of labor markets and the rationales of individuals participating in them.

The primary theoretical explanations for actor behavior or market dynamics in informal economies include dual market theory and bureaucratization theories, though both are underpinned by an assumption of rationality on the part of actors.

Dual market theory, elaborated by Reich et al. (1973), posits a bifurcation of the economy into primary and secondary labor markets. The primary market is characterized by more stable, higher paying jobs, often with the possibility of promotion. Within the primary market, desirable occupations are further segregated by race and gender, with white male workers inhabiting the most desirable jobs. The secondary market encompasses a broad swath of the remaining workforce (but primarily consists of women, minorities, and youths), including in its ranks low skilled white collar, blue collar, and service industry jobs, as well as all other informal occupations (legal or otherwise). Constructing the theory as an historical explanation of US labor market structure, Reich et al. contend that this segmentation was not accidental, but was a

component of the trajectory of monopoly capitalism (see Baran and Sweezy 1966). Labor force homogenization and growing union politicization collided with new manufacturing technology and a necessity for oligopolic capitalists to maintain monopolistic control over commodity and labor markets. Large firms were able to divide their workforce up through specialization, union busting, and promotion opportunities to well-paying jobs (instilling an appreciation for bureaucracy). Lesser firms and sectors—those on the “industrial periphery”—were more unstable and tended to employ less stable employees (Reich et al. 1973).

Bales (1984) expands this notion into the criminal economy, positing that another dichotomy exists within this sub-sector of the secondary economy. Bales assumes that the tendency of criminologists to focus on arrested individuals as representative actors of the criminal economy is problematic due to selection bias. Instead, Bales suggests that a similar opportunity structure to the primary sector exists within the world of crime, with lower level criminals prone to high turnover and unstable working conditions, and higher level criminals enjoying more stable employment and prospects for advancement (147). A key explanatory variable in this approach is the availability of investment capital; achieving stability in the underground economy is highly dependent upon owning the (illegal or quasi-legal) means of production.

In both cases, individuals within the secondary labor market come to view the informal economy as a supplement to unsteady conditions in the formal economy and rationally choose to participate in the former. While helpful to understand the historical conditions behind divergent labor markets in the US, this theoretical tradition does not

offer a nuanced description of specific causal forces driving informal market participation.

Bureaucratization theories primarily focus on political and economic structural forces, which influence the size and composition of informal markets. Tax and social security burdens, the intensity of regulation, social welfare transfers, regulation and cost of labor, and the quality of public sector services are the primary influences on the size of a nation's informal economy (Schneider and Enste 2000). As tax burdens, public assistance, and public services increase in a nation's formal economy, shadow economies are said to increase in size and complexity. Firms respond to these particular forces by cutting their labor costs (reduction of hours and benefits, layoffs, and consolidation), and individuals (again) rationally augment their lost income by entering the informal economy in various manners. The extent of participation in the informal sector is difficult to assess and left unaddressed by this theoretical tradition; bartering, working under the table, and manufacturing illegal goods are not qualitatively equivalent in their intensity. Despite significant shortcomings, the approach offers several innovative methods for calculating the relative size of informal markets within a country.

Methods of Calculating Underground Economy Size

Arriving at an accurate estimate of total activity for any economic sector is problematic. The difficulty is obviously greater with informal activity, illegal or otherwise. A number of studies have attempted to estimate the size of underground economies; the approaches vary, but are—due to data availability—generally applied to national economies, and include direct micro-level surveys, indirect monetary measures,

and indirect non-monetary measures (Williams and Windebank 1998). A brief review of these methods follows.

Direct Methods

Direct approaches are essentially limited to micro-level surveys, which ask respondents to estimate the amount of income they receive from “off-the-books” employment and how many illicit goods or services they purchase. Williams and Windebank (1997) note that studies of this variety almost exclusively focus on small geographic areas (Barthe 1985; Leonard 1994; Pahl 1984), particular groups (Phizacklea and Wolkowitz 1995) or particular sectors of the economy (Lin 1995). Critics of this approach question the willingness of respondents to provide potentially incriminating information about their activities, leading to a downward biasing of results. Counter to this criticism, Pahl (1984) found that interviews with both suppliers and consumers of underground goods resulted in equivalent levels of informal participation, and others (Leonard 1994; MacDonald 1994; Evason and Woods 1995; Fortin et al. 1996) noted an inherent willingness of respondents to discuss their participation (as both producers and consumers of informal goods and services). The most glaring difficulties of direct surveys is meaningfully extrapolating the results of a narrow sample to a larger geographic area and locating willing respondents (especially in the context of illegal activities).

Indirect Monetary Methods

Indirect monetary methods include the high denomination bank note approach, cash deposit ratio method, the monetary transaction model, and the income/expenditure

discrepancy measures. While a useful starting point in studying informal economies, these strategies all suffer from serious methodological shortcomings.

The high denomination bank note approach assumes that most illegal and informal transactions are conducted with \$100 and \$50 bills; as a result, tracking the production of these bills should provide an estimate of total informal activity (Henry 1976). The US Bureau of Engraving and Printing (BEP) produces bank notes; specific amounts of particular denominations are manufactured each year according to their assumed velocity and rate of physical deterioration. The BEP states that 95% of year-to-year money production is meant to replace damaged bills, rather than meet any particular demand of end-users (US BEP 2012). If this is the case, the high denomination bank note approach requires that any money made in the informal economy stays out of the formal economy—essentially, confining large, illicitly earned bills to shoeboxes, mattresses, or additional black market exchanges for an indefinite time. To make this approach even more problematic, others have estimated that anywhere between one half and two-thirds of all US currency is held outside of the US (Carlson and Keen 1996).

The cash deposit ratio method expands on the high denomination bill strategy by calculating the ratio of circulating currency to aggregate demand deposit accounts. Though this approach is widely implemented by researchers (Cocco and Santos 1984; Matthews 1982; Matthews and Rastogi 1985; Meadows and Pihera 1981; Tanzi 1980)—and only slightly altered by Feige (1979) to include checks (the monetary transaction model)—it suffers from the same methodological shortcomings of the high denomination bill method—with so much of the physical US currency held in other nations, using this approach will lead to inflated estimates of underground activity. Furthermore, like many

other measures of the informal economy, this method relies on establishing a base period where no informal activities were occurring, then attributes changes in subsequent years to these activities. Results are highly dependent on base year selection.

Income/expenditure discrepancy measures use data gathered by national statistical agencies to compare reported incomes to reported expenditures; when expenditures total more than income, the difference is attributed to informal activity (Paglin 1994). While this is a vast improvement—methodologically and theoretically—over previous indirect monetary measures of the underground economy, it has tended to produce inconsistent results and suffers from ecological fallacy. For example, in the case of Switzerland (a nation with historically high savings rates), Weck-Hanneman and Frey (1985) find that income outpaces expenditure, suggesting a negative informal economy (this is true in the US in recent years as well). Any nation with a positive savings rate is likely to elicit similar results when examined with this method. Additionally, it is important to consider the data collection methodology of the national statistical agencies that are relied upon for these measures; in the US, the Bureau of Labor Statistics' Consumer Expenditure Survey provides this information. Discrepancies between reported income and expenditures often arise in this particular data set due to tax liabilities and benefits, unaccounted transfer payments (SSI, unemployment, TANF, etc.), and deficit spending at the household-level. In any event, reliance on these figures to determine the size of informal activity will lead to potentially biased results; the direction of the bias is nation-specific and, as is the case in the US, historically-specific as well.

Indirect Non-Monetary Methods

Indirect non-monetary methods include labor force estimates, the “very small establishment” model, an electricity demand approach, and a national regulatory policy method.

The labor force approach attempts to use official labor statistics to track changes in the informal sector. Some identify occupational categories that are likely to employ individuals informally and use official increases in these categories to arrive at a rough estimate of the total informal economy size (Alden 1982; Del Boca and Forte 1982). Others rely on discrepancies between official estimates (such as the difference between CPS and BLS data) to impute the level of informal labor participation (Denison 1982). Benefits of this approach are derived from the relative ease of data collection in developed nations, where multiple government agencies collect and disseminate labor statistics. However, the primary problem with these approaches is that they assume a monotonic relationship between certain “official” occupations and informal employment, while barring the possibility of dual employment—i.e. participating in both formal and informal sectors—within a national economy. Theoretical and empirical research on underground economies directly contradicts this assumption; formally employed individuals often undertake informal employment as an income augmentation strategy (Castells and Portes 1989; Schneider and Enst 2000).

The “very small establishment” model (VSEs) (Portes and Sassen-Koob 1987) assumes that legitimate businesses employing less than 10 people are the locus of informal activity in advanced economies. Larger firms are assumed to rely on formal

employees due to possible financial sanctions resulting from labor regulation violations. With looser government oversight, small enterprises operate within a more fluid and flexible labor environment, leaving them capable of utilizing informal labor as needed. Portes and Sassen-Koob (1987) find that roughly three-quarters of all businesses in the US are VSEs; while this suggests the possibility of significant underground employment opportunities, there is little empirical verification of the extent of informal employment. How many of these operations rely on informal employment? What is the assumed relationship between VSE counts and total informal activity? Without a baseline measure of the relationship between VSEs and informal activity, we have no meaningful way of determining the total level of underground activity within an economy—any attempt to do so becomes an exercise in arbitrary assumptions.

The electricity demand approach moves away from labor and firm data to focus on a concretized non-monetary measure of total economic activity: electricity consumption. Pioneered by Lizzeri (1979) and implemented in various forms (Del Boca and Forte 1982; Portes 1996; Kaufmann and Kaliberda 1996; Johnson, Kaufmann, and Shleifer 1997; Lackó 1998; Lackó 2000), this method assumes: (1) official GDP estimates do not account for informal activity, (2) total electricity consumption can account for informal activity because underground participation requires physical input and electricity is the most important, and (3) a unitary elasticity between electricity consumption and GDP production is present in most economies. By establishing a baseline relationship between electricity consumed and GDP produced in a given year, researchers can assess the size of a nation's informal economy through excess electricity consumption relative to official GDP. Lackó (1998; 2000) extends and addresses critics

of this approach (Hanousek and Palda 2004) by incorporating multiple ancillary measures that could affect relative informal economy size and focuses on household electricity consumption. The new measures (Lackó 2000) are formalized as:

(1)

$$\ln ER_{ij} = \alpha_1 \ln C_{ij} + \alpha_2 AG_{ij} + \alpha_3 G_{ij} + \alpha_4 Q_{ij} + \alpha_5 PR_{ij} + \alpha_6 H_{ij} + \alpha_7$$

$$\alpha_1 \geq 0, \alpha_2 \leq 0, \alpha_3 \leq 0, \alpha_4 \leq 0, \alpha_5 \leq 0, \alpha_6 \geq 0$$

Where: i : country; j : year; ER_{ij} : per capita household electricity consumption in country i in year j (kWh); C_{ij} : per capita real consumption of households (at purchasing power parity); AG_{ij} : the share of GDP produced in agriculture in total GDP; G_{ij} : index for weather-differences = relative frequency of months with the need for heating in houses (under 10°C) multiplied by the average temperature in January; Q_{ij} : the ratio of energy sources other than electric energy to all energy sources in household energy consumption; PR_{ij} : real price of consumption of 1 kWh residential electricity in US dollars (at exchange rate); H_{ij} per capita output of the hidden economy.

(2)

$$H_{ij} = \beta_1 TL_{ij} + \beta_2 TC_{ij} + \beta_3 D_{ij} + \beta_4 I_{ij} + \beta_5 EX_{ij}$$

$$\beta_1 \geq 0, \beta_2 \geq 0, \beta_3 \geq 0, \beta_4 \geq 0, \beta_5 \geq 0$$

Where: TL_{ij} : tax rate on labor income in country i in year j ; TC_{ij} : tax rate on capital income in country i in year j ; D_{ij} : output decline since 1989: $D_{ij} = 1 - (GDP_{ij} / GDP_{i,1989})$; I_{ij} : annual inflation rate of consumer prices; EX_{ij} : general government expenditure, per cent of GDP.

While Lackó's revised approach certainly adds necessary nuance to the previous measures, several issues remain embedded in this model. First, establishing a baseline level of informal activity is required before proceeding with year-to-year estimates of change. In Lackó's case, this baseline is extracted from an editorial published in *International Economic Insights* that estimates the size of the US informal economy (Morris 1993), which is then applied uniformly to all nations. As with other approaches, using any estimated baseline—while necessary and important—introduces elements of circularity and methodological artifacts into the analysis. Second, the assumption of

unitary elasticity between total electricity consumption and GDP is problematic. As Lackó (2000) notes, reliance on this method can create problems when applied uniformly to all nations; developing nations' growth in electricity consumption is often lower than GDP growth, middle-income nations increase electricity consumption at higher rates than GDP growth, and high income nations approach unitary elasticity between the two measures (Gray 1995). These divergent findings are further complicated by studies of causality between electricity consumption and GDP measures; some find that electricity consumption determines GDP (Altinay and Karagol 2005; Aqeel and Butt 2001; Jumbe 2004; Morimoto and Hope 2004; Narayan and Singh 2007; Shiu and Lam 2004; Wolde-Rufael 2006; Yoo 2005), some find that GDP determines electricity consumption (Ghosh 2002; Mozumder and Marathe 2007), and others find mixed results (Murry and Nan 1996; Yoo 2006). Furthermore, recent studies on the implications of energy efficiency on economic growth and total energy consumption in advanced economies suggest that the unitary elasticity assumption is problematic (York 2010). These divergent findings indicate that a careful comparison of informal economies between nations must accommodate the differences in both the elasticity of energy consumption and GDP production, and the direction of causality present. Third, the assumption that the proceeds of informal labor do not appear in official GDP statistics seems erroneous in cases of cash exchange. While it is true that initial transactions will not appear in GDP data, income derived from underground economic activities is bound to re-enter the formal economy, particularly if informal work is undertaken to supplement legitimate jobs. This is obviously not true of any informal activity relying on bartering, trade, or other non-remunerated labor; however, any transference of underground earnings back

into the formal market will be captured in official GDP statistics (after the initial transaction). The velocity of informal wages returning to the official economy becomes a key unknown variable.

Best Method?

The most difficult aspect of calculating the size of an informal economy using any of the above-described methods is data availability. This is particularly true for the more sophisticated econometric models. Additionally, most studies of informal economy size are comparative in their approach and carried out at the nation-level. Assessing the size of a particular state's informal economy or the size of a narrowly focused activity like marijuana production and consumption leaves few methodological options. This analysis relies on a direct, web-based survey of self-reported marijuana users in Oregon to answer the posed research questions; while using a direct measure limits the generalizability of the findings, it permits for a more accurate estimation of the size and structure of Oregon's marijuana economy (Pahl 1984).

The Marijuana Economy

Investigations of the marijuana economy in the US are limited, but findings appear relatively consistent. The popular view of domestic marijuana distribution networks follows a deterministic flow reminiscent to any other commodity; individual growers (or, more often, criminal syndicates) are believed to produce large quantities of the drug and sell it to wholesalers, who break it down and sell to street-level distributors ("pushers"), who in turn sell to individual consumers—profit is believed to be extracted from each transaction (Carey 1968; Schlosser 2003). Adler and Adler (1983) reaffirm one aspect of this structure in their study of large-scale drug smugglers;

the bulk of imported marijuana is handled by a relatively small number of wholesalers. Similarly, Weisheit's (1992) study of arrested marijuana growers in Illinois contends that a relatively small number of producers are responsible for the bulk of domestic marijuana (76), though he also finds a dichotomy amongst growers of marijuana, with most engaging in the activity for non-monetary, pro-social reasons ("communal growers") (45). In a study of the Baltimore and Washington DC area, Eck and Gersh (2000) contend that most drug distribution is handled through a "cottage industry" of individuals or small cooperatives, though a handful of large, well-coordinated organizations exist and tend to dominate small geographic areas—however, no attempt is made to identify the quantity of drugs handled by the two respective classes of dealers (262). The structure of smaller level sales, however, is less clearly delineated.

Becker (1963) and Goode (1970) identified transaction patterns amongst marijuana users, demonstrating that most obtained their drug from friends; access to a friend with marijuana plays a key role in maintaining use (Becker 1963: 63-64) and, within friendship networks, very little financial profit was realized by sellers (Goode 1970). Further, the transactional roles of seller and buyer appear fluid amongst a community of marijuana users; as Goode indicates,

Selling takes place on many levels, among many kinds of participants. Selling is often a matter of convenience; it may be an arbitrary decision as to who is the buyer and who the seller on a specific transaction. Knowledge of current deals being transacted, or simply having requisite cash, often defines who is to play the role of the dealer on a given occasion. Among our informants, nearly half (44 percent) said that they had sold at least once. Moreover, there was a continuum from the user who had sold only once (12 percent of those who admitted ever selling) to the one who sold frequently, say, more than fifty times (18 percent of all sellers), with shades of variation between. One is struck by the evenness of the range of selling, while if one took the classic pattern of pushing seriously, one would expect to see very few sellers, with nearly all of

those that sold to have done so innumerable times in gigantic quantities. Rather, what we actually find is that many marijuana smokers sell, characteristically in very small quantities. Over a third of those who had sold (36 percent) reported that they most commonly sold in ounces, and about 5 percent said that selling in quantities of a pound or more was usual. The typical seller sold a median of eight times in an average quantity of two ounces (1970: 75).

It appears that many marijuana users engage in selling, usually an ounce or less at a time; the activity appears motivated by both intrinsic social rewards (helping out a friend, gaining positive subcultural status) and a rational attempt to support one's habit. Additionally, Goode (1970) found that individuals' frequency of use is positively related to their status as a seller and the amount they sell.

In any event, the distributed nature of marijuana distribution provides necessary nuance to our conceptions of the marijuana market; regular users of the drug play an important role in ensuring access to the drug for others, though their location in the supply chain is unknown.

Methods

I use a direct approach for assessing the size of Oregon's informal marijuana economy, with data collected via web-based survey. Sample construction was made possible through Respondent Driven Sampling (RDS) procedures. This process and its limitations (both in general and specifically relating to this study) are detailed in Chapter IV. Survey responses of interest directly assess individuals' level of participation in several aspects of the marijuana economy.

The survey instrument collected self-reported information on: (1) demographic characteristics (gender, age, body mass index (BMI), frequency of exercise, county of residence, ethnicity, political party membership, education level, employment status,

relationship status, occupational category, health insurance coverage, number of close friends, and income); (2) marijuana-related questions (use status, frequency of use, reasons for use, medical license status and roles, number of close friends who use, reasons for growing, number of plants growing, method of growing, source and reimbursement rate for obtained marijuana, amount consumed, amount sold and for what price, and the perceived acceptance of marijuana use by immediate social circle and local community); and (3) detailed political orientation (using a replication of the 2011 Pew Political Research political typology questionnaire). OLS regression is used to identify variables associated with marijuana use amount. These results are then used to predict Oregon's total marijuana demand, estimate the economic value of Oregon's marijuana market, and provide several tax revenue projections if the drug were to be legalized.

Results

This section addresses how marijuana is obtained in Oregon, who sells and produces the drug (and their rationales for doing so), and provides an evaluation of illegal marijuana sales' impact on Oregon's economy.

Obtaining Marijuana: Sources, Use Amount, and Costs

Where do users obtain the drug? Respondents were asked to identify all of the sources they received or purchased marijuana from in the last year; this information is presented in Table 5-1, divided along Oregon Medical Marijuana Program (OMMP) participation status. Friends, the black market, and medical growers are the most widely cited sources of marijuana in Oregon. Licensed medical users, as a group, appear to be the most self-sufficient, though they still rely on other medical growers or friends. Most non-licensed users obtain the drug from friends, the black market, and medical growers.

Table 5-1. Sources of Marijuana for Users and OMMP Status

OMMP Participant	Self	Black Market	Dispensary	Medical Growers	Friends	Other
No	4	25	1	14	34	3
Yes	12	3	5	7	6	0
Total	16	28	6	21	40	3

The majority of respondents use less than 20 grams per month, though a handful of outliers consume between 2-3 ounces over the same period. Men, at first glance, appear to use significantly more than women (19.6g vs. 11.1g); however, all of the extremely heavy users are men. If the major outliers ($n=4$) are dropped, men average 11.8g per month—or roughly the same as women. Assuming an 11g per month average use rate, each marijuana-using adult in Oregon will consume approximately 4.5 ounces per year; with an estimated 550,000 users in Oregon, the state requires over 154,000 pounds of processed marijuana to meet the market’s demand. Determinants of monthly marijuana consumption are presented in Table 5-2.

Frequency of use and possession of an Oregon medical license is positively related with monthly marijuana use; for each increase in frequency of use category, users consume approximately 4.6g more per month. Holding a medical license is associated with much higher usage—over 12g more per month—before controlling for age at first use. Higher levels of education are associated with lower consumption of the drug. Having children in the home is positively related and consistently statistically significant with monthly use amounts; in the final model (4), this variable has the greatest overall effect on use amounts (12g). Age at first use is negatively related to monthly consumption; in this context, each additional year of waiting before trying marijuana for

the first time leads to a 2g reduction in monthly consumption. Gender, age, and income do not appear to be related to total monthly marijuana use, although more data is necessary to strengthen the robustness of these findings. Despite their statistical insignificance, coefficients for all three of these variables are negative. With a larger sample size, women may use less. Age has a small effect on use (1g less per month for every four years aged). Income is negatively related, but the coefficient is zero.

Table 5-2. OLS Regression Models Estimating Marijuana Use Amounts

Variable	Model			
	1	2	3	4
Use Frequency	4.64*** (1.06)	4.58*** (1.08)	4.05*** (.96)	4.63*** (.91)
OMMP Cardholder	12.82** (4.35)	12.57** (4.31)	2.47 (4.42)	----
Gender	----	-3.38 (4.01)	-5.50 (3.58)	----
Age	----	-.39 (.21)	-.08 (.23)	----
Education	----	----	-5.37** (1.75)	-5.85*** (1.67)
Income	----	----	-.00 (.00)	----
Children in home	----	----	12.02** (4.04)	11.52** (3.91)
Age at First Use	----	----	-2.00** (.66)	-2.14*** (.59)
Constant	-8.39 (4.96)	5.28 (8.52)	54.43 (14.79)	49.10 (13.14)
<i>n</i> = (Adj. R ²)	68 (.35)	68 (.36)	62 (.50)	62 (.50)

* $p > .05$, ** $p > .01$, *** $p > .001$

The average price paid per ounce of marijuana is \$177 (std. dev.: \$91; $n=57$). Interestingly—and contrary to the claims of many law enforcement officers and policy makers—there is not a statistically significant relationship between the per capita rate of OMMP cardholders and marijuana prices in Oregon counties (see Figure 5-1), though the coefficient is negative and small (-2.37 ; $p=.072$; Adj. $R^2: .04$) in univariate regression tests.

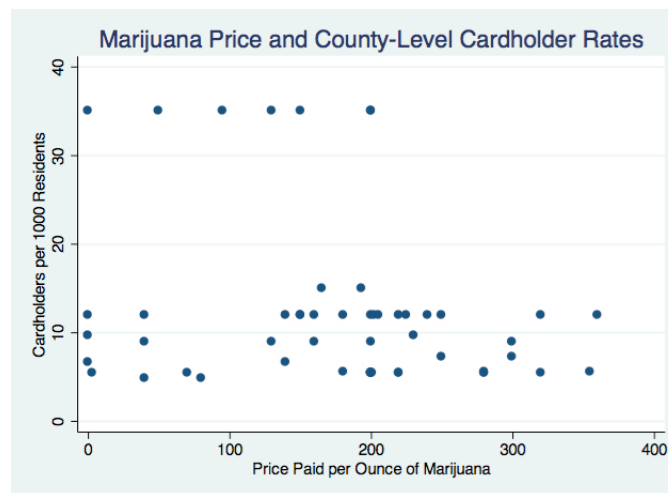


Figure 5-1. Marijuana Price and County-Level Cardholder Rates

It would be logical to assume that individuals paying under \$50 per ounce are members of the OMMP and are receiving the drug at cost from licensed growers (as specified in the Oregon medical marijuana law); however, data indicates that all 8 of these people are illegal users, obtain the drug from “friends,” and use slightly more marijuana per month than average (15g vs. 11g). This finding—which is further supported by anecdotal statements from those involved in marijuana production—suggests that there is a bifurcation in this particular market between medium and small buyers/sellers.

Additionally, the price paid per ounce could also be a function of social proximity; close

friends and family may receive steep discounts or free marijuana, while others pay market price.

While there is little difference in the mean price reported by OMMP participants and illegal users (\$0.11), the variation in prices are significantly greater for non-medical users (std. dev.: \$103 vs \$53) (Figure 5-2).

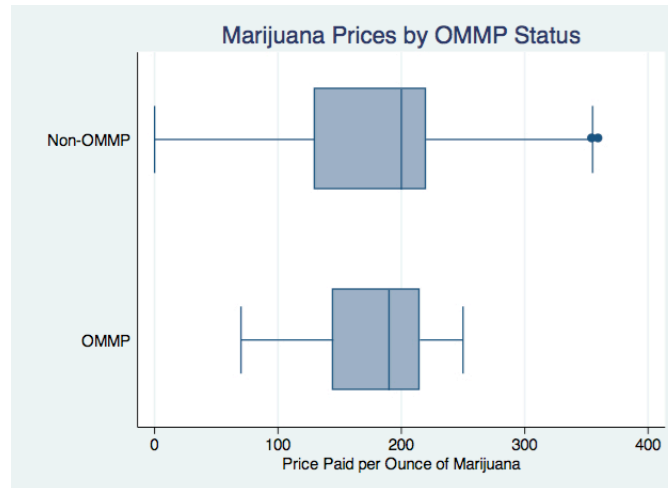


Figure 5-2. Marijuana Prices by OMMP Status

Illegal users have a greater chance of both paying more for their drug than licensed medical users and receiving steep discounts. This is likely to be a function of the amount of marijuana consumed by medical patients and their access to quasi-legitimate sources of the drug. Illegal users who consume small amounts report paying little to nothing for their supply, but more regularly users pay much more.

Who Sells and How Much?

52% of respondents ($n=38$) have sold marijuana at some point in their life. Those who have sold are disproportionately male (76%), educated (76% hold a bachelor's degree or above), and are much more likely to have a criminal record than other respondents. In fact, of the 16 respondents who have been arrested, 15 have sold marijuana and 8 have been arrested on marijuana-related charges. Those who begin

using the drug at an early age are slightly more likely to have sold during their lifetimes. Current use amounts are also positively related to lifetime selling events, though the effect is small. There is no relationship between having sold marijuana and an individual's political ideology, size of close friends network, ethnicity, income, or relationship status.

33% ($n=24$) of respondents have sold marijuana in the past year. 75% of recent sellers are male, 66% hold a bachelor's degree or above, and 91% are employed. The relationship between the number of ounces sold and an individual's income are not statistically significant, though the coefficient is negative; this suggests that sellers of marijuana are either not making a profit, under-reporting their actual income, using sales to offset their own use, or attempt to use marijuana sales to buttress lower-than-average incomes. The mean income of recent sellers is lower than those who have not sold (\$28,937 vs. \$34,975), which provides support to the possibility that selling is used as an adjunct income source for employed, low wage earners or simply offsets the cost of personal use. Of the 24 recent sellers, 14 are participants in the Oregon Medical Marijuana Program (OMMP); re-stated in slightly different terms, 18 of the respondents are participants in the OMMP program and 14 of those sold in the last year. 10 of the 14 individuals who have sold more than 1 pound of marijuana (16 ounces) in the last year are participants in the program as well (see Table 5-3).

Table 5-3. Marijuana Selling and OMMP Participation

Ounces Sold in Last Year	OMMP Participant?		Total
	No	Yes	
15 or less	6	4	10
16-48	3	6	9
49 or more	1	4	5
Total	10	14	24

The groupings present in Table 5-3 can be elaborated further by examining the aggregate amount of marijuana sold: the first group ($n=10$) sold 51 ounces, the second group ($n=9$) sold 253 ounces, and the third group ($n=5$) sold 850 ounces. The top three sellers moved nearly an equivalent amount of marijuana through the underground economy as all other sellers combined (544 ounces vs. 559 ounces). Though it sounds like a lot of marijuana (69 lbs.), the magnitude of these sales must be contextualized in relation to the total demand in Oregon. The amount of marijuana reportedly sold by respondents in this study would meet the personal needs of 245 average users, with an overall consumer/seller ratio of approximately 10:1.

Who Grows and Why?

Sixteen respondents admit to growing marijuana; 12 of those are participants in the OMMP and 4 produce the drug without state protection. Growers from this study sold a total of 721 ounces (mean: 45 ounces per grower; non-growers sold a total of 433 ounces) of marijuana in the last year for a mean price of \$175 an ounce. Limited data obviously hampers the generalizability of these findings, but the results do provide an interesting window into demographic characteristics of growers, rationalizations for growing, and the size of production operations. 13 of the 16 growers are male; 11 of the 16 hold a bachelor's degree or above; 14 are employed; the average age is 31 years; all but one is white; and all are either married or in a stable relationship. The ranked rationalizations for growing offered by these producers are presented in Table 5-4. Self-reliance is the highest ranked and most cited reason for growing, followed closely by "enjoy gardening". There appears to be a strong ideological commitment to the notion that marijuana has a positive impact on people's lives, as well as to helping other people

in need (by extension, marijuana is viewed as fulfilling this unmet need). Surprisingly, making extra money or engaging in production because of the business challenge involved are the least cited and lowest ranked of all rationalizations, despite the fact that 14 of the 16 growers claimed to have sold marijuana in the last year.

Table 5-4. Counts and Ranks of Reasons for Growing

Reason	<i>n</i>	Mean rank	<i>n</i> ranked as #1	
			Medical	Illegal
Being Self-Sufficient	12	1.75	6	2
Enjoy Gardening	12	2.66	1	0
Marijuana’s Positive Impact	10	2.9	2	2
Helping Others in Need	8	3.75	0	0
Black Market Avoidance	8	4.25	0	0
Commitment to Freedom	6	4.5	0	0
Spiritual Aspects	5	4	0	0
Making Extra Money	4	4.5	0	0
Business Challenge	2	6.5	0	0

n=13

Most growers use both indoor and outdoor methods to produce marijuana (*n*=9); 2 exclusively grow outdoors and 5 only grow indoors. The mean plant counts reported—i.e. the average number of plants (seedling, vegetative, and flowering) grown at one time—is 18.5 (std. dev.: 12.8; min: 4, max: 50). All of the respondents who are growing marijuana would be considered small-scale producers by previous researchers (Weisheit 1992; Decorte 2010). The mean gross revenue generated by marijuana sales by these growers (\$7800) supports the “small-scale” designation as well, particularly when larger producers (*n*=2) are excluded: in that case, the gross revenue drops to \$2971 per grower.

Marijuana and Oregon’s Informal Economy

How much marijuana is consumed and produced in Oregon, and how large is its informal marijuana economy? As noted above, estimations suggest that around 550,000 adult Oregonians use marijuana each year (SAMHSA 2009), and data collected in this

study indicate that the average user consumes 4.5 ounces a year—using these figures, Oregon requires about 154,000 pounds of marijuana to meet its internal demand. At an average reported price of \$177 / ounce, this market would generate over \$436 million in revenue per year, making it Oregon’s third most valuable commodity (Oregon Blue Book 2009). Using the data gathered in this study offers the possibility of a slightly more nuanced projection of marijuana’s contribution to Oregon’s informal economy; unfortunately, the RDS sample constructed for this study did not attain equilibrium, so accurate population estimates are not possible. On the other hand, enough data was collected to offer tentative econometric projections (which should be re-examined in a fully-funded study of this population).

Demand

Estimates for Oregon indicate that 10.27% of individuals 26 or older have used marijuana in the last year, and 6.58% used in the last month; for persons in the 18-25 age category, 36.96% used in the last year and 21.9% used in the last month (SAMHSA 2009). If “light users” are operationalized as individuals who use once a month or less and “heavy users” are operationalized as any individual using multiple times in one month, marijuana demand models can be constructed using population estimates for these age groups (18-25 and 26+) and the survey-derived use amounts associated with each category of user and age:

$$D = ((18-25 \text{ POP} * \% \text{ Users}) * \text{Use Amount}) + ((>26 \text{ POP} * \% \text{ Users}) * \text{Use Amount})$$

(3) Light User Demand Model

$$\text{Demand} = (((265,677 * .15) * 1.75\text{g}) + (2,701,901 * .0369) * 3.25\text{g}) * 12$$

(4) Heavy User Demand Model

$$\text{Demand} = (((265,677 * .219) * 22.4\text{g}) + (2,701,901 * .0658) * 17.6\text{g})) * 12$$

Using this approach, the total amount of marijuana demanded in Oregon for 2012 was approximately 169,183 pounds, which translates to \$480 million. This is a larger estimate than was derived from mean usage data. Separating medical users out of the illegal user population can further specify demand models, since many produce their own marijuana and are self-sufficient. About 55,000 individuals are registered with the state as legal medical users; data collected in this study suggests that 11% are between the ages of 18-25, 11% meet the criteria for “light users,” and usage rates vary between illegal and legal using populations. The augmented demand models are:

(5) Light User Demand Model + Medical Users

$$D = (((265,677 * .15) * 1.75\text{g}) + ((2,701,901 * .0369) - 6,050) * 4\text{g}) + (6,050 * 1\text{g})$$

(6) Heavy User Demand Model + Medical Users

$$D = (((265,677 * .219) - 6,050) * 20.54\text{g}) + (((2,701,901 * .0658) - 42,900) * 10.4\text{g}) + (6,050 * 33\text{g}) + (42,900 * 32.6\text{g})$$

This approach suggests that total demand is around 119,846 pounds, with a value of \$339 million—not as large as previous estimates, but still sizeable in relation to other commodities in the state. Demand from medical patients alone is estimated to be 42,515 pounds and valued at \$120.4 million.

Supply

Estimates of marijuana supply are difficult to construct due to the small sample size obtained in this study. For example, 75% of medical users in this study produce their own supply (all are considered “heavy users”)—if this were true for the population of

Oregon medical users, total demand would be reduced by 31,927 pounds (\$90.4 million). Additionally, most produce a small surplus (mean: 45 ounces per year). If this were an accurate depiction of the medical population of users, the quasi-legal production of medical marijuana in Oregon would supply the market (after meeting personal needs) with 140,508 pounds of the finished drug for \$398 million in gross revenue.

Similarly, 6.9% of illegal users also grow marijuana without a state license. 75% of these growers are under 26 years of age and are considered “heavy users”. The mean amount sold in the last year by these producers is 16.5 ounces. Projecting these rates onto the estimated population of Oregon users yields 11,103 illegal growers (9,309 are 18-25 years old; 1,794 are 26 or older). Estimated production from these growers is approximately 11,450 pounds, which would produce gross revenue of \$32 million. If self-sufficient, their production would also reduce aggregate demand by 4827 pounds (\$13.6 million).

Table 5-5 presents estimated marijuana demand and supply figures for Oregon. Demand estimates range from 83,092 to 169,183 pounds (\$235-\$480 million). Supply estimates are very rough projections.

Table 5-5. Oregon Marijuana Demand and Supply Estimates

Demand / Supply	Pounds	Gross Revenue
Demand		
Light / Heavy / Medical User, less Growers	83,092	\$235 million
Light / Heavy / Medical User	119,846	\$339 million
Mean Use	154,000	\$436 million
Light / Heavy User	169,183	\$480 million
Supply		
Medical Growers	140,508	\$398 million
Illegal Growers	11,450	\$32 million

Supply and demand estimates are highly sensitive to changes in self-sufficiency assumptions, particularly regarding medical users. Anecdotal evidence from within the Oregon medical community suggests that far less than 75% of patients produce their own marijuana, but more data is required to confirm this.

Discussion

Even though the sample of Oregon marijuana users constructed for this study are not representative (RDS equilibrium was not achieved), the data collected offers several key insights into the structure and size of this particular informal economy and suggests policy changes are probably necessary.

Oregon decriminalized the possession of 1 ounce or less of marijuana to the level of a civil infraction—you can receive a ticket and pay a small fine—decades ago, but the sale of any amount of marijuana is still charged as a felony. Most marijuana users—legal or otherwise—obtain the drug from friends. This re-confirms decades old research (Becker 1963; Goode 1970) and suggests that the buying and selling of personal quantities of the drug primarily occurs peer-to-peer, rather than “pusher-to-user”. The importance of this finding cannot be overstated; if 33% of marijuana users sold the drug in the last year, this translates to approximately 181,500 Oregonians committing drug distribution felonies for the year. To put this figure in context, 19,262 were arrested on drug related charges in Oregon in 2011; further, 133,414 adults were arrested in total in the state in 2011 (FBI UCR 2011). This either means that law enforcement has dramatically failed to uphold Oregon laws or Oregon lawmakers have ignored the reality of drug distribution network topologies (or, more likely, both). Oregon marijuana distribution appears to meet “robust network” criteria in the dual sense that (1) many

nodes are responsible for and take part in the exchange of this drug, and (2) it “performs well in the face of attack” (Goyal and Vigier 2010). Lawmakers and law enforcers must take note: the criminalization of marijuana sales is an ineffective and piecemeal approach to controlling this substance—there is no centralized source to attack and there are too many active participants to incarcerate. If the goal is to control access to this drug, distribution must be centralized and overseen by the state (either directly or through licensure). Controlling production in a logically consistent fashion may not be possible under the current legal regime, as the medical marijuana program has legitimized and culturally entrenched small-scale, distributed production (and, as demonstrated in this study, most medical users/growers sell the drug, albeit in small quantities).

The situation is further complicated by the rationalizations offered by marijuana growers: though the amount of marijuana produced and sold in the state likely rivals other top commodities, most producers reportedly engage in this activity to help other people and are not attempting to earn a significant profit. Sales by growers seem to offset personal use costs, production costs, and to make up for slightly lower than average incomes. This finding could be attributable, in part, to sampling bias, as all of the growers in this study are considered “small-scale” (under 99 plants; all but two had less than \$10,000 in sales) and they adhere to Weisheit’s “communal grower” classification (1992). Larger producers must exist to meet in-state demand; however, none were identified using the RDS procedure. The implications of this are profound: if a centralized distribution system is put into place (as is under review in Washington), thousands of small growers will be locked out of this emerging market, while a few large

scale producers will reap most of the benefits. For a state with high unemployment and significant income inequality, this type of change is negative.

Proponents of legalization often cite potential tax revenue as a justification for altering the current legal environment. How much could the state of Oregon raise if the drug were legalized? The answer depends on the true market size, effective tax rates levied, retail price, and the proposed method of production and distribution. California’s relatively *laissez-faire* approach to medical marijuana (plant count limits are still in effect for producers) offers some insightful clues; the state levies a sales tax on medical marijuana at the final distribution point (dispensaries) and raised between \$58 million and \$105 million in 2011 (Lifsher 2011). Using the demand models constructed from this study’s survey results, the estimates of tax revenue are offered in Table 5-6.

With a total tax of \$1 per gram, Oregon could see gross tax revenues increase between \$37 million to \$76 million per year. At \$2 per gram, gross tax revenue generated would be between \$75 million to \$153 million per year. These taxes could be collected from growers, at the point of sale, or a combination of the two. Even the lowest estimates are more than double the tax revenue obtained from alcohol licensure (\$16.2 million 2011).

Table 5-6. Oregon Marijuana Tax Revenue Estimates

Demand Model	Pounds	Total Tax / Gram	Revenue
Light / Heavy / Medical User, less Growers	83,092	\$1	\$37,624,057
Light / Heavy / Medical User	119,846	\$1	\$54,266,268
Mean Use	154,000	\$1	\$69,731,200
Light / Heavy User	169,183	\$1	\$76,606,062
Light / Heavy / Medical User, less Growers	83,092	\$2	\$75,248,115
Light / Heavy / Medical User	119,846	\$2	\$108,532,538
Mean Use	154,000	\$2	\$139,462,400
Light / Heavy User	169,183	\$2	\$153,212,125

The amount of revenue generated by legitimizing marijuana-related occupations (growers, trimmers, retailers, plant and seed sales) could prove to be more than direct taxes levied on marijuana itself. Assuming that 15% of the market's gross revenue is recouped through personal income taxes, Oregon could expect to see between \$35 million and \$72 million in additional income tax revenue. Combined with the above estimates of direct taxation on marijuana sales, the state could likely expect to earn between \$72 million and \$225 million by legalizing marijuana. Though this sounds impressive, particularly in the midst of crushing cuts to state programs from reduced revenues, these additions only amount to 1.4% and 4.6%, respectively, of the current \$4.8 billion in revenue collected by Oregon. Additional savings could be derived from the criminal justice system; a thorough calculation is outside the scope of this study, but Miron (2005) estimates that enforcement and incarceration savings are likely to be double that of tax revenue generated from marijuana sales. If that were the case, marijuana legalization—in addition to providing a more logically coherent legal system and social integration for those participating in this particular black market activity—could prove to be a serious economic force in the state.

Conclusion

This study investigated the size and composition of Oregon's informal marijuana economy using WebRDS and survey methods. The results suggest that average marijuana users consume approximately 4.5 ounces per year and pay approximately \$177 per ounce. Most users purchase the drug from friends and nearly 1/3 of respondents indicate that they sell marijuana in small quantities. Growers tend to sell inauspicious quantities to friends and relatives, and rarely earn more than \$10,000 from their sales.

Importantly, the composition of distribution networks suggest that the informal marijuana economy is a “robust network,” particularly in states that allow personal medical production; the implications of this for lawmakers and law enforcers is profound in that it demonstrates that the 40 year old “war on drugs” is not winnable using traditional law enforcement techniques. Several taxation schemes are presented to offer estimates of revenue if the drug were legalized; these findings suggest that marijuana could contribute modestly to the state’s total revenue (much more than alcohol), but the most economically beneficial aspect of legalization could be from criminal justice savings.

CHAPTER VI

CONCLUSION: THE FUTURE OF MARIJUANA IN AMERICA

This study has (1) investigated the sociopolitical factors responsible for passage (or failure) of marijuana-related voter initiatives and legislation in states and detailed the process of policy diffusion occurring amongst states that adopt such measures; (2) assessed which social, political, economic, and ecological factors explain the wide variations in medical cardholder rates between Oregon counties; (3) identified differences amongst marijuana users (legal or otherwise) and general population; and (4) estimated the economic impact of marijuana on Oregon's informal economy and its potential boon to Oregon tax revenues. The findings of this study suggest that: (1) states with strong Democratic majorities and histories of adopting innovative policies are the most at risk to pass marijuana liberalization measures in the near future; (2) the production of medical marijuana—in Oregon at least—is strongly associated with economic malaise and is particularly present in counties whose economies were based on extractive industries in the recent past and are experiencing high levels of unemployment today; (3) users of marijuana do so to alleviate pain, relax, and to stimulate creativity; they are similar in many ways to the population at large, but are more educated, politically liberal, and have healthier average weights—additionally, most who use the drug consume more often and in greater amounts than was previously presumed; and (4) the production of marijuana (in Oregon) is handled by many individuals at small scales (under \$10,000 per year in gross revenue for nearly all growers) and distribution is most often a peer-to-peer affair. Additionally, this study successfully demonstrated that RDS techniques are not effective at achieving sampling equilibrium sample after the third wave of recruiting without

monetarily derived primary incentives. I conclude the study with a brief look at the future of marijuana in America.

In the time between starting this study and preparing to defend it, marijuana laws in the United States took an unexpectedly radical turn. In the November 2012 election, Washington and Colorado voters passed the first initiatives legalizing recreational use and possession of up to an ounce of marijuana for adults 21 and over. Both have stopped arresting and prosecuting individuals for possessing small amounts of the drug, though no official system of supply or distribution has been established yet. Government committees in both states are investigating possible avenues for commercialization, but the structure of the new marijuana marketplace will be strongly influenced by the federal response.

The electoral wins were strong; Washington's I-502 passed with 55% of the vote³³, and Colorado's Amendment 64 garnered 54.8% (more than re-elected President Obama)³⁴. The newfound support for legalization has forced elected officials to seriously consider a topic that, historically, was easily derided; for example, in 2009, during an online "town hall" meeting, the most popular questions (voted on by participants) directed at President Obama dealt with marijuana reform—his response was telling (Sarno 2009):

Three point five million people voted. I have to say that there was one question that was voted on that ranked fairly high and that was whether legalizing marijuana would improve the economy —(laughter)—and job creation. And I don't know what this says about the online audience -- (laughter)—but I just want—I don't want people to think that—this was a

³³ http://vote.wa.gov/results/current/Initiative-Measure-No-502-Concerns-marijuana_ByCounty.html

³⁴ <http://data.denverpost.com/election/results/amendment/2012/>

fairly popular question; we want to make sure that it was answered. The answer is, no, I don't think that is a good strategy—(laughter)—to grow our economy. (Applause.)

The president and federal agencies now confront a situation where laughter will not resolve or clarify the federal position. If the reaction is a retrenchment of previous policies, marijuana producers following state law will be targeted by arrest and asset forfeiture just like medical growers in recent years (Crombie 2012); however, if the federal policy allows this experiment to go forward uninterrupted, a new, legitimate market will supplant the current quasi-illegal one. At least one legal scholar (Mikos 2009) argues that the Supreme Court's anti-commandeering rulings prevent the federal government from forcing their state and local counterparts to enforce the prohibition, so long as they “do not actively assist marijuana users, growers, and so on—they may continue to look the other way when their citizens defy federal law” (1424). What dynamics can we expect from a newly legitimated marijuana market? With an opportunity to shape the market for decades to come, what policy path should states follow?

The case of alcohol re-legalization in America is illustrative in many ways and problematic in others. In pre-prohibition years (1865-1920), the brewing industry was dichotomized between large, national shippers of beer (e.g. Pabst, Schlitz, Blatz, Anheuser-Busch, Lemp, and Christian Moerlein) and a diverse population of local producers (Stack 2000). During this time, beer was distributed in kegs and consumed primarily in saloons, which were often controlled by local breweries (Stack 2000). Between 1865 and 1895, national shippers grew in prominence through vertical and horizontal integration, technological advances (i.e. pasteurization, refrigerated rail cars,

automated bottling machines), advertising, and a five-fold increase in per capita consumer demand (Stack 2000). From 1895 to 1920, however, local producers—who widely varied in their productive capacity—began undercutting the profits of national shippers with their cheaper product (due to lower transportation costs) (Stack 2000). Local prohibition laws also played a role in this process; by 1910, 17% of US lived in dry states and 48% lived in states, counties, or municipalities that strictly regulated or prohibited the sale of alcohol (Brewers Almanac 1979). These market closures placed national shippers under duress, as a significant source of their profits were cut off by the emerging prohibition regime; however, local breweries in wet states prospered in these times, increasing their market share to 72% of the US production total by 1905 (Stack 2000). The tide turned with national prohibition (1920-1933), forcing most local producers into liquidating their production facilities; the national shippers turned to producing bottles of 0.5% alcohol “near beer” (which did not generate much profit, but allowed the large firms to maintain their productive capacity), canned malt extract (sold to quasi-illegal small-scale brewers), and “medicinal beer” licensed by the federal government (Plavchan 1969). Production of intoxicating liquors shifted to a cottage industry of small-scale producers and resulted in higher-potency concoctions—the alcohol industry, for a short time, became a decentralized, democratic (albeit illegal) affair (Levine and Reinerman 2004). When prohibition was finally lifted in 1933, the large breweries were strategically positioned to re-enter the marketplace. New regulations prohibited alcohol manufacturers from owning saloons or bars, and individuals were banned from creating their own alcohol (a change from pre-prohibition days); this had a dramatically negative effect on home production and sales of kegged

beer, giving the large, shipping breweries a distinct competitive advantage—bottled beer sales skyrocketed and, with it, control over the beer marketplace was ceded to large manufacturers (Cochran 1948). An inexorable march towards oligopolic control was carried out in the intervening decades by the largest firms; by 1982, only 67 breweries produced beer in the US (Gisser 1999) and today, two firms—Anheuser-Busch InBev and MillerCoors—control 80% of the domestic beer market (Rosenbaum et al. 2009). Despite concentrated control of the marketplace, craft breweries—owing their origins to the re-legalization of home brewing in 1977—have exploded in recent years, leading to a diversity of small firms even under oligopolic conditions (Carroll 2000). While this new diversity has not lead to a dramatic change in market share controlled by the top producers, it has tapped states into the revenue stream of craft beer sales and helped democratize beer production in an important way (Carroll 2000).

The data collected in this study and others (Weisheit 1992; DeCorte 2010) suggest that the current marijuana market structure is populated by many growers who produce and sell in small quantities, with a tiny minority of growers producing large amounts. This mirrors the known structure of alcohol production during prohibition, with an important caveat: even with the rise of medical production in key states, industrial producers of marijuana are not waiting in the wings to meet demand following the repeal of prohibition, even at the state level. The lessons gleaned from the tradition of tight control in the alcohol industry suggest that restrictive rules—especially at the outset of legalization—will have a profound influence on market structure, with oligopolic control ceded to a handful of firms (through official licensure, firms’ ability to invest, and the early adoption of legalization by particular states). The historically specific rate of

consolidation will obviously vary, but the tendency of mature capitalist economies is towards monopolization in key sectors (Sweezy 1942; Baran and Sweezy 1966; Veblen 1904, 1923; Heffernan 2000). Oligopolic control presents important ramifications for specific industries, workers within those industries, consumers, and the underlying natural systems required to produce particular products—essential elements of these problematics are addressed by the Treadmill of Production (ToP) theory.

ToP was first proposed by Schnaiberg (1980) and focuses on the consequences of the production of goods and services in the capitalist world economy. Schnaiberg posited that capital-intensive producers create consumer goods (and manufacture buyers' consent through advertising and political maneuvering) at whatever rate is necessary to expand production and grow rates of profit. In a general sense, the theory is one of crisis; the necessity for constant growth in production leads to unsustainable consumption of natural resources, which in turn undermines the foundations for all production (nature and labor). In many ways, ToP is an empirical and ecologically-oriented explication of the underconsumption/overaccumulation school of Marxian crisis theory (Gould et al. (2004)). Buttel calls ToP the “single most important contribution sociological concept and theory to have emerged within North American environmental sociology” because it is “based in sociological reasoning and is not a biological or ecological analysis” (Buttel 2004: 323). ToP locates the roots of social and environmental exploitation within the capitalist production process. This has been critiqued for its glossing over of the accumulation process as the motive social force within capitalism (Wright 2004)—some have even said it should be renamed to the “Treadmill of Accumulation” (Foster 2004). However, by demonstrating that capitalism is a social system that deals with the

contradictions it generates through further expansion (in production, extraction, and exploitation of labor), the ToP school levies a lasting critique at any conception of “green capitalism,” while bringing an ecological element to Marxian crisis theories.

The nature and history of capitalism, as developed through ToP theory, suggests that the legalization of marijuana will wrest control from small artisan producers and turn it over to large firms (Heffernan 2000; Baran and Sweezy 1966; Foster, McChesney, and Jonna 2011). The legalization of marijuana—in this lens—is both an economic and social loss for many communities, but especially those with long traditions of illegal growing; even if traditional “hot spots” of production (Northern California and Southern Oregon, for example) become legal cannabis production centers, the economic benefits will disproportionately accrue in the hands of corporate owners and politically disenfranchise small marijuana farmers (Lewontin 2000). ToP theory, in addition to highlighting the inevitable capture of surplus generated from marijuana production by large firms, suggests that legalization will follow a path of profit maximization to the detriment of nature; the loss of genomic diversity is of particular concern with marijuana, as a capitalist approach to its production will focus on yield, maturation time, and ease of harvest (and Glenna 2006). Many scholars of marijuana botany suggest that specific policy decisions during prohibition were already responsible for several radical changes in this domesticated plant (Clarke 1993; Hillig and Mahlberg 2004; Hillig 2005). In particular, the tall, long-flowering, narrow leaf *cannabis indica* varieties (known colloquially as “sativas”) were crossed with short, fast-flowering, broad leaf *cannabis indica* (“indicas”) to facilitate indoor growing after US and Mexican authorities adulterated outdoor crops in Mexico with Paraquat in the late 1970s (Clarke 1993;

Landrigan et al. 1983). In addition to altering the physical stature and maturation time, this selective breeding regime led to significant changes in the chemical profile of commercially available marijuana; as predicted by the “iron law of drug prohibition,” THC concentrations and overall potency increased (Thornton 1991). Similarly, the infusion of broad leaf genes into narrow leaf varieties produced plants with much higher cannabidiol (CBD) ratios than previously seen in domestic marijuana (Clarke 1993). Other chemical changes—which, to this point, have been unelaborated—undoubtedly occurred, as users’ accounts of shifting phenomenological experiences induced by marijuana was altered; older varieties of the drug tended to influence perception, whereas newer varieties have a strong impact on motor coordination (Clarke 1993; King 2001). At this point, it is unknown whether or not legalization will have a more profound effect than prohibition did, but the prohibition years helped to demonstrate how versatile marijuana can be when subjected to the whims of human ingenuity (Pollan 2001)—ToP theory suggests that a legalized production regime will influence marijuana breeding efforts towards strictly profit-oriented goals (Gould et al. 2004). Steps must be made to preserve the remaining genetic diversity of this species before capitalism casts non-profitable traits and expressions on the funeral pyre of progress.

Consumers also stand to lose in some troubling ways. The modernization of marijuana production by industrial capitalism will—if it follows the rationalized developmental path (Weber 2002) of other products—be conducted according to the principles of efficiency, calculability, predictability, and control—or what Ritzer (1996) terms “McDonaldization”. “McDonaldized” marijuana and its production would adhere to the following principles: (1) production will occur at very large scales and with the

use of advanced technology (farming combines, automated trimming machines, industrial vacuum-packing, genetically engineered seed, etc.) to achieve high efficiency in pursuit of maximum profitability (Ritzer 1996: 35); (2) production and sales will be dictated by the quantitative aspects (calculability) of profits, costs, and total volume sold, as opposed to qualitative considerations or for public benefit (Ritzer 1996: 59); (3) finished products will be predictable, both in physical consistency and, as much as possible, in phenomenological experience (Ritzer 1996: 80; Merleau-Ponty 2002); and (4) control over the individuals participating in the production process will be exercised to the point where their actions are vapidly machinelike (Ritzer 1996: 101). Marijuana users will have little choice in the matter, since oligopolic markets sell their goods through advertising rather than following actual consumer preference (Gould et al. 2004).

After the dust has settled on the nationwide marijuana legalization debate, future policy battles will be over non-commercial personal production (reminiscent of the home brewers movement) and limited commercial production by small artisan growers, though, in all likelihood, this will be—much like the microbrewery movement spawned by creative, entrepreneurial home brewers—relatively insignificant in terms of corporate profits. Artisan growing will enable small producers to take advantage of the grape-like *terroir* influences that induce positive manifestations of marijuana traits (Clarke 1993); it will also provide an outlet and expression for the art of marijuana growing, allowing the continued cultural transmission of location and experiential-specific knowledge, which cannot be expressed through rationalized, industrial production. Despite their limited financial impact, artisan *cannabis* producers—or, alternatively, “micro-weederries”—will fill an important niche in the market (Swaminathan 1995), enable more local decision-

making and economic benefit (Ostrom 2010), help protect *cannabis*' genomic diversity (Clarke 1993), and provide users with the peak expression of marijuana's potential.

APPENDIX A

MEDICAL MARIJUANA LAWS IN THE US

A statewide minimum weight and plant count is in effect in California, set at 8 oz. of processed marijuana and 18 plants per patient. However, counties and cities are still allowed to set their own guidelines above this amount, leading to wide variations between areas. Of California's 58 counties, 35 abide by the state minimum; the other 23 range from 8 oz. to 3 lbs. of processed marijuana per patient, and permissible plant counts vary from 18 to infinite (capped by garden canopy size: largest = 150 square feet).

Not surprisingly, counties with the largest allowable possession limits are in Northern California, a traditional “hot-spot” of illegal production. These high plant and possession amounts—coupled with legally sanctioned marijuana dispensaries, legal provision for the “reasonable compensation” of growers, and allowances for growers to produce for multiple patients—make small-scale commercial production possible. While not as *laissez-faire* in its allowance as some California counties, Oregon is still far above the national average. Each patient is allowed 24 oz. of processed marijuana, and 24 plants (6 mature, 18 immature). However, any for-profit sale of marijuana is illegal and no provision for marijuana dispensaries exists. Registered growers may produce marijuana for up to 4 patients, which would equate to 6 lbs. of cannabis and 96 plants (24 mature) at any given time.

Table 2-1. Medical Marijuana States and Their Legal Frameworks¹

Year	State	Method of Passing (% Yes Vote)	Personal Production Allowed?	Weight Allowed per Patient	Permissible Plant Count per Patient	Dispensaries?
1996	California	Proposition 215 (56%)	Yes	8 oz.	18 plants (6 mature, 12 immature)	Yes
1998	Alaska	Ballot Measure 8 (58%)	Yes	1 oz.	6 plants (3 mature, 3 immature)	No
1998	Oregon	Ballot Measure 67 (55%)	Yes	24 oz.	24 plants (6 mature, 18 immature)	No
1998	Washington	Initiative 692 (59%)	Yes	60 day supply	15 plants	No
1999	Maine	Ballot Question 2 (61%)	Yes	2.5 oz.	6 plants	Yes
2000	Colorado	Ballot Amendment 20 (54%)	Yes	2 oz.	6 plants (3 mature, 3 immature)	Yes
2000	Hawaii	Senate Bill 862 (32-18 House; 17-4 Senate)	Yes	3 oz.	7 plants (3 mature, 4 immature)	No
2000	Nevada	Ballot Question 9 (65%)	Yes	1 oz.	7 plants (3 mature, 4 immature)	No
2004	Montana	Initiative 148 (62%)	Yes	1 oz.	6 plants	No
2004	Vermont	Senate Bill 76 (22-7); HB 645 (82-59)	Yes	2 oz.	9 plants (2 mature, 7 immature)	No
2006	Rhode Island	Senate Bill 0710 (52-10 House; 33-1 Senate)	Yes	5 oz.	12 plants	Yes

¹ Derived from ProCon.org (2011) and applicable state laws.

Year	State	Method of Passing (% Yes Vote)	Personal Production Allowed?	Weight Allowed per Patient	Permissible Plant Count per Patient	Dispensaries?
2007	New Mexico	Senate Bill 523 (36-31 House; 32-3 Senate)	Yes	6 oz.	16 plants (4 mature, 12 immature)	No
2008	Michigan	Proposal 1 (63%)	Yes	2.5 oz.	12 plants	Yes
2010	Arizona	Proposition 203 (50.13%)	Yes	2.5 oz.	0-12 plants	Yes
2010	Dist. of Columbia	Amendment Act B18-622 (13-0)	No	2 oz.	--	No
2010	New Jersey	Senate Bill 119 (48-14 House; 25-13 Senate)	No	2 oz.	--	Yes
2011	Delaware	Senate Bill 17 (27-14 House; 17-4 Senate)	No	6 oz.	--	Yes
2012	Connecticut	House Bill 5389 (96-51 House, 21-13 Senate)	No	30 day supply	--	No
2012	Massachusetts	Ballot Question 3 (63%)	Yes	60 day supply	Not specified	Yes

APPENDIX B
QCA TRUTH TABLE

QCA Truth Table for Marijuana Ballot Measures, 1972-2011

Condition									
Democratic Orientation	Innovative State	Deintensify Sanctions	Decriminalize	Legalize	Medical Use	Dispensary Provisions	<i>N</i>	Consistency	
1	1	0	0	0	1	0	6	1	
0	1	0	0	0	1	1	1	1	
0	1	0	0	0	1	0	1	1	
0	0	0	0	0	1	1	1	1	
1	1	0	0	0	1	1	2	1	
1	0	0	0	0	1	0	1	1	
0	1	1	0	0	0	0	3	.66	
1	1	1	0	0	0	0	4	.5	
0	0	0	0	0	1	0	3	.33	
1	1	0	1	0	0	0	4	0	
0	1	0	0	1	0	0	1	0	
0	0	0	1	0	0	0	2	0	
0	1	1	0	0	1	1	1	0	
1	1	0	0	0	0	1	1	0	
1	1	0	0	1	1	0	1	0	
1	1	1	0	0	1	0	1	0	

APPENDIX C

NUMBER AND RATES OF CHANGE IN MEDICAL MARIJUANA CARDHOLDERS

IN OREGON COUNTIES

Number of Medical Marijuana Cardholders Per 1000 County Residents, 2005-2011.

$x > 95\% \text{ CI}$ | $95\% \text{ CI} > x > 5\% \text{ CI}$ | $x < 5\% \text{ CI}$

County	2005	2006	2007	2008	2009	2010	2011
Mean (n=x)	3.98 (n=24)	4.40 (n=24)	4.61 (n=25)	5.39 (n=27)	6.49 (n=30)	8.04 (n=30)	11.08 (n=32)
Baker			3.47	3.77	4.62	4.74	7.49
Benton	1.39	1.71	1.81	2.19	3.04	3.98	5.44
Clackamas	1.92	2.19	2.56	3.20	4.26	5.16	7.20
Clatsop	2.67	3.13	3.13	4.19	5.97	6.21	10.00
Columbia	3.94	3.98	4.42	5.55	7.54	8.86	13.01
Coos	8.34	9.35	8.91	9.59	11.65	12.65	19.91
Crook					3.27	5.21	6.19
Curry	12.74	12.92	12.95	13.25	14.20	17.11	22.22
Deschutes	1.69	1.89	2.49	3.67	5.38	7.29	9.60
Douglas	9.80	9.60	9.06	9.62	11.61	12.81	15.72
Gilliam							
Grant							10.57
Harney							7.11
Hood River	3.82	3.37	4.52	5.60	6.40	7.92	9.78
Jackson	4.28	5.22	5.80	6.98	9.31	14.11	23.27
Jefferson				2.32	3.61	4.50	6.47
Josephine	7.70	9.26	10.83	12.26	15.79	24.09	34.98
Klamath	3.34	3.32	3.83	4.11	5.64	6.89	11.50
Lake				7.25	7.37	10.30	11.74
Lane	4.01	4.69	4.37	5.43	6.83	8.61	11.95
Lincoln	5.36	6.24	7.13	8.61	10.45	11.27	14.93
Linn	2.45	2.80	2.84	3.40	4.95	5.98	8.51
Malheur					1.73	2.73	3.83
Marion	1.42	1.63	1.83	2.27	2.95	3.71	5.60
Morrow							
Multnomah	2.46	2.69	3.07	3.99	5.17	6.12	8.98
Polk	2.09	2.19	2.49	2.89	3.71	4.54	6.61
Sherman							
Tillamook	7.58	8.62	7.82	8.60	10.03	10.89	12.90
Umatilla	0.72	0.76	0.89	1.69	2.39	2.75	4.84
Union	2.00	2.75	2.69	3.98	4.32	5.18	7.62
Wallowa					7.04	8.61	9.89
Wasco	2.63	3.86	4.52	6.16	8.87	10.67	15.11
Washington	1.41	1.59	1.67	2.03	2.70	3.34	4.86
Wheeler							
Yamhill	1.78	1.94	2.27	3.10	4.08	4.99	6.99

Rates of Change in Medical Marijuana Cardholders by County, 2006-2011.

x > 95% CI | **95% CI > x > 5% CI** | **x < 5% CI**

County	2006	2007	2008	2009	2010	2011
Mean (n=x)	.13 (n=24)	.09 (n=24)	.25 (n=25)	.29 (n=27)	.24 (n=30)	.41 (n=30)
Baker			.09	.23	.03	.58
Benton	.23	.05	.22	.39	.31	.37
Clackamas	.14	.17	.25	.33	.21	.39
Clatsop	.17	.00	.34	.42	.04	.61
Columbia	.01	.11	.26	.36	.18	.47
Coos	.12	-.05	.08	.22	.09	.57
Crook					.59	.19
Curry	.01	.00	.02	.07	.20	.30
Deschutes	.12	.32	.47	.47	.36	.32
Douglas	-.02	-.06	.06	.21	.10	.23
Gilliam						
Grant						
Harney						
Hood River	-.12	.34	.24	.14	.24	.24
Jackson	.22	.11	.20	.33	.52	.65
Jefferson				.56	.25	.44
Josephine	.20	.17	.13	.29	.53	.45
Klamath	-.01	.15	.07	.37	.22	.67
Lake				.02	.40	.14
Lane	.17	-.07	.24	.26	.26	.39
Lincoln	.17	.14	.21	.21	.08	.32
Linn	.14	.02	.20	.46	.21	.42
Malheur					.57	.40
Marion	.15	.12	.24	.30	.26	.51
Morrow						
Multnomah	.09	.14	.30	.30	.18	.47
Polk	.05	.14	.16	.28	.22	.46
Sherman						
Tillamook	.14	-.09	.10	.17	.09	.18
Umatilla	.06	.16	.90	.42	.15	.76
Union	.37	-.02	.48	.08	.20	.47
Wallowa					.22	.15
Wasco	.47	.17	.36	.44	.20	.42
Washington	.13	.05	.21	.33	.24	.45
Wheeler						
Yamhill	.09	.17	.37	.32	.22	.40

APPENDIX D

EFFECTS OF MARIJUANA: RESPONSES BY USERS (1970)¹

	N	Percent
More relaxed, peaceful, calmer; marijuana acts as a tranquilizer	88	46
Senses in general are more sensitive, perceptive	69	36
Think deeper, have more profound thoughts	60	31
Laugh much more; everything seems funny	55	29
Exaggeration of mood; greater subjective impact, emotional significance	48	25
Time seems slowed down, stretched out, think more time has passed	44	23
Become more withdrawn, introverted, privaticistic	42	22
Generally, feels nice, pleasant, enjoyable, fun, good, groovy	40	21
Mind wanders, free-associates, stream of consciousness	40	21
Feel dizzy, giddy, lightheaded	39	20
Become tired, lazy, lethargic, don't want to move	37	19
Feel light, airy, floating, elevated	35	18
Feel "happy"	35	18
Forget easily, have memory gaps, can't remember things	34	18
Feel freer, unrestrained, uninhibited	34	18
Stimulation of senses more enjoyable	34	18
Become hungry, want to eat more	32	17
Hear music better, musical ear sharper, more sensitive, accurate	32	17
Enjoy music more, greater pleasure from listening to music	30	16
Feel paranoid	28	15
Have hallucinations	28	15
Feel sleepy	26	14
Care less about everything, worry less, don't give a damn	25	13
Become erotically aroused, marijuana acts as an aphrodisiac	25	13
Mouth and throat feel dry	24	13
Concentrate better, become more involved in anything	24	13
Selective concentration: concentrate on one thing, shut out all else	23	12
Can communicate with others better	22	12
Euphoria, ecstasy, exhilaration	22	12
Sense of depersonalization: being cut off from myself	22	12
Food tastes better	20	10
Tend to fixate on trivial things	20	10
Feel secure, self-confident, get a sense of well-being	20	10
Able to understand others better, their meaning and being	20	10
The pleasure of touching is greater, touch more sensuous	19	10
Feel depressed	19	10
Tend to talk a lot more	19	10
Hear better, auditory sense more acute, hearing more sensitive	18	9
Colors appear to be brighter, more vivid	17	9

¹ Reproduced from Goode (1970).

More uncoordinated, clumsier, motor skills impaired	17	9
Sex is more enjoyable	16	8
Become pensive, introspective, meditative	16	8
Senses become numb; marijuana acts as an anesthetizer	15	8
Body feels warm	15	8
Other people annoy me more, find fault in others	15	8
My vision is clearer, sight improved, see more, see more detail	15	8
Enjoy dancing more	14	7
Subconscious comes out; the real you emerges, one's truer self	14	7
Feel a sense of unity in the universe, a sense of oneness	14	7
Aesthetic impulse greater, enjoy art works more	14	7
Feel more nervous	14	7
I feel thirsty	14	7
Skin feels tingly	14	7
Become outgoing, gregarious, convivial, extroverted	13	7
Eyes become hot, heavy, bloodshot, puffy	12	6
Body feels heavy	12	6
Sense of touch improved, more sensitive, can feel things sharply	12	6
Mind works more quickly, mind races	11	6
Experience synesthesia phenomena	11	6
Become more active, want to move around more	11	6
Feel a sense of unreality of everything around me	10	5

APPENDIX E

ASSOCIATION OF USE MEASURES WITH CLOSE FRIENDS WHO USE

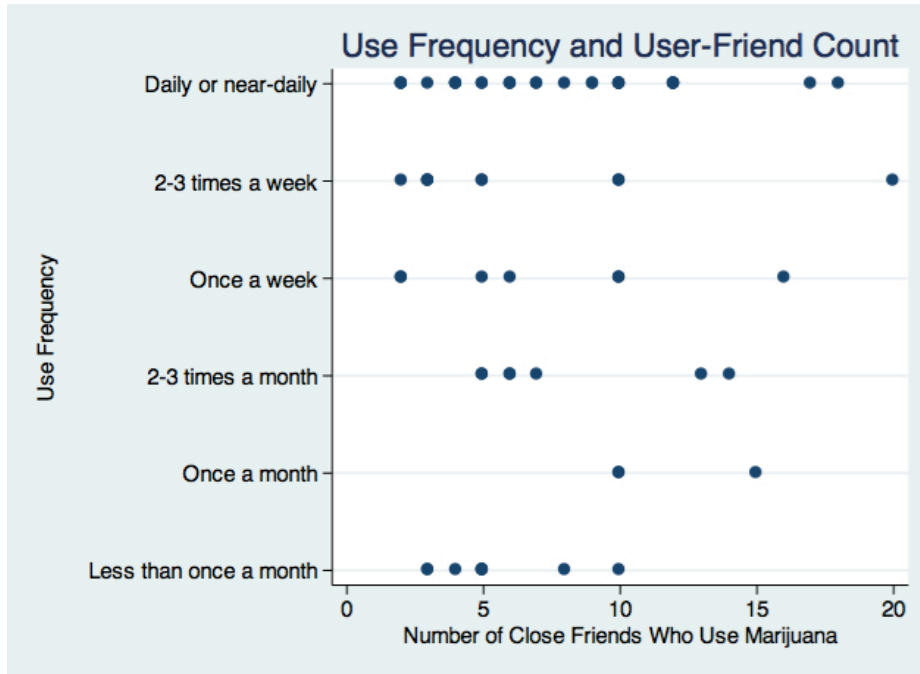


Figure 4-7: Frequency of Use and Number of Close Friends Who Use

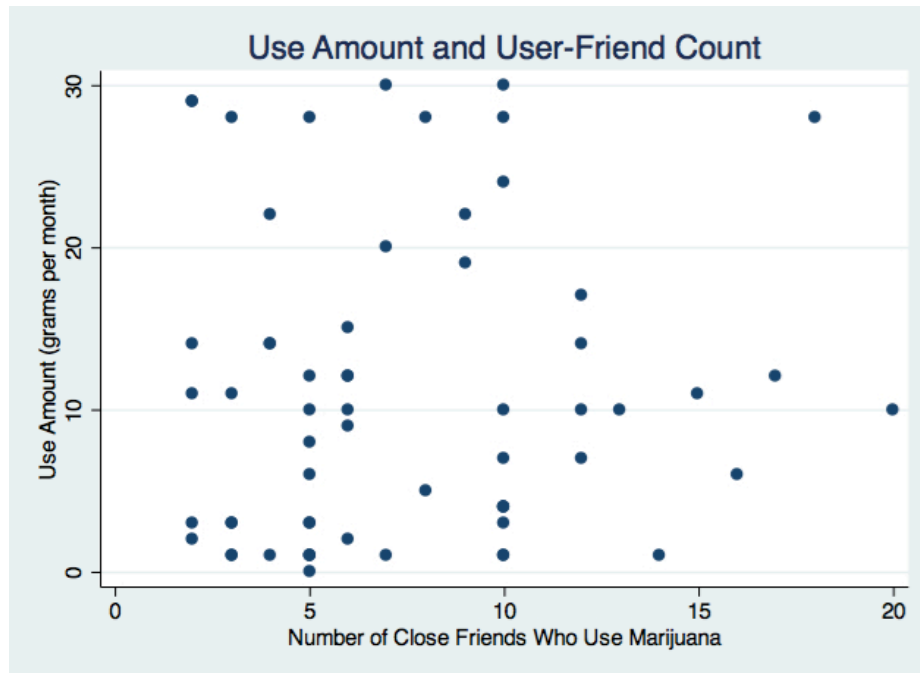


Figure 4-8: Use Amount and Number of Close Friends Who Use

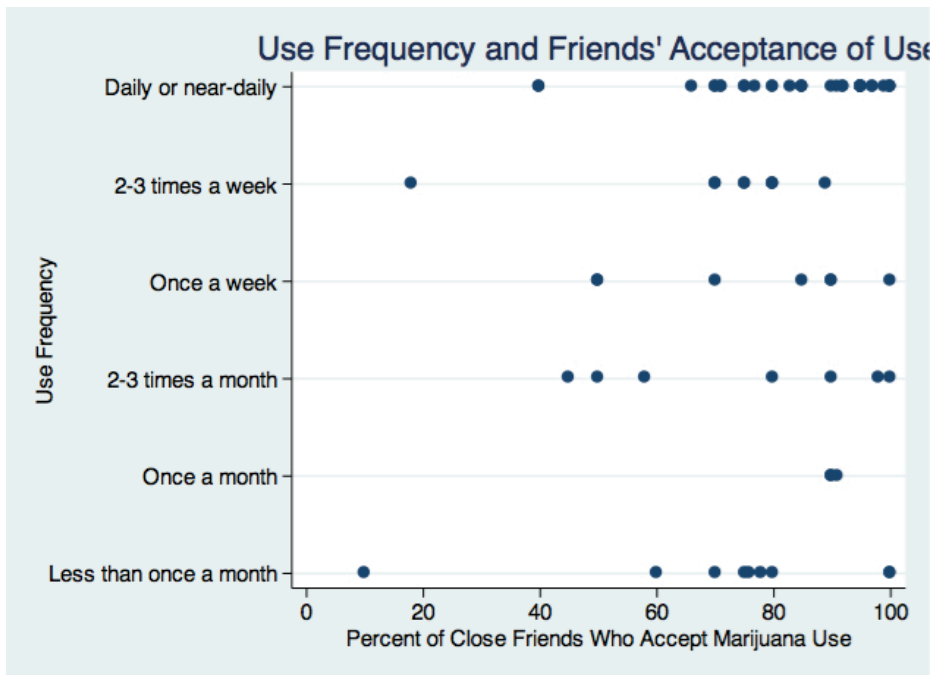


Figure 4-9: Frequency of Use and Close Friend Acceptance of Use

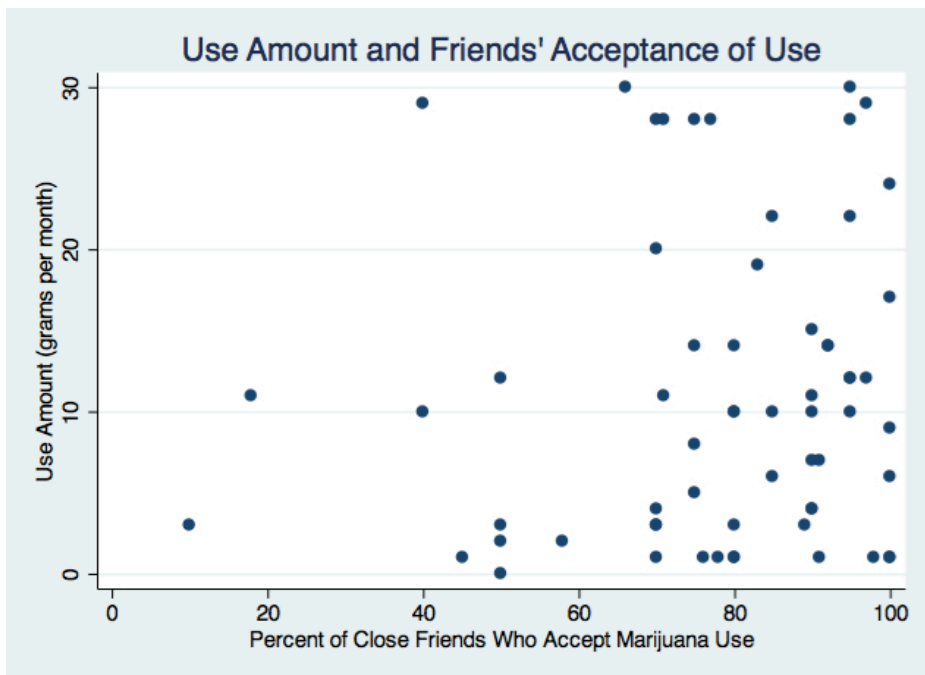


Figure 4-10: Use Amount and Close Friend Acceptance of Use

APPENDIX F

RECRUITMENT LETTER AND SURVEY INSTRUMENT

Recruitment Letter

Dear Oregonian,

I am writing to invite you to participate in a unique research study I am conducting at the University of Oregon. Participation in the study is completely voluntary and no personally identifiable information will be collected from or about you. Please be forewarned that the questions will ask you to provide sensitive information regarding illegal activities. If you choose to participate, please take the survey in a private, secure setting. Your responses are anonymous and confidential.

The study is examining a specific “hidden population” in Oregon and attempting to gather information about their attitudes, opinions, and experiences. If you are receiving this letter, it means that a previous participant in the study believes you could contribute to the project in a meaningful way (i.e. another participant believes you are a member of the “hidden population” being studied). If you choose to complete the survey, you will also have the chance to refer other participants to the study.

A unique aspect of this study is that previous participants identify future potential participants in a process known as “respondent-driven sampling”. This helps ensure that the researcher will not collect any personally identifiable information from you (your name, address, etc.), and provides a way of accessing difficult to reach populations. At no point in the research process will your identity be identifiable by any of the researchers conducting this study. Each participant receives a unique “study ID” (located below); this ID protects your identity and allows researchers to identify patterns of association between study participants along key variables (such as gender, age, and ethnicity). The ID is used to anonymously link participants to their anonymous referrers.

The study is open to all adults (18+) who live in Oregon and who have received a unique version of this letter. Participation would involve completing an online survey, which will take about 20 minutes to complete. I cannot guarantee that you will personally benefit from this research. The study is seeking approximately 500 participants.

After completing the survey, you will be asked to refer other participants to the study. The success of this research project is entirely reliant on the recruitment of additional respondents. Please take a few moments to consider referring other people to this study.

If you are interested in participating in this study, you may do so at the following website:

<http://tinyurl.com/oregon-seth>

You will be asked to enter your **unique** study ID. Your **study ID** is: -----> **1a0000**

Please contact me at scrawfo1@uoregon.edu if you would like to learn more information about the study. Your participation is voluntary. Thank you in advance for considering this request,

Seth Crawford, MPP, MS
Doctoral Candidate
Department of Sociology
University of Oregon

Introduction and Informed Consent

University of Oregon Consent Form

University of Oregon
Department of Sociology

Informed Consent for Participation as a Subject in:
The Political Economy of Medical Marijuana

Investigator: Seth Crawford
Type of consent: Adult

Introduction

- You are being asked to be in an anonymous and confidential research study designed to contribute to a doctoral dissertation on licensed medical marijuana users and non-licensed marijuana users.
- You were selected as a possible participant because you were referred by a previous participant of this study as a potential marijuana user. The person who referred you to this study is anonymous to researchers. You will be anonymous to researchers as well.
- We ask that you read this form and ask any questions that you may have before agreeing to be in the study.
- After completing the survey, you will be asked to refer other marijuana users that you know into the study. This portion is optional, though the success of this study hinges on collecting a large sample of users.

Purpose of Study:

- The purpose of this study is to identify characteristics of licensed medical marijuana users and characteristics of non-licensed marijuana users.
- Participants in this study are adults living in Oregon.

Description of the Study Procedures:

- If you agree to be in this study, we would ask you to answer several questions about yourself and provide information about the attitudes of people in your community. Please note: the questions will ask you about illegal behaviors, including marijuana use, frequency of use, marijuana growing, and the purchasing/selling of marijuana. To protect your privacy, **please take the survey alone and in a private setting**. This process should take about 20 minutes to complete. After completing the survey, you will be redirected to a web site that will provide you with documents to distribute to other marijuana users that you may know. If you choose to recruit other users into this study (by either printing out the recruitment letter and hand-delivering it or sending it electronically), please exercise caution when recruiting others to this study. Sending a recruitment letter to an acquaintance, friend, co-worker, or family member will most likely identify you as a marijuana user to the recipient. Please also consider the implications for your intended recipient; receiving a recruitment letter will also signal to others that they are a marijuana user. Your responses and those of people you refer to the study are anonymous and confidential. No personally identifying information will be collected.

Risks/Discomforts of Being in the Study:

- There are no potential physical risks known in this study. The primary risk in this study is derived from the illegality of marijuana production, consumption, and distribution at the federal level; though Oregon allows these types of activities with official licensure, the federal government does not. Potential prosecution poses both financial and emotional risks to participants. To minimize this risk, **no personally identifiable information is collected**. Attempting to contact other respondents for referral into the study poses emotional risks to respondents; since this survey is directed at marijuana users, recruiting others could be interpreted as admission to marijuana use and cause embarrassment, other social sanctions, or threat to employment. Please exercise appropriate discretion when contacting potential recruits into this study. There is also a slight possibility of emotional risk derived from the discussion of previous or currently illegal behavior associated with marijuana production, consumption, and distribution.
- Due to the nature of the questions asked in this survey, **please take the survey alone, in a private setting**. Do not take the survey at work or in a place where someone may see your responses.

Benefits of Being in the Study:

- The benefits of participation include having access to the final report, which will be available at

<http://pages.uoregon.edu/scrawfo1/Seth/Dissertation.html>

- However, I cannot guarantee that you will receive any personal benefit from participating in this study.

Payments:

- You will not receive any direct reimbursement for participating in this study.

Costs:

- There is no cost to you to participate in this research study.

Confidentiality:

- The records of this study will be kept private, though none of the information collected will contain any personally identifiable data. Each respondent is assigned a unique, non-personally identifying "study ID" number (located on your recruitment letter). This number allows researchers to track recruitment chains without collecting any personally identifiable information. Study IDs allow researchers to identify patterns of association between marijuana users, but in a way that protects your anonymity. In any sort of report we may publish, we will not include any information that will make it possible to identify a participant. Research records will be stored in an encrypted, password-protected computer file.

Voluntary Participation/Withdrawal:

- Your participation is voluntary. If you choose not to participate, it will not affect your current or future relations with the University.
- You are free to withdraw at any time, for whatever reason.
- You will be asked, upon completing the survey, to refer other individuals to the study. You are not required to participate in this aspect of the research.
- There is no penalty or loss of benefits for not taking part or for stopping your participation.

Contacts and Questions:

- The researcher conducting this study is **Seth Crawford**. For questions or more information concerning this research you may contact him at scrawfo1@uoregon.edu.
- If you have any questions about your rights as a research subject, you may contact: Research Compliance Services, University of Oregon at (541) 346-2510 or ResearchCompliance@uoregon.edu

Copy of Consent Form:

- You may print this consent form to keep for your records and future reference.
 - By clicking on this box, I acknowledge I have read (or have had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to any questions I might have. I give my consent to participate in this study. I have received a copy of this form.

Demographics

What is your study ID? (located on your recruitment letter)

Thank you for participating in this survey!

The first section of this survey will ask you to provide some general information about yourself. The second will ask questions about your relationship with marijuana. The third section will ask a couple questions about your views on the world. Participation is voluntary and you may stop at any time.

Estimated time to complete survey: 15 minutes.

Thank you for participating in this survey!

The first section of this survey will ask you to provide some general information about yourself. Participation is voluntary and you may stop at any time.

What is your gender?

- Male
- Female

How old are you?

How tall are you?

How much do you weigh? (in lbs.)

How many days do you exercise for 20 minutes or more each week?

	0	1	2	3	4	5	6	7
Days per week of exercise								

What county do you live in?

Please identify the ethnic/racial category that best describes you.

- White
- Black
- Asian American
- Latino
- Native American
- Other

Which political party are you registered with?

- Republican
- Democrat
- Independent
- Libertarian
- Green
- Constitution
- Other
- Not registered with any political party

What is the highest level of education you have completed?

- Some high school
- High school graduate (or GED)
- Associate's degree
- Bachelor's degree
- Master's degree or above

Are you currently employed?

- Yes
- No

Which occupational category best describes your employment?

Do you have health insurance?

- Yes
- No

Who is your health insurance provider?

- Regence Blue Cross / Blue Shield
- Kaiser Foundation Health Plan
- Providence
- Pacificsource
- Health Net
- Unitedhealthcare Insurance
- Pacificare
- Lifewise
- ODS Health Plan
- Oregon Health Plan
- Other

What is your current relationship status?

- Single or divorced
- Married or in a civil union
- In a stable relationship (but not married or in civil union)

Do you have children who live with you?

- Yes
- No

What is your current gross yearly income (include unemployment insurance if unemployed)?

Marijuana Questions

The following questions will ask you describe aspects of your life that are potentially illegal. Your participation in this study is voluntary and you may stop taking the survey at any time.

Have you ever used marijuana?

- Yes
- No

At what age did you first use marijuana?

	5	15	24	34	43	53	62	72	81	91	100
Age											

Have you consumed marijuana in the last year?

- Yes
- No

How often do you consume marijuana?

- Less than Once a Month
- Once a Month
- 2-3 Times a Month
- Once a Week
- 2-3 Times a Week
- Daily or near daily

On average, how much marijuana do you consume each month (in grams--28g per ounce)?

	0	10	20	30	40	50	60	70	80	90	100
Marijuana Consumed (grams)											

Which of the following are reasons that you consume marijuana?

- | | |
|---|--|
| <input type="checkbox"/> Euphoria | <input type="checkbox"/> To dull reality |
| <input type="checkbox"/> Sleep aid | <input type="checkbox"/> To forget problems or worries |
| <input type="checkbox"/> Pain management | <input type="checkbox"/> Stimulate creativity |
| <input type="checkbox"/> Appetite stimulant | <input type="checkbox"/> Depression |
| <input type="checkbox"/> Relaxation | <input type="checkbox"/> Other medical reasons |
| <input type="checkbox"/> Spiritual aspects | <input type="checkbox"/> To get "stoned" |
| <input type="checkbox"/> To be social | <input type="checkbox"/> Other |

Please order your reasons for consuming marijuana from most important to least important.

» Euphoria

» Sleep aid

» Pain management

» Appetite stimulant

» Relaxation

» Spiritual aspects

» To be social

» To dull reality

» To forget problems or worries

» Stimulate creativity

» Depression

» Other medical reasons

» To get "stoned"

» Other

Do you have a current Oregon Medical Marijuana Card?

Yes

No

About how long have you been a licensed participant in the Oregon Medical Marijuana program?

Which of following describes your role(s) in the Oregon Medical Marijuana program? Please select any that apply.

Patient

Caregiver

Grower

What is your qualifying medical condition? (select all that apply)

Severe pain

Cancer

Glaucoma

Agitation due to Alzheimer's disease

HIV/AIDS

Cachexia

Severe nausea

Seizures

Persistent muscle spasms

How do you primarily obtain your marijuana?

Grow it myself

Receive it for free from friends or family

Purchase it from black market sources

Other

Purchase it from co-ops or quasi-dispensaries

I do not use marijuana and do not provide it to others

Obtain it from licensed growers

Please select any of the following items that motivate you to grow marijuana.

- Making extra money
- Being self-sufficient
- Enjoy gardening
- Spiritual satisfaction
- Helping friends or others in need
- Political commitment to freedom
- Belief that marijuana has a positive impact in people's lives
- The business challenge associated with marijuana production
- Staying out of the black market

Please rank your motivations to grow marijuana from most important to least important.

» Making extra money

» Being self-sufficient

» Enjoy gardening

» Spiritual satisfaction

» Helping friends or others in need

» Political commitment to freedom

» Belief that marijuana has a positive impact in people's lives

» The business challenge associated with marijuana production

» Staying out of the black market

Do you grow indoors, outdoors, or both?

- Indoors only
- Outdoors only
- Both indoors and outdoor

How many marijuana plants (on average) do you grow at a time? Please include seedlings, vegetating, and flowering plants in your count.

	0	10	20	30	40	50	59	69	79	89	99
Number of Plants											

What is the average "reimbursement" amount for an ounce of marijuana when you obtain it from someone else?

	0	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Reimbursement Amount																	

Have you ever sold or received "reimbursement" for marijuana (legal or otherwise)?

- Yes
- No

How many ounces did you sell or receive reimbursement for in the last year? (16 oz = 1 lb)

	0	32	64	96	128	160	192	224	256	288	320
Ounces of Marijuana Sold											

On average, how much reimbursement did you receive per ounce?

	0	40	80	120	160	200	240	280	320	360	400
Price per ounce											

What percentage of your social circle (friends, family, co-workers) are accepting of marijuana use?

	0	10	20	30	40	50	60	70	80	90	100
% of social circle who accept marijuana use											

How many close friends do you have (not including family members)?

	0	2	4	6	8	10	12	14	16	18	20
Number of close friends											

How many of your close friends use marijuana?

	0	2	4	6	8	10	12	14	16	18	20
Friends who use marijuana											

How acceptable are the following activities in your community?

	Never Acceptable			Always Acceptable						
	1	2	3	4	5	6	7	8	9	10
Using marijuana										
Growing marijuana										

Selling marijuana									
Having a medical marijuana card									

Have you ever been arrested for any crime?

- Yes
- No

Have you ever been arrested for a marijuana-related crime?

- Yes
- No

Pew Political Orientation Factors

This is the final section of the survey. Please choose the response from each pair that comes closest to your views. Your participation in this study is voluntary and you may stop taking the survey at any time.

Choose the response that comes closest to your views.

Religion is an important part of my life.

Religion is not that important to me.

Business corporations make too much profit.

Most corporations make a fair and reasonable amount of profit.

Government regulation of business is necessary to protect the public interest.

Government regulation of business usually does more harm than good.

This country should do whatever it takes to protect the environment.

This country has gone too far in its efforts to protect the environment.

The growing number of newcomers from other countries threatens traditional American customs and values.

The growing number of newcomers from other countries strengthens American society.

Homosexuality should be accepted by society.

Homosexuality should be discouraged by society.

The best way to ensure peace is through military strength.

Good diplomacy is the best way to ensure peace.

<input type="radio"/>	<input type="radio"/>
I often don't have enough money to make ends meet.	Paying the bills is generally not a problem for me.
<input type="radio"/>	<input type="radio"/>
I'm generally satisfied with the way things are going for me financially.	I'm not very satisfied with my financial situation.
<input type="radio"/>	<input type="radio"/>
Too much power is concentrated in the hands of a few large corporations.	The largest companies do NOT have too much power.
<input type="radio"/>	<input type="radio"/>
Poor people today have it easy because they can get government benefits without doing anything in return.	Poor people have hard lives because government benefits don't go far enough to help them live decently.
<input type="radio"/>	<input type="radio"/>
Government is almost always wasteful and inefficient.	Government often does a better job than people give it credit for.
<input type="radio"/>	<input type="radio"/>
It is NOT necessary to believe in God in order to be moral and have good values.	It IS necessary to believe in God in order to be moral and have good values.
<input type="radio"/>	<input type="radio"/>
Most people who want to get ahead can make it if they're willing to work hard.	Hard work and determination are no guarantee of success for most people.
<input type="radio"/>	<input type="radio"/>
Racial discrimination is the main reason why many black people can't get ahead these days.	Blacks who can't get ahead in this country are mostly responsible for their own condition.
<input type="radio"/>	<input type="radio"/>
Immigrants today strengthen our country because of their hard work and talents.	Immigrants today are a burden on our country because they take our jobs, housing and health care.
<input type="radio"/>	<input type="radio"/>
Using overwhelming military force is the best way to defeat terrorism around the world.	Relying too much on military force to defeat terrorism creates hatred that leads to more terrorism.
<input type="radio"/>	<input type="radio"/>
Our country has made the changes needed to give blacks equal rights with whites.	Our country needs to continue making changes to give blacks equal rights with whites.

Click to write the question text

The government should do more to help needy Americans, even if it means going deeper into debt.

The government today can't afford to do much more to help the needy.

Stricter environmental laws and regulations cost too many jobs and hurt the economy.

Stricter environmental laws and regulations are worth the cost.

End Survey

Thank you for participating in this survey! Your responses are greatly appreciated and will help us to understand Oregon marijuana users. The final analysis of this data will be made available at:

<http://pages.uoregon.edu/~scrawfo1/Seth/Dissertation.html>

You will be redirected to the recruitment letter generator web site in a moment. Please follow the instructions on that web page if you are willing to recruit other participants into this study.

The success of this study relies on your willingness to recruit additional Oregon marijuana users (legal or not) to take the survey. While you are not required to do so, please consider recruiting other people that you know (who use marijuana) into this study. Due to the sensitivity and federal illegality surrounding marijuana use, please exercise caution when recruiting others to this study. Sending a recruitment letter to an acquaintance, friend, co-worker, or family member will most likely identify you as a marijuana user to the recipient. Please also consider the implications for your intended recipient; receiving a recruitment letter will also signal to others that they are a marijuana user.

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