



Research paper

Cannabis policies and user practices: Market separation, price, potency, and accessibility in Amsterdam and San Francisco

Craig Reinerman*

Department of Sociology, University of California, Santa Cruz, CA 95060, USA

Received 3 September 2007; received in revised form 4 November 2007; accepted 12 November 2007

Abstract

Background: This paper explores user perceptions and practices in contrasting legal-policy milieux—Amsterdam (*de facto* decriminalization) and San Francisco (*de jure* criminalization) on four policy issues: sources of cannabis and separation of markets for it and other drugs; user perceptions of effects of price on consumption; effects of potency on consumption; and perceived risk of arrest and accessibility of cannabis.

Methods: Questions on these issues were added to surveys on career use patterns amongst representative samples of experienced cannabis users using comparable methods.

Results: Most San Francisco respondents obtained cannabis through friends who knew dealers, whereas most Amsterdam respondents obtained it from regulated shops. Only one in seven Amsterdam respondents but half the San Francisco respondents could obtain other drugs from their cannabis sources. Majorities under both systems had never found cannabis “too expensive.” Amsterdam respondents preferred milder cannabis whilst San Francisco respondents preferred stronger; majorities in both cities reported self-titrating with potent cannabis. Risk and fear of arrest were higher in San Francisco, but most in both cities perceived arrest as unlikely. Estimated search times were somewhat longer in San Francisco, but a majority reported being able to access it within half a day.

Conclusions: There is substantial separation of markets in the Dutch system. Policies designed to increase cannabis prices appear unlikely to impact consumption. Decriminalization was associated with a preference for milder cannabis, but under both policy regimes most respondents self-titrated when using more potent strains. Criminalization was associated with somewhat higher risk and fear of arrest and somewhat longer search times, but these did not appear to significantly impede access for most respondents.

© 2007 Published by Elsevier B.V.

Q2 Keywords: Cannabis; Drug policy; Drug markets; Potency; Price

Introduction

With the partial exception of the Netherlands, virtually all governments around the globe have passed laws prohibiting cannabis use (Levine, 2003). The most fundamental premise of these laws and the policies flowing from them is that criminalization is necessary for keeping cannabis use in check, and that the absence of such legal deterrents would increase the prevalence of use and thus increase related problems. However, in comparison to the large body of sophisticated research on how alcohol and tobacco policies influence the behaviour of drinkers and smokers, there has been much less research on the specific empirical relationships between drug

laws and the drug user behaviours they are designed to impact (see, e.g., Kilmer, 2002, for a thorough review).

In a previous study we had the rare opportunity to analyse use patterns over several phases of the user careers of representative samples of experienced cannabis users in contrasting legal-policy milieux (Amsterdam and San Francisco) using comparable sampling designs and survey instruments (Reinerman, Cohen, & Kaal, 2004). First-stage prevalence surveys of the general population were used to identify experienced users who were then interviewed in depth in a second-stage survey. Contrary to expectations, the general population prevalence surveys (age 18 and above) showed significantly lower lifetime prevalence of cannabis use in Amsterdam (34.5%), where it has been effectively decriminalized, than in San Francisco (62.2%) where it remains criminalized. Similarly, the subsequent experienced

* Tel.: +1 831 459 2617; fax: +1 831 459 3518.
 E-mail address: craigo@ucsc.edu.

user survey found significantly lower lifetime prevalence of the use of other illicit drugs – cocaine, crack, amphetamine, ecstasy, and opiates – in Amsterdam than in San Francisco.

Differences in drug law and use prevalence notwithstanding, there were many more similarities than differences in use patterns across the two samples. Age of onset, age at first regular use, and age at the start of their periods of maximum use were nearly identical in both cities. Amsterdam respondents reported somewhat more frequent use when they first began using regularly and during their maximum use periods, but they used smaller quantities in their first year of regular use and were similar to San Francisco respondents in frequency and quantity of use during other phases of their careers. Two-thirds of both samples consumed 4 g per month or less during their first years of regular use and 14 g per month or less during their maximum use periods. Amsterdam respondents were more likely to report mild intoxications in most career periods, but clear majorities in both samples reported intoxication limited to 2–3 h duration over most of their use careers. There were no substantial differences between the two samples regarding in which parts of the day or week cannabis was used (mostly evenings and weekends), in the number or seriousness of cannabis-related problems, or in the length of cannabis use careers. Almost exactly one-third of each sample had ceased using cannabis at time of interview (Reinerman et al., 2004). These similarities across the different legal-policy milieux suggested that cannabis use may now be so deeply embedded a cultural practice that drug laws and policies by themselves may have limited influence on the user practices they are intended to affect (Cohen & Kaal, 2001; Reinerman & Cohen, 2007, in press; cf., Kilmer, 2002).

In those surveys on career use patterns, we included several side questions intended to explore the relationship between drug policies and user practices. In this paper we report responses from experienced cannabis users in Amsterdam and San Francisco on the following issues:

- the extent of *separation of markets* for cannabis from those for other illicit drugs;
- the extent to which users perceive the *price* of cannabis influencing their use level;
- the extent to which *potency* of cannabis influences users' practices; and
- the extent to which *perceived risk of arrest* is associated with *accessibility*.

Study design and methods

The original study was designed to assess use patterns as they evolved over time, which required a survey of representative samples of cannabis users who had enough experience to be able to answer questions about use over a “career.” We defined as “experienced” those who had used cannabis on at least 25 occasions in their lives. Use of this criteria meant that the samples would, by definition, include a wide range

of respondents at different phases of their user careers, e.g., some young people whose 25 use occasions were in recent years, and some older people or former users whose 25 use occasions took place years ago. It is likely that some of their responses will vary accordingly, but in a study of career use patterns in a representative sample, that variation is not only unavoidable but desirable; it reflects the variation that exists in the general population, which is what we hoped to learn about.

The Amsterdam sample was recruited from respondents who took part in a broader household survey of drug use prevalence. This survey was administered to a random sample drawn from Amsterdam’s Municipal Population Registry. The overall response rate was 50.2%, yielding a sample of 4364. We compared responders with non-responders and with city demographic data and found no significant differences requiring weighting. Further details on the response/non-response analysis are available in Sandwijk, Cohen, Musterd, and Langemeier (1995) on the website of the Center for Drugs Research at the University of Amsterdam (<http://www.cedro-uva.org/lib/>).

All respondents in the prevalence survey who reported having used cannabis at least 25 times ($n=535$; 12.3% of the population sample) were asked to participate in an in-depth interview about their cannabis use. Of the 535 experienced users identified in the general population sample, 216 (40.5%) were ultimately interviewed in 1996 (Cohen & Sas, 1998). This modest response rate necessitated a check on representativeness. We compared the 216 who responded to the 319 who did not on 12 demographic variables (e.g., age, sex, ethnicity, education) and drug use prevalence variables (e.g., lifetime and last-year prevalence of cannabis and other drugs). Respondents had slightly higher levels of formal education and slightly higher last-year prevalence of cannabis use (Cohen & Kaal, 2001; Cohen & Sas, 1998), but did not otherwise differ from non-respondents and thus were reasonably representative of experienced cannabis users in the population.

We later replicated the Amsterdam survey of experienced users in San Francisco. We selected San Francisco as the comparison city not because it is representative of the U.S., but because it is the most comparable to Amsterdam. Both are liberal, cosmopolitan port cities of similar population size; both are cultural and commercial capitols of regional conurbations. San Francisco does not maintain a population registry, so to remain consistent with the Amsterdam research protocol we first drew an area probability sample by randomly selecting census tracts, blocks, buildings, households, and adults within households. We then administered a brief prevalence survey consisting of demographic and drug use prevalence questions. Unlike the Amsterdam prevalence survey, which was an extensive study in its own right, this brief prevalence survey in San Francisco was designed principally as a means for generating a comparable random representative sample of experienced cannabis users. (Homeless and institutionalized inhabitants were not sampled in either city.)

Table 1

Q5 Demographic characteristics of the experienced user samples

	Amsterdam	San Francisco	Chi-square
Mean age	34.2	37.1	Significant
% female	41	47	Not significant
Live alone (%)	44	40	Not significant
Steady partner (%)	67	59	Not significant
Have children (%)	33	17	Significant
Employed (%)	73	84	Significant
Unemployed in last 2 years (%)	16	29	Significant
Felony conviction last 4 years (%)	4	2	Not significant
Education			
High (some college>) (%)	45	63	Significant
Middle (high school grad) (%)	34	22	Significant
Low (<high school grad) (%)	21	14	Significant

The overall response rate in the San Francisco prevalence survey was 52.7%, which yielded a sample of 891. Of these, 349 (39.2%) reported using cannabis 25 or more times; this was over 3 times the 12.3% prevalence rate of 25-times-or-more users found in the Amsterdam sample. We asked these experienced users to participate in the depth interview, and 266 (76.2%) were ultimately interviewed in depth beginning in 1997. To check their representativeness, we compared respondents and non-respondents on 10 demographic and drug use prevalence variables and found no statistically significant differences.¹

The response rates on the initial prevalence surveys were very similar (50.2% and 52.7%), but there was a substantial difference in response rates in the second-stage, depth survey of experienced users, 40.5% in Amsterdam and 76.2% in San Francisco. One might imagine that in Amsterdam, where cannabis use is less stigmatized, the response rate would have been higher than in San Francisco instead of lower. The Dutch team asked both the leading Dutch academic expert on survey methodology and survey sampling specialists at the Central Bureau of Statistics (CBS) in the Netherlands what might account for this difference. They noted that survey response rates are relatively low in the Netherlands in general because many Dutch feel they have been “over-surveyed” (by market researchers, municipal and national government, academic researchers, and increasingly by the European Union) and thus would be more frequently resistant to yet another study, particularly a depth interview of up to 2 h duration. The CBS

¹ For the San Francisco portion of the study, the Dutch questionnaire was translated into English and Spanish (bilingual interviewers used as needed). Non-English-speaking Asian Americans were excluded because of the prohibitive costs of translating instruments and training interviewers in the many Chinese and other Asian languages found in San Francisco. This was not consequential because national prevalence studies show that illicit drug use among Asian Americans is the lowest of any ethnic group (e.g., SAMHSA, 1995), the non-English speakers being mostly elderly and thus least likely to be cannabis users. More details on sampling and methods may be found in the Dutch Final Report on the comparative study (Cohen & Kaal, 2001); on the website of the Centrum voor Drugsonderzoek at the Universiteit van Amsterdam: <http://www.cedro-uva.org/lib/cohen.3cities.html>; and in Reinerman et al. (2004).

now designs its surveys explicitly to minimize their number and thus reduce this pressure on the population. By their logic, the question is not why the comparatively low rate of 40.5% on the depth survey but why the high response rate (for the Netherlands) of 50.2% on the prevalence survey.

It is also possible that precisely because cannabis has long been decriminalized in Amsterdam, it has become mundane—a non-issue for most of the population, many of whom may be bored by their city’s notoriety with regard to drugs. San Franciscans, on the other hand, are renowned for their iconoclastic views and for taking a certain pride in their defiance of federal drug laws and may therefore have been more open to participating in the experienced user survey. But we do not have data that bear directly upon these issues, so these possible interpretations of differential response rates must be considered speculative. Readers wishing more sampling details on the experienced user survey are welcome to consult the response/non-response analysis done by the Dutch team (Cohen & Sas, 1998; <http://www.cedro-uva.org/lib/cohen.3cities.html>).

There were some statistically significant differences in the demographic characteristics of the two resulting samples of experienced users. As Table 1 shows, San Francisco respondents were older on average; less likely to have children (perhaps due in part to the high proportion of gay men in the population); more likely to have been employed at the time of interview and more likely to have been unemployed in the previous 2 years, which may reflect the tendency for higher highs and lower lows in the U.S. economy in general and nearby Silicon Valley in particular. (N.B. The more generous unemployment and welfare benefits in the Netherlands are likely to have reduced the salience of unemployment in the Dutch sample.) Finally, the San Francisco respondents reported a higher average level of formal education than Amsterdam respondents, although this difference must be interpreted with care; the Dutch and U.S. education systems do not map onto each other neatly, so our constructed ordinal variable – high, middle, low – is only a rough approximation.

Table 2
Primary source of cannabis, past 12 months

	Amsterdam		San Francisco	
	n	%	n	%
Friend knows dealer	8	4	111	43
Several friends know dealer	35	16	78	30
Friend is dealer	12	6	44	17
Street dealers			10	4
Growers	8	4	5	2
Grow it myself	4	2	2	1
One coffee shop	75	35		
Several coffee shops	67	31		
Other	6	3	11	4
Total	215	100	261	100

Table 3
Other drugs available at source for cannabis?

	Amsterdam		San Francisco	
	n	%	n	%
Yes	29	15	127	51
No	167	85	124	49
Total	196	100	251	100

$\chi^2 = 62.1$; d.f. = 1; $p = .000$.

Sources of cannabis and separation of markets

As expected given the divergent drug policies of the two cities, there were sharp differences in the sources from which respondents obtained their supplies of cannabis (respondents who had not used in the past 12 months were asked for their source in the last year in which they had used). Table 2 shows that San Francisco respondents were far more likely to report that they obtained their cannabis through friends. Combining the three response categories that centre on friends, 90% of San Francisco respondents obtained their cannabis from a friend or friends who know dealers or, to a lesser extent, who are themselves dealers. In Amsterdam, by contrast, about one in four respondents (26%) reported obtaining their cannabis from or through friends, whilst about two-thirds (66%) purchased their cannabis in licensed coffee shops. None of the Amsterdam respondents obtained their cannabis through street dealers, whilst none of the San Francisco respondents obtained their cannabis in coffee shops.

Criminalization is designed to make cannabis more risky to obtain, expensive, difficult to find, and unreliable. In such a policy context, the use of friends as a route to sources makes sense to users because it helps to reduce risk of detection by law enforcement and to increase availability and reliability. Even under decriminalization in Amsterdam, however, friends remained a source of supply for about one in four, perhaps because cannabis use tends to be a social phenomenon and/or because some such friends who supplied others obtained their cannabis in coffee shops. Suffice to say that in Amsterdam, where legal supplies are widely available, a strong majority obtained their cannabis from those legal sources and far less often involved friends in the procurement process.

We asked about sources of supply because one of the key public health objectives of the architects of the Dutch system was “separation of markets” (Engelsman, 1989; Leuw & Marshall, 1994). Their policy of *de facto* decriminalization of cannabis was designed in part to keep the market for what they called “soft drugs” like cannabis separate from the market for “hard drugs” like cocaine and heroin, which were

thought to entail greater risks. Their hope was to reduce the likelihood that those Dutch youth who might seek cannabis would also find “hard” drugs available from the same source.

To explore this issue, we asked respondents if they could obtain other illicit drugs where they get their cannabis. Their responses (Table 3) indicate that Dutch drug policy has not resulted in complete separation of markets, but that it has achieved substantial separation. Just under one in six (15%) Amsterdam respondents reported that they could obtain other drugs at their source for cannabis. This is not an insignificant amount of cross-over, but it is much lower than that found in the illicit market in San Francisco, where over three times as many respondents (51%) reported that other drugs were available for sale where they bought their cannabis. Put differently, 85% of Amsterdam respondents reported that other drugs were *not* available from their source for cannabis, whilst 49% of San Francisco respondents reported this. This finding must be interpreted with caution because of the limitations of these data. In a questionnaire designed to explore in detail use patterns over time, we were unable to ask the full range of relevant questions about this issue, including, for example, what proportion of users were actually *offered* other illicit drugs by their sources for cannabis, and what proportion then bought them. Given the universally higher prevalence of cannabis use than of other illicit drugs, it is likely that even when such other drugs are available most cannabis users would not purchase them. More extensive research designed to address this question will be necessary to determine the precise extent of market separation and the factors that cause it to vary.

That said, this finding does provide support for the idea that the system of regulated availability under Dutch decriminalization of cannabis can achieve a substantial degree of market separation. Additional cross tabulations also supported this conclusion. Those sources used most often by San Francisco respondents were associated with a greater likelihood of the availability of other illicit drugs and those sources most often used by Amsterdam respondents were associated with a lesser likelihood. Street dealers were the most likely to have other illicit drugs available (86%), followed by friends who are dealers (53%), several friends who know dealers (48%), a friend who knows a dealer (44%), growers (23%), several coffee shops (14%), and one coffee shop (4%).

Price and consumption

A core objective of cannabis criminalization is to eliminate or at least minimize consumption. If history is any guide, complete elimination of supplies does not appear to be a practical possibility. But policy makers intend criminalization to reduce supplies sufficiently so that prices will be higher than they would have been, thereby at least discouraging consumption. The basic law of supply and demand in microeconomics suggests that in Amsterdam, where small-scale sales of cannabis are effectively legal, supplies will be more plentiful and that therefore there will be competition amongst the many coffee shops operating there (Bieleman & Goeree, 2000, estimated that 288 operated in Amsterdam at the time of our survey, but Bieleman & Naayer, 2006, report that the number has since declined to 248, attrition due in part to competition). The hypothesized result is that this competition will result in lower prices and thus greater consumption.

Conversely, the law of supply and demand would lead us to expect that in San Francisco, where it is illegal, supplies of cannabis would be relatively scarce, that there would be less competition, and that sellers would take advantage of this and charge higher prices, thereby reducing consumption. (Related reasons for higher prices under criminalization include the addition of a risk premium, security expenses, and bribes, which are passed on to the consumer, although licensed coffee shops must pay rent, salaries, and taxes, which may reduce this expected price differential.)

The survey data in this study did not allow measurement of all the variables required for a rigorous test of the effects of price on consumption patterns. Because the primary objective of the study was to trace career use patterns, we asked a battery of questions about use in each of several different career phases or periods (e.g., “first year of regular use,” “period of maximum use”). By definition, both the length of these periods and how distant in time they were from the interview varied by respondent. These variations in career phases, combined with market price fluctuations during each phase, often years in the past, meant that no precise measure of price was possible. Moreover, responsiveness to price would naturally vary by age, stage of life, income, financial obligations, use level, and other characteristics. So we could only ask respondents about the perceived effects of price in a very general way.

We first asked if cannabis had ever been “too expensive” for them to use. As expected, San Francisco respondents were significantly more likely to report that cannabis had been “too expensive.” The higher lifetime prevalence in San Francisco notwithstanding, just under one in three (30%) reported that at least at some point in their careers cannabis had been “too expensive,” compared to just under one in five (18%) in Amsterdam. In both legal-policy milieux, however, strong majorities – 82% in Amsterdam and 70% in San Francisco – reported that they had never found cannabis too expensive. We suspect that the cost of cannabis was not a factor for

Table 4
If cannabis became much cheaper, would you use more? (current users)

	Amsterdam		San Francisco	
	<i>n</i>	%	<i>n</i>	%
Yes	7	5	22	13
No	131	95	142	87
Total	138	100	164	100

$$\chi^2 = 6.1; \text{d.f.} = 1; p = .037.$$

most because clear majorities of experienced users in both cities consumed relatively small quantities throughout most of their user careers—e.g., 4 g or less per month (c. \$30–50 per month) in the year prior to interview (Reinerman et al., 2004, p. 838).

To explore this a bit further, we also asked respondents whether they thought changes in price would effect their consumption. We asked those who were still using at the time of interview, “If cannabis became much cheaper, would you use more of it?” Table 4 shows that the vast majority of current users in both cities reported that they would not increase their consumption of cannabis if it became less expensive. San Francisco respondents were significantly more likely to say “yes,” but still seven of eight (87%) said “no.”

For those who had stopped using at the time of interview, we asked, “If cannabis became much cheaper, would you start using again?” Of the 161 respondents in both cities who had stopped using cannabis at the time of interview, only 3 reported that they would be induced by lower prices to begin using again.

We next asked current users, “If cannabis became much more expensive, would you use less of it?” As Table 5 shows, nearly two in five respondents in each city (37% and 39%) reported that they would use less if it became “much more expensive.” This suggests that at least for substantial minorities under both policies, demand for cannabis is to some degree price-elastic. However, majorities in each city (63% and 61%) reported that they would not use less if cannabis became much more expensive, indicating that demand for cannabis amongst most experienced users under either policy is to some degree price-inelastic. These data suggest that at least for most experienced cannabis users in both legal-policy milieux, price may not be an important influence on level of consumption, again, perhaps because clear majorities used small amounts that would not be a financial burden for most people.

Table 5
If cannabis became much more expensive, would you use less? (current users)

	Amsterdam		San Francisco	
	<i>n</i>	%	<i>n</i>	%
Yes	50	37	64	39
No	84	63	99	61
Total	134	100	163	100

There are, however, important limitations of data derived from survey questions about possible future behaviour under hypothetical conditions. What some respondents *say* they would do if cannabis became “much cheaper” or “much more expensive” might well differ from what they would *actually* do. Moreover, findings based on such data cannot establish any causal link with policy, so they must be considered only suggestive and interpreted with caution. More detailed research would be required to determine the precise influence of price on consumption and how this might vary by policy.

Potency and consumption

For over two decades now, U.S. drug control officials have warned that cannabis is more of a risk today because it is much more potent than in the 1960s when it first came into widespread use (e.g., Office of National Drug Control Policy, 2002). One former Drug Czar claimed that “Cannabis is forty times more potent today . . . than ten, fifteen, twenty years ago” (Dallas Morning News, 1995), whilst another went so far as to say that potency had increased 100 times (MacDonald, 1984, p. 57). Such claims far exceed the smaller increases in potency (THC [Delta-9 tetrahydrocannabinol] content) reported in U.S. Government and European Union studies (DEA, 2005; EMCDDA, 2006; National Drug Intelligence Center, 2006) and in the scientific literature (see Earleywine, 2002, for a thorough overview). The most detailed study of the THC content of “Nederwiet” sold in Dutch coffee shops showed higher mean potency in some recent years but considerable variability from year to year: 11.3% in 2000–2001; 20.4% in 2003–2004; 11.7% in 2005–2006; and 16% in 2006–2007 (Niesink, Rigter, Hoek, & Goldschmidt, 2007; see also Pijlman, Rugter, Hoek, Goldschmidt, & Niesink, 2005). But exaggeration and variation aside, many coffee shop owners in Amsterdam and users in both cities report that in addition to the regular varieties of cannabis which have always been sold, there now are some more potent strains available than once was the case.

One reason why this seems likely is that law enforcement pressures have pushed cannabis growers indoors and thus toward high-intensity technologies of production. The U.S. Drug Enforcement Administration, for example, has reported that “To enhance the potency of marijuana” growers have come to use “advanced agronomic practices such as hydroponics, cloning, . . . special fertilizers, plant hormones, steroids, and carbon monoxide” (1993, p. 63). By means of such indoor technology, growers produce fewer but more potent plants, which both reduces their risk of arrest and maximizes profit per-plant (see Dorn, Murji, & South, 1992, on such ironic consequences of drug control).

In a survey designed primarily to investigate career use patterns during different career phases in the past, it was not possible to obtain samples of the cannabis ingested by respondents to test potency. We did ask respondents what potency

Table 6
Preferred potency of cannabis

	Amsterdam		San Francisco	
	<i>n</i>	%	<i>n</i>	%
Mild	59	30	42	16
Moderate	69	35	71	27
Strong	59	30	100	38
Very strong	10	5	51	19
Total	197	100	264	100

$$\chi^2 = 32.0; \text{d.f.} = 3; p = .000.$$

they *preferred* and whether potency affected the quantity they consumed. Their responses showed that potency was a matter of significant interest to them. Under both policy regimes, the great majority indicated a preference for a particular strength (91% in Amsterdam and 99% in San Francisco), although these preferences varied by city. As shown in Table 6, Amsterdam respondents were significantly more likely than those in San Francisco to prefer “mild” and “moderate” cannabis over “strong” or “very strong” varieties. Nearly two-thirds (65%) of the Amsterdam respondents reported preferring “mild” or “moderate” potency cannabis, whilst just over two in five (43%) San Francisco respondents did. Conversely, a higher proportion of respondents in San Francisco reported preferences for “strong” or “very strong” cannabis—57% vs. 35% in Amsterdam.

How should these differences in potency preferences be interpreted? Many factors could conceivably be at work here, including cultural differences in drug use norms and differing cultural repertoires of intoxication that inscribe such norms with specific meanings (e.g., Alasutari, 1992; MacAndrew & Edgerton, 1969). Obviously, a rigorous test of the many possible explanations was beyond the scope of our study; exploratory ethnographic research would be required to identify and describe possible causes of differential preferences, followed by comparative quantitative research to test these and to determine their distribution.

Here we can do no more than suggest a hypothesis having to do with policy differences. One goal of drug prohibition is supply elimination or at least reduction, but even partial success can have unintended and paradoxical consequences (e.g., Westermeyer, 1976). For example, historical evidence from the U.S. experiment with alcohol prohibition between 1920 and 1933 suggests that in a context where national policy criminalized sales and made alcohol supplies relatively scarce and uncertain, per capita consumption of higher alcohol-content distilled liquor increased whilst consumption of milder alcoholic beverages like beer and wine decreased (Levine, 1985; Levine & Reinerman, 2006; Morgan, 1991; Warburton, 1932). It is difficult to disentangle how much of this shift toward consumption of more potent alcoholic beverages was due to supply factors (e.g., the black market’s economic incentives toward production of less bulky, easier-to-smuggle distilled spirits) and how much to demand factors (e.g., drinkers’ preferences moving toward more potent bev-

Table 7
When using stronger cannabis, do you use . . .

	Amsterdam		San Francisco	
	<i>n</i>	%	<i>n</i>	%
Less	143	70	186	71
Same	56	27	72	27
More	6	3	5	2
Total	205	100	263	100

$\chi^2 = 1.40$; d.f. = 2; $p = .778$; n.s.

erages in illicit settings such as “speakeasies”). But after Repeal, when drinkers could again choose from the full range of strengths, consumption of milder beverages like beer and wine increased whilst that of hard liquor decreased (see Miron & Zweibel, 1991).

Something like this may be at work amongst cannabis users, with more intensive drug law enforcement in San Francisco pushing the market toward a preference for more potent forms of cannabis. Again, our data do not allow us to rule out other factors that might also contribute to this difference. But the significantly greater preference for more potent cannabis in San Francisco may indicate that when supplies are not always reliable in either quality or quantity, more users are likely to feel they can never be certain of adequate potency and thus more often opt for the stronger varieties. On the other hand, in the Dutch policy context, where coffee shops give users the choice of up to a dozen varieties of cannabis graded according to potency and other characteristics, a strong majority reported a preference for the milder strains (cf., Westermeyer, 1976).

This interpretation gained further plausibility from responses to a follow-up question. We asked whether, “on those occasions” when they had “used particularly strong or potent cannabis,” they had smoked “less, more, or about the same” amount as they usually did. The alarm over increased potency of cannabis presumes that users wittingly or unwittingly consume the same doses of the stronger cannabis, but for most experienced users in both legal-policy milieux this was not the case. As Table 7 indicates, over two-thirds of respondents in both cities reported that when they had encountered more potent cannabis they had used *less* than usual. This finding is consistent with the self-titration hypothesis that has emerged from some experimental studies (e.g., Heishman, Stitzer, & Yingling, 1989) and in the recent user survey by Korf, Benschop, and Wouters (2007).

When we asked these users an open-ended follow-up question about *why* they had smoked less when encountering a strong variety of cannabis, the most common responses also centered on a logic of self-titration: they said they “needed less” of the more potent strain of cannabis to achieve “the same effect”; they only wanted to reach highs of a certain moderate intensity; they did not want to become “too stoned”; and, the effects of a usual size dose when using stronger cannabis would be “too severe” for their liking. In both cities, the theme in these responses seemed to be

that most users have a particular level of altered consciousness they regard as preferable and that they tend to regulate their cannabis consumption so as to reach but not exceed that level (see Korf et al., 2007; Reinerman & Cohen, 2007, *in press*; Reinerman et al., 2004). The fact that a minority of about one in four respondents in both cities (27%) reported that when faced with higher potency cannabis they would use the same amount, is consistent with the findings of Korf et al. (2007), who found that the extent of self-titration varied with type of cannabis user and stage of career.

In Amsterdam, three decades of *de facto* decriminalization (Scheerer, 1978) have fostered a stable and translucent retail cannabis market in which users are reliably able to buy cannabis of the potency they prefer. These market characteristics may mitigate against uncertainty and allow users to reach more precisely the level of high they desire. This seems less likely to be the case in San Francisco, where a higher proportion of users reported a preference for stronger varieties of cannabis. Again, in a survey centring on career use patterns, we could not collect the sorts of data required to test this hypothesis formally; additional comparative research on this issue will be required. But it may be that because the cannabis markets in San Francisco remain illicit, users are more apt to feel they can never be certain of potency and so are more likely to choose stronger strains, for then at least they would be assured of adequate potency and could regulate their intake accordingly.

The short arm of the law

San Francisco stands in relation to the rest of the U.S. much as Amsterdam stands in relation to the rest of the Netherlands, which is to say on the liberal/lenient end of any drug law enforcement continuum. Still, criminalization of cannabis remains public policy in San Francisco by virtue of U.S. law. About 1 in 12 (8%) San Francisco respondents reported ever having been arrested for cannabis offences. Less than 2% of Amsterdam respondents reported such arrests. Since arrests for possession of cannabis in Amsterdam are very rare under current policies, we assume these arrests occurred prior to decriminalization, in another country, or were linked to distribution charges.

As expected, San Francisco respondents were significantly more likely to report fear of arrest. Whilst 95% of Amsterdam respondents reported that they had “never” been “afraid of being arrested” for cannabis, in the San Francisco sample only 27% said this, with two-thirds (66%) reporting that they had at least “sometimes” had this fear. The vast majority of respondents in San Francisco (83%) said they took precautions to avoid arrest, mostly using discretion about where and when they used; very few (7%) Amsterdam respondents reported this, although they too exercised very similar forms of discretion (Reinerman & Cohen, 2007, *in press*). These responses appear to reflect the differential severity of drug

Table 8
Estimated likelihood of being arrested for cannabis possession or use

	Amsterdam		San Francisco	
	<i>n</i>	%	<i>n</i>	%
1—very unlikely	133	93	131	75
2	7	5	33	19
3	1	1	6	3
4	1	1	1	1
5	1	1		
6—very likely			3	2
Total	143	100	174	100
Mean	1.11		1.36	

Current users only. $\chi^2 = 14.95$; d.f. = 5; $p = .02$.

control laws and the differential probability of arrest across the two cities.

Even in San Francisco, however, few respondents believed their probability of being arrested for cannabis was very high. Our question was, “How likely do you think it is that you will be arrested for possession or use of cannabis at some point in the future?” We asked respondents to select a point on a 6-point scale on which 1—“very unlikely” and 6—“very likely.” Table 8 indicates, as expected, that San Francisco respondents reported significantly higher mean likelihood of arrest (1.36) than did Amsterdam respondents (1.11), but even in San Francisco the great majority of responses still clustered toward the “very unlikely” end of the scale.

As a rough indicator of the effect of cannabis laws on accessibility, we asked respondents to estimate how much time they would need to obtain at least 1 g of cannabis. As Table 9 indicates, virtually all (99%) Amsterdam respondents said it would take them 1 h or less, which is to be expected under the Dutch system of licensed shops. These short “search times” are most characteristic in Amsterdam where roughly one-third of all such shops in the Netherlands are located; search times would likely increase somewhat in smaller cities, villages, and rural areas. San Francisco respondents estimated that it would take them significantly longer to obtain a gram of cannabis. Only one in four (24%) respondents in San Francisco said they would be able to obtain a gram of cannabis in 1 h or less. Yet close to half (44%) the San Francisco respondents said they could obtain cannabis

Table 9
How much time to get 1 g of cannabis?

	Amsterdam		San Francisco	
	<i>n</i>	%	<i>n</i>	%
Less than half an hour	204	94	40	18
Half to 1 h	10	5	14	6
1–2 h	1	0	44	20
Half a day			39	17
1–2 days			56	25
3 days–1 week	1	0	24	11
>1 week			6	3
Total	216	100	223	100

in 1–2 h or less, and a majority (61%) reported that they could do so within half a day. So whilst the reported search times to obtain cannabis were longer in San Francisco than in Amsterdam, these responses suggest that this was not a substantial impediment to access for most experienced users in San Francisco.

Summary and conclusions

The findings reported in this paper have a number of limitations that must be noted. First, like all research based on self-reports, the data are subject to the vicissitudes of memory, including loss of detail, forgetfulness, and selectivity. Second, the paper is about responses to questions that were adjuncts to a survey instrument designed primarily for a different purpose. This meant we were unable to operationalize and measure all the relevant variables required for rigorous testing of even the hypotheses we explored, to say nothing of alternative hypotheses. Third, the surveys were cross-sectional, snapshots taken at a specific moment in time. In order to draw clear causal inferences, a longitudinal design, in which the same respondents could be re-interviewed and key variables measured at successive intervals, would be required. Fourth, the goal of the paper was to explore *possible* links between different drug policies and user practices, so the discussion of findings was limited to those questions. This should not be interpreted as implying that the contrasting drug control regimes in the U.S. and the Netherlands by themselves explain the differences in patterns of response. A variety of other, potentially confounding variables rooted in historical and cultural differences could well be influencing these patterns and should be part of future research. Therefore, the findings reported here must be considered exploratory and suggestive.

That said, on the issue of sources and separation of markets our findings suggest that the Dutch system of regulated sales has achieved substantial separation of markets. The great majority of San Francisco respondents used friends who had a connection to a dealer as their source for cannabis. In the context of criminalization, relying on friends reduces risk of arrest and increases reliability of supply, although this may entail the unintended consequence of increasing the number of people involved in illicit drug distribution networks. As expected, most Amsterdam respondents obtained their cannabis in licensed coffee shops, and 85% reported that they could not purchase other illicit drugs at their source for cannabis. San Francisco respondents were three times more likely to report being able to purchase other illicit drugs from their cannabis sources.

There were significant differences between the two samples with respect to the perceived influence of price, but clear majorities in both legal-policy milieux reported that they had never found cannabis too expensive. Responses by over one in three in each city suggested some price elasticity, but majorities reported that they would neither use less cannabis if it

were more expensive nor use more if it were cheaper. Determining what cannabis users would *actually* do would require more extensive and complicated research designed specifically for that purpose. However, in both policy contexts, a majority of respondents perceived little influence of price their consumption, probably because most consumed relatively small quantities. These findings suggest that at least for most experienced users, policies designed to reduce aggregate demand for cannabis in part by increasing its price are unlikely to have a large impact.

Nearly all respondents in both samples expressed clear preferences with regard to potency, but these differed sharply by city. Amsterdam respondents were significantly more likely to prefer mild or moderate strength cannabis whilst San Francisco respondents were more likely to prefer stronger varieties. Our data did not permit us to determine the precise reasons for this difference. We know that the stable, licit market in Amsterdam affords users reliable supplies in a wide range of THC content, which allows users access to their preferred potency; and we hypothesize that the illicit market in San Francisco more often leaves users with unreliable supplies of uncertain potency, which increases the likelihood that they would opt for more potent strains. But perhaps more importantly, strong majorities in both legal-policy milieux reported that when using more potent cannabis they consumed less, principally because they calibrated their consumption to achieve specific, usually moderate states of altered consciousness. These results provide further support for the self-titration hypothesis, which should at least partially mitigate concern about potential health risks from more potent cannabis.

About 1 in 12 San Francisco respondents had been arrested for cannabis offences and they were far more likely to report fear of arrest and having taken precautions against arrest than their counterparts in Amsterdam, for obvious reasons. Similarly, San Francisco respondents also perceived their risk of arrest for cannabis offences as significantly higher than Amsterdam respondents. However, despite the differences in legal-policy context, on average, respondents in both cities perceived their risk of such arrests as very unlikely. As expected, under Dutch decriminalization and the licensed shop system, most Amsterdam respondents said they could obtain cannabis in half an hour or less. The context of criminalization in San Francisco was associated with somewhat longer search times, although even there a majority of respondents reported being able to obtain a supply of cannabis in a few hours.

The differences in response patterns between samples of experienced users in different legal-policy milieux suggest that various aspects of drug policy interact in complex ways with both user cultures and the broader cultures in which these are situated. But the fact that we found more similarities than differences across the contrasting drug control regimes provides further support for the view that cannabis use is a deeply embedded cultural practice that is not easily reached by drug policy.

Acknowledgments

The research on which this paper is based was supported by grants from the Dutch Ministry of Health and the U.S. National Institute of Drug Abuse (Grant #1 R01 DA10501-01A1). The views expressed herein do not necessarily reflect those of the funding agencies. Dr. Peter Cohen of the Center for Drug Research at the University of Amsterdam envisioned this comparative project, obtained the initial funding for the Dutch surveys from the Dutch Ministry of Health, and was central to every phase of the research and analysis. The author is also grateful to Dr. Alex Wodak for his critical comments and encouragement; to Dr. Dirk Korf for his thoughtful and detailed critique; to Manja Abraham, Dr. Hendrien Kaal, Arjan Sas, and Fran Lanthier for their assistance with tables; and to three anonymous peer reviewers who spotted numerous flaws. Whatever weaknesses remain are entirely the author's doing. Some of the material in this paper was presented at the 97th Annual Meeting of the American Sociological Association, Chicago, 2002; the 15th Annual International Conference on the Reduction of Drug Related Harm, Melbourne, 2004; the International Conference on Drug Policy, London, 2005; and at the Centre for Social Research on Alcohol and Drugs, University of Stockholm, 2005.

References

- Alasutari, P. (1992). *Desire and craving: A cultural theory of alcoholism*. Albany, NY: State University of New York Press.
- Bieleman, B., & Goeree, P. (2000). *Coffee shops geteld: Aantallen verkooppunten van cannabis in Nederland [Coffee shops counted: Numbers of points of sale of cannabis in the Netherlands]*. Groningen, NL: Stichting Intraval.
- Bieleman, B., & Naayer, H. (2006). *Coffeeshops in Nederland: Aantallen coffeeshops en gemeentelijk beleid 1999–2005 [Coffee shops in the Netherlands: Number of coffee shops and local policy 1999–2005]*. Groningen, NL: Stichting Intraval.
- Cohen, P., & Kaal, H. (2001). *The irrelevance of drug policy: Patterns and careers of experienced cannabis users in the populations of Amsterdam, San Francisco, and Bremen*. Amsterdam, NL: University of Amsterdam, Centre for Drug Research.
- Cohen, P., & Sas, A. (1998). *Cannabis use in Amsterdam*. Amsterdam, NL: University of Amsterdam, Centre for Drug Research.
- Dallas Morning News. (1995, May 21). Interview with Lee Brown.
- Dorn, N., Murji, K., & South, N. (1992). *Traffickers: Drug markets and law enforcement*. London: Routledge.
- Drug Enforcement Administration. (1993). *U.S. drug threat assessment, 1993* (p. 63). Washington, DC: U.S. Department of Justice.
- Drug Enforcement Administration. (2005). *Drugs of abuse, 2005*. Washington, DC: U.S. Department of Justice. <http://www.dea.gov/pubs/abuse/7-pot.htm>.
- Earleywine, M. (2002). *Understanding marijuana: A new look at the scientific evidence*. New York: Oxford University Press.
- EMCDDA, European Monitoring Centre for Drugs and Drug Addiction. (2006). Table PPP5: Potency of cannabis products at retail level. *EMCDDA Statistical Bulletin 2006*. Lisbon, Portugal. <http://stats06.emcdda.europa.eu/en/elements/ppat05a-en.html>.
- Engelsman, E. L. (1989). Dutch policy on the management of drug-related problems. *British Journal of Addiction*, 84, 211–218.

- 767 Heishman, S. J., Stitzer, M. L., & Yingling, J. E. (1989). Effects of tetrahydrocannabinol content on marijuana smoking behaviour, subjective reports and performance. *Pharmacology, Biochemistry and Behaviour*, 34, 173–179.
- 771 Kilmer, B. (2002). Do cannabis possession laws influence cannabis use? *Cannabis 2002 Report* (pp. 101–123). Brussels, Belgium: Ministry of Public Health.
- 774 Korf, D. J., Benschop, A., & Wouters, M. (2007). Differential responses to cannabis potency: A typology of users based on self-reported consumption behavior. *International Journal of Drug Policy*, 18, 168–176.
- 777 Leuw, E., & Marshall, I. (1994). *Between prohibition and legalization: The Dutch experiment in drug policy*. Amsterdam: Kugler.
- 779 Levine, H. G. (1985). The birth of American alcohol control: Prohibition, the power elite, and the problem of lawlessness. *Contemporary Drug Problems*, 12, 63–115.
- 782 Levine, H. G. (2003). Global drug prohibition: Its uses and crises. *International Journal of Drug Policy*, 14, 145–153.
- 783 Levine, H. G., & Reinerman, C. (2006). Alcohol prohibition and drug prohibition. In J. Fish (Ed.), *Drugs and society: U.S. public policy* (pp. 43–76). New York: Rowman and Littlefield.
- 786 MacAndrew, C., & Edgerton, R. (1969). *Drunken comportment: A social explanation*. Chicago, IL: Aldine.
- 788 MacDonal, D. I. (1984). *Drugs, drinking, and adolescence*. Chicago, IL: Yearbook Medical Publishers.
- 791 Miron, J. A., & Zweibel, J. (1991). Alcohol consumption during prohibition. *American Economic Review*, 81, 242–247.
- 792 Morgan, J. P. (1991). Prohibition is perverse policy: What was true in 1933 is true now. In M. B. Kraus & E. P. Lazear (Eds.), *Searching for alternatives: Drug control policy in the US*. Stanford, CA: Hoover Institution Press.
- 795 National Drug Intelligence Center. (2006). “Marijuana,” [U.S.] *National Drug Threat Assessment, 2007*. <http://www.usdoj.gov/ndic/pubs21/21137/marijuana.htm#start>.
- 800 Niesink, R. J. M., Rigter, S., Hoek, J., & Goldschmidt, H. (2007). *THC-concentraties in wiet, nederwiet en hasj in Nederlandse coffeeshops (2006–2007)*. Utrecht, NL: Trimbos Institute.
- 802 Office of National Drug Control Policy. (2002, October 7). An open letter to parents about marijuana. *New York Times* (p. A5).
- 804 Pijlman, F. T. A., Rugter, S. M., Hoek, J., Goldschmidt, H. J. M., & Niesink, R. J. M. (2005). Strong increase in total delta-THC in cannabis preparations sold in coffee shops. *Addiction Biology*, 10(2), 171–180.
- 806 Reinerman, C., & Cohen, P. (2007). Law, culture, and cannabis: Comparing use patterns in Amsterdam and San Francisco. In M. Earleywine (Ed.), *Pot politics: Cannabis and the costs of prohibition* (pp. 113–137). New York: Oxford University Press.
- 808 Reinerman, C., & Cohen, P. (in press). Lineaments of cannabis culture: Rules regulating cannabis use in Amsterdam and San Francisco. *Contemporary Justice Review*, 10.
- 810 Reinerman, C., Cohen, P., & Kaal, H. (2004). The limited relevance of drug policy: Cannabis in Amsterdam and San Francisco. *American Journal of Public Health*, 94, 836–842.
- 812 SAMHSA, Substance Abuse and Mental Health Services Administration. (1995). *Preliminary estimates from the 1994 national household survey on drug abuse*. Rockville, MD: U.S. Department of Health and Human Services, SAMHSA, Office of Applied Studies.
- 814 Sandwijk, P. J., Cohen, P. D. A., Musterd, S., & Langemeier, M. P. S. (1995). *Licit and illicit drug use in Amsterdam*. Amsterdam, NL: University of Amsterdam, Centre for Drug Research.
- 816 Scheerer, S. (1978). The new Dutch and German drug laws: Social and political conditions for criminalization and decriminalization. *Law and Society Review*, 12, 585–606.
- 817 Warburton, C. (1932). *The economic results of prohibition*. New York: Columbia University Press.
- 818 Westermeyer, J. (1976). The pro-heroin effects of anti-opium laws in Asia. *Archives of General Psychiatry*, 33, 1135–1139.