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CANNABIS USE, A STEPPING STONE TO OTHER DRUGS?
The case of Amsterdam

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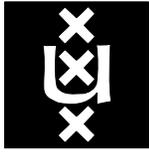
Cannabis use, a stepping stone to other drugs?

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Does smoking reefer lead to using other drugs, in daily practice usually described as cocaine and heroin? Raising the possibility that the answer to this question might be affirmative, is known as the stepping stone hypothesis. Recently this hypothesis has been raised again in slightly other terms: cannabis use as a "gateway" to other allegedly more dangerous drugs.
Gabriel Nahas summarizes the evidence in support of the theory which connects marijuana use to other drug use in the preface to 1990's 5th edition of *Keep Off the Grass*:

> *"It appears that the biochemical changes induced by marijuana in the brain result in a drug-seeking, drug taking behavior, which in many instances will lead the user to experiment with other pleasurable substances. The risk of progressing from mari-juana to cocaine or heroin is now well documented"*

In this article we will investigate the adequacy of the stepping stone hypothesis for Amsterdam, in a population that has been relatively free to try and use cannabis for at least 20 years. The method used is different from the one chosen by Kandel et al. (Denise B. Kandel et al. 1992, 1993, 1995). Kandel's database is a sample from students in New York State in schools from grade 10 and 11, which she has followed from 1971 to 1990. In another study she reports data from a student survey in the same area, grades 7 to 12 in 1988. She clearly finds temporal patterns in drug use, although she remarks that "the notion of stages in drug behavior does not imply that these stages are either obligatory or universal...." (Kandel et al., 1992, 453). Entry into a particular stage is a common and perhaps even necessary, although not a sufficient prerequisite for entry into the next higher stage. (Kandel et al., 1992, 454). In this article we will confirm her conclusions with a high level of detail. We show evidence that a large majority of cannabis users in Amsterdam do not enter the next higher stage and that for those who do, current or frequent drug use other than cannabis is very rare.

Our approach involves the use of large datasets derived from household surveys in Amsterdam covering the total adult population over 12 years of age. This method involves samples that are far more representative for the total population than student samples. Also, we will base our conclusions on analysis of many thousands of respondents.

We are less interested in precise sequential patterns than we are in general associations between drugs. Contacts with many policy makers in the field of drugs and with parents of cannabis users, have led us to believe that there still is a need to show if marihuana use is associated with other drug use (like cocaine, heroin or ecstasy) and if so, for what proportions of marihuana users such associations occur. Another need is to establish clarity about the degree in intensity of involvement marihuana users normally develop with other drugs, inasmuch as it occurs at all.

First we will present general drug use prevalence data to illustrate some of the drug use context the city offers. Then we will show details about cannabis use in different age cohorts, measured in three different household surveys over a period of 7 years since 1987. Of the cannabis users in Amsterdam we will show whether they used other illicit drugs and if so, in what proportions. We will pursue the topic of other drug use by cannabis users in Amsterdam, by formulating a series of rather precise but alternative 'stepping stone hypotheses' which we will test with the help of our household survey data.

We will inspect all other drug use by cannabis users and not only drug use that was initiated after the onset of cannabis use. But for those who do use other illicit drugs than cannabis, we will provide data on the average time interval, between first use of cannabis and first use of cocaine, heroin and ecstasy. For those users of cannabis who also have other drug use experience, we will show last 12 months and last 30 days discontinuation rates. We show discontinuation rates, because we found discontinuation the rule and continuation the exception. We will end with our conclusion about the relevance or reality of the stepping stone hypotheses in Amsterdam.

General drug use data for the city of Amsterdam

In Table 1 we present data on:

- lifetime drug use of a few well-known substances for the city of Amsterdam[1] (ever use);
- drug use in the year preceding each household survey (last 12 months prevalence);
- and drug use in the month preceding each household survey (last 30 days prevalence).

Table 1. Developments in drug use prevalence, 1987 - 1994 (percentages). All 1990 and 1994 data are corrected for the age, gender and ethnic composition of 1987.

drug	Lifetime			Last 12 months			Last 30 days			N		
	1987	1990	1994	1987	1990	1994	1987	1990	1994	1987	1990	1994
tobacco	71.1	67.4	65.3 °	49.6	46.3	44.9 °	45.9	42.5	40.0 °	4376	4443	2170
alcohol	87.6	85.7	84.5 °	78.8	77.4	76.0 °	71.1	68.4	68.3 °	4370	4443	2168
cannabis	22.8	24.0	28.5 °	9.3	9.8	10.5	5.5	6.0	6.4	4370	4440	2166
cocaine	5.6	5.3	6.0	1.6	1.2	1.6	0.6	0.3	0.8	4371	4438	2136
ecstasy*	n.a.	1.2	3.4	n.a.	0.7	1.7	n.a.	0.1	0.9		4440	2126
opiates (all)	9.2	7.2	8.5	2.4	1.9	2.3	1.1	0.6	0.7	4360	4422	2179
heroin**	n.a.	1.1	1.2	0.3	0.1	0.2	0.2	-	-	4360	4422	2179
no drug at all	6.3	8.1	9.3 °	12.0	14.2	14.9 °	17.4	20.4	20.1 °	4378	4443	2179

Sign. test Chi square: ° p<0.5 (1987 - 1994)
* Ecstasy was not asked for in 1987.
** Life time prevalence of heroin was not asked for in 1987.
Source: Sandwijk et al. (1995).

From Table 1 it appears that cannabis is the most often used illicit drug in Amsterdam (Life Time Prevalence (LTP) 28.5% in 1994), followed at a long distance by cocaine (LTP 6% in 1994). Heroin is used rarely when looked at from a lifetime perspective (LTP 1.2% in 1994), and completely disappears from the drugs of which last 30 day use is reported. Ecstasy is on the increase, although very slowly (LTP 3.4% in 1994). Its last 30 days use figures are low when seen for the population as a whole, but on the rise for certain age cohorts. In the age cohort 16-19 years, last 30 days prevalence of ecstasy rose from 0.4 percent in 1990 to 4.8 percent in 1994. In the age cohort 20-24 years it rose from 0.6 percent to 2.6 percent (Sandwijk et al., 1995, p. 157).

Lifetime prevalence of cannabis use in Amsterdam increased slowly since our first measurement in 1987. In the age-adjusted figures (standardized for the age composition of 1987) we can see that experience with cannabis increased from just under 23% of the population in 1987 to just under 29% in 1994. This increase is to be expected because the older inhabitants who mostly have no experience with cannabis pass away. They are replaced by youths with a much greater likelihood of having used cannabis. Therefore, because of this replacement effect the ever use figures in Amsterdam can only increase, even if use among youths would drop.

Cannabis use in the city of Amsterdam

In Amsterdam, decriminalization of cannabis started in the early seventies when youth clubs were allowed to have their own house dealers". Decriminalization of cannabis progressed relatively fast after 1980 when the "coffee shops" developed. Coffee shops were retail outlets for non alcoholic beverages, like coffee and orange juice, that had a special legal position in the Dutch licensing system for bars, cafÈs and restaurants. Unlike the latter, the coffee shop did not need a special license and was freed from most of the usual building codes. In these shops the free enterprise of commercial retail of cannabis products started to appear,[2] thereby initiating a system of supply and distribution as we know for legal goods.

We already noted, that lifetime prevalence of cannabis use in Amsterdam has increased in a statistically significant way since our first measurement in 1987, from about 23% to almost 29% of the population. However, cannabis use reported in the year prior to the interview (Last Year Prevalence, or LYP) increased very little during this period, and not statistically significant. We should therefore say that last year cannabis use remained very stable over the years, – fluctuating at around 10% of the population. This is much less than the ever use figures. Last month use is lower again and also very stable–at around 6% of the population. Apparently, a much larger number of people smokes cannabis occasionally, than with any regularity. This pattern of predominantly infrequent use returns in all three household surveys we have conducted in Amsterdam.

More detailed observation of cannabis use in Amsterdam since 1987 reveals, that the stability in prevalence does not show for all age cohorts (Table 2). In the group of 12-15 year olds, *lifetime* experience with cannabis is stable in the period from 1987-1994 at roughly 5%. It is also stable in the age group 16-19 at roughly 25%. However, in the age group 20-24 years, lifetime experience increased slowly (and statistically significant) over the years from just under 40% in 1987 to 50% in 1994. This means that in 1994, by the time young people in Amsterdam reached their 24th birthday, half of them will have smoked a joint or pipe on at least one occasion. The average age for first cannabis use is quite stable at 20 years of age. The median age is 18 years. Because of the replacement-effect (older people die, younger take their places), the ever use figures increase for the group 35 and up, exactly the group for which the last month figures decrease.

If we look at the *last month* use figures for each age cohort, the picture over the years is quite stable. Throughout the years of the study, we find that 20-25% of all lifetime cannabis users report last month use as well. Of these last month users 66% used less than 8 times per month. Approximately 20% of all last month users report a frequency of use of 20 times or more during that month, (roughly 5% of all respondents who report lifetime cannabis use). In comparison, of all respondents who report alcohol consumption during life time, 16% report last month use of alcohol of 20 times or more.

In the 20-24 year age group, the group with the most active night life in the city and the age cohort with the highest lifetime cannabis experience, –roughly one out of every eight respondents, (or around 13%,) reports last month cannabis use. Among people older than 24 years, last month use falls off. In Amsterdam, people over the 25-35 year age group show less enthusiasm for the herb, and those in their fifties lose interest almost altogether. We can say with confidence that cannabis use, in contrast to alcohol use, is at the moment strongly bound to a phase of life. When it occurs, irrespective of popularity, it is chiefly something for the 16-35 year age group. The average age of the current cannabis user in Amsterdam is around thirty.

Table 2. Developments in cannabis use, 1987 - 1994 (percentages) by age cohort. All 1990 and 1994 data are corrected for the age, gender and ethnic composition of 1987.

	lifetime			last 12 months			last 30 days			N		
	1987	*1990*	*1994*	*1987*	*1990*	*1994*	*1987*	*1990*	*1994*	*1987*	*1990*	*1994*
12-15 years	4.7	2.9	5.8	2.9	2.9	5.8	0.6	1.7	2.3	172	175	86
16-19 years	25.5	21.7	28.7	17.8	16.7	19.4	11.6	10.3	10.9	259	263	129
20-24 years	38.2	36.3 •	50.0 °	23.4	20.6	26.8	13.1	11.4	14.0	458	465	228
25-29 years	41.9	42.8	44.1	17.8	19.2	16.9	11.1	12.0	11.4	585	594	290
30-34 years	46.5	44.4	42.3	13.1	14.9	15.9	8.8	9.3	12.3	443	450	220
35-39 years	36.2	42.8	45.3 °	12.4	13.4	13.5	6.2	9.6	7.8	387	395	192
40-49 years	19.1 •	26.7 •	36.1 °	5.7	7.2	8.8	3.3	3.9	5.6	576	584	285
50 years a.o.	3.0	3.7 •	6.9 °	0.4	0.9	0.3	0.2	0.6	-	1,489	1,515	737
total	22.8	24.0 •	28.5 °	9.3	9.8	10.5	5.5	6.0	6.4	4,369	4,441	2,167

Sign. test Chi sq. • p<.05 (1987-1990, 1990-1994); ° p<.05 (1987-1994).

Source: Sandwijk et al. (1995).

Cannabis as stepping stone

We computed the extent to which people who have had experience with cannabis have also had experience with cocaine (Table 3) , heroin (Table 4) and ecstasy (Table 5). We split the population by age group (born in or after 1958 or before) so as to be able to track any possible age-bound differences. In Amsterdam, after cannabis, cocaine is the most frequently used illegal drug. As Table 1 shows, about 6% of the household population older than 12 have ever lifetime experience with cocaine. Among people who have ever used cannabis this percentage is noticeably higher. Among them, ever-experience with cocaine is roughly 22% over the years in which we performed our household surveys (see Table 3). But if we look at the *last 30 days* cocaine use figures among those who have ever used cannabis, we find around 2%. For heroin, the figures are considerably lower still (see Table 4).

If we look for heroin or cocaine users (LTP) among those people *who have never tried cannabis*, we scarcely find any. For cocaine, there were only 0.4% in 1987 and 1990 and 0.5% in 1994, for heroin they were 0.1% in 1990 and 1994. We do not have data on LTP heroin in 1987.

For Amsterdam we also have data for a drug that is slowly becoming more fashionable, MDMA or ecstasy. Table 1 showed that experience with MDMA/ecstasy is growing in Amsterdam. Table 5 shows that the same is true for ecstasy experience among cannabis users, certainly in the age group between 16

Table 3. Ever use, use last 12 months, and use last 30 days use of cocaine, for persons who ever used cannabis (in percentages).

age	1987			1990			1994			N		
	ever	*year*	*month*	*ever*	*year*	*month*	*ever*	*year*	*month*	*1987*	*1990*	*1994*
12-15	-	-	-	-	-	-	-	-	-	8	4	9
16-19	7.6	3.0	-	1.8	1.8	-	1.8	1.8	-	66	56	55
20-24	16.0	5.7	1.1	12.3	4.9	0.6	14.5	9.2	5.2	175	163	173
25-29	33.1	10.2	4.1	23.1	7.0	1.7	18.5	5.8	1.5	245	242	260
30-34	29.6	6.8	1.5	27.7	6.1	2.3	30.3	7.5	3.1	206	213	228
35-39	22.1	2.9	2.1	27.9	4.2	2.1	31.5	7.0	2.3	140	190	213
40-49	21.8	5.5	3.6	21.6	4.0	1.1	23.9	2.7	1.6	110	176	255
50-59	8.1	2.7	2.7	11.4	-	-	15.6	1.6	1.6	37	35	64
60-69	-	-	-	9.1	9.1	9.1	18.2	9.1	9.1	7	11	11
70+	-	-	-	-	-	-	-	-	-	1	6	4
total	23.4	6.2	2.3	21.2	5.0	1.6	22.2	5.7	2.4	995	1,096	1,272

Table 4. Ever use, use last 12 months, and use last 30 days use of heroin, for persons who ever used cannabis (in percentages).

age	1987			1990			1994			N		
	*ever**	*year*	*month*	*ever*	*year*	*month*	*ever*	*year*	*month*	*1987*	*1990*	*1994*
12-15		-	-	-	-	-	-	-	-	8	4	9
16-19		-	-	1.8	-	-	-	-	-	66	56	55
20-24		1.1	0.6	2.5	0.6	-	1.7	1.2	-	175	163	173
25-29		1.2	0.4	5.8	1.2	0.4	3.5	1.5	0.4	245	242	260
30-34		2.4	1.5	5.2	0.5	-	6.1	-	-	206	213	228
35-39		2.1	0.7	3.7	-	-	7.5	1.4	0.5	140	190	213
40-49		-	-	3.4	-	-	4.3	1.2	0.4	110	176	255
50-59		2.7	-	-	-	-	1.6	-	-	37	35	64
60-69		-	-	9.1	-	-	9.1	-	-	7	11	11
70+		-	-	-	-	-	-	-	-	1	6	4
total		1.4	0.6	4.0	0.5	0.1	4.3	0.9	0.2	995	1,096	1,272

* No data available

Table 5. Ever use, use last 12 months, and use last 30 days use of ecstasy, for persons who ever used cannabis (in percentages).

age	1987*			1990			1994			N		
	ever	*year*	*month*	*ever*	*year*	*month*	*ever*	*year*	*month*	*1987**	*1990*	*1994*
12-15				-	-	-	-	-	-		4	9
16-19				7.1	5.4	1.8	16.4	10.9	5.5		56	55
20-24				7.4	3.1	1.8	15.0	12.1	6.4		163	173
25-29				7.0	4.1	-	15.8	5.8	2.3		242	260
30-34				3.8	1.9	-	10.5	3.9	1.8		213	228
35-39				3.7	2.1	-	8.0	2.8	0.9		190	213
40-49				3.4	1.1	-	5.9	1.2	0.8		176	255
50-59				-	-	-	-	-	-		35	64
60-69				-	-	-	9.1	-	-		11	11
70+				-	-	-	-	-	-		6	4
total				4.9	2.6	0.4	10.5	4.7	2.2		1,096	1,272

* No data available

and 39 years. Looking at the group of never cannabis users as a whole, we find their consumption of ecstasy is almost nil (life time experience in 1990 and 1994 is 0.1%), as is their experience with cocaine.

From the tables 3 till 5 we cannot conclude that other drug use is very prevalent among cannabis users. The drug most often found among cannabis users when looking at *life time experience* is cocaine. Roughly 21% of all cannabis users have some experience with cocaine, which means that a large majority

of 79% of all cannabis users have no such experience. Looking at last month prevalence*, non use of cocaine is almost universal for cannabis users (97,6%).* For heroin and ecstasy the same is true, but even more so. Heroin *life time prevalence* among cannabis users is just over 4%, and LTP of MDMA is 10%. Before concluding that we find very little evidence for a "stepping stone phenomenon" in Amsterdam for a large majority of cannabis users, we should however not exclude the possibility that we are looking into the wrong sample. If we want to test the value of the stepping stone hypothesis we may have to look at different sub samples of cannabis users, those with the most cannabis-experience.

A series of stepping stone hypotheses

In this article we present the statistical part of the stepping stone hypothesis that is, the data we have for the city of Amsterdam. This means that we will try to show the statistical association between the use of cannabis and the use of other drugs, i.e. cocaine, heroin or ecstasy. We will do this now through a series of logically correlated hypotheses, *by associating an ever increasing level of involvement with cannabis* to the use of the other drugs. Also, we will introduce a generation effect into our operationalizations of the stepping stone hypotheses.

The city of Amsterdam has a system of hassle free access to cannabis type drugs for its inhabitants, mostly marihuana and hashish, that started to develop in the early seventies. Since cannabis has become available to the household population in the seventies, a whole new generation has grown up. This generation has no real life knowledge of cannabis prohibition, since it never existed for them. Also, this generation, born in 1958 or later (12 years or younger in 1970), never experienced active law enforcement against any individual drug use, even if of non cannabis type. For this age cohort cannabis decriminalization had already begun when they reached the age of 12 years, only to increase during the time they were growing up. We might find reflections of this in a much higher cannabis use among them compared to the older generation, i.e. the age cohort that had been raised under conditions of more or less severe criminalization. The reason for lower cannabis prevalence in the older generation might be that inhabitants of the city of Amsterdam who had been raised prior to cannabis decriminalization could have internalized rules against the use of cannabis to such a degree, that cannabis use among them was more inhibited than for the younger generation. So we might find that the drug evasion effects of growing up in a prohibitionist drug culture lingers on after change of policy for the old age cohort, which shows in low prevalence figures for cannabis and other drugs. However, the older generation also experienced a gradual decline in enforcement against any other drug use, which might be reflected in a later onset of use but similar or even higher prevalence. We will further refer to these two groups as the young cohort and the old cohort.

By creating these two cohorts we are conducting some kind of statistical experiment: we are looking at drug use behavior over time in groups that were exposed to quite different drug policies. We can inspect, if an adult urban generation which in less than a decade suddenly finds itself free to use drugs that were rather inaccessible before, is able to use this freedom without falling prey to it, or whether such a generation massively uses this freedom to experiment with drug use. We might see as a contrast, that the younger generation develops higher prevalence for both cannabis and other drugs, growing up in conditions of relatively free access to these drugs. Background of such (hypothetical) higher prevalence is that they might not have been taught to stay away from drugs as intensely as the older generation. Because prevention of drug use is considered important, the data we create with this statistical experiment might throw some light on questions about what happens if drug policies change: would drug use prevalence rise because of decriminalization? And if yes, for whom and how much?

In their ethnographic study of cannabis use in the Netherlands, Sifanek and Kaplan (1995) mention a

possible difference between the age cohorts where they state that the probability of stepping on "to hard drugs was most prevalent inusers who began their drug careers before the separation of the hard and soft markets was realized in the Netherlands "(p. 499). Separation of the hard and soft markets was the motive behind the de facto decriminalization of using and buying cannabis type drugs in the Netherlands during the 1970's. In tables 6 and 10, we show that the assumption of Sifanek et al. is not correct, one or two measures excepted. Most cannabis users show similar LTP, LYP and LMP of combinations of cocaine and heroin and/or ecstasy irrespective of the generation they were born in.

For our analysis we merged the datasets we have from our household surveys in 1990 and 1994 (total N = 8,809). This, because we are only interested in drug use as a function of having been raised mainly before or after the new drug policy, based on the assumptions of separation of markets, and not as a function of date of measurement. We exclude the household survey data of 1987, because in 1987 we did not inquire about lifetime use of heroin, but only about lifetime use of 'opiates'. Furthermore, in 1987 we did not inquire about the use of MDMA (Ecstasy).

After merging the data of 1990 and 1994, we categorized it into the already described age cohorts. The young age cohort contains 3,796 respondents of which 1,427 have life time experience with cannabis (37.6%). The old age cohort counts 4,996 persons, 941 of which have life time experience with cannabis (18.8%). The young age cohort of cannabis users has an average experience of 5.6 years of cannabis consumption and the old cohort has 9.7 years. Average age of onset is 17.9 for the young and 22.6 for the old. These differences between the age cohorts are considerable but the significance of all these differences is not immediately clear.

The difference in life time prevalence may simply be explained with a large part of the old age cohort having outgrown the age range in which initial drug use usually takes place, when drug policy changes started. Cannabis suddenly becoming more fashionable or available - as reflected and emphasized by decriminalization since the early seventies- does not overrule all effects of the age barrier against initial use. But the large difference in life time prevalence of cannabis between the old and young age cohort indicates that decriminalization does not cause massive use among the generation that lives during a changing policy. Because of increased cultural acceptance of cannabis, the young age cohort probably found it easier to experiment with marijuana than the old. Still, even among the young age cohort almost two thirds never even tried it.

But life time prevalence figures are not the most important ones when we look at epidemiological data. Regular and heavy use is more important and befitting the theme of this article, than the association between cannabis use and regular or heavy use of other illicit drugs. In the rest of this article we will show that other drug use and discontinuation of other drug use is remarkably similar between the age cohorts.

Stepping stone hypotheses 1-8

The stepping stone hypothesis in its simplest form will predict that having any experience with cannabis will be associated to any experience with other drugs. We are able to test this stepping stone hypothesis both for the young and the old age cohort.[3] But, as we already found very little support for this stepping stone hypothesis in the Amsterdam population as a whole - not differentiated by generation- we could introduce other ways of looking at the hypothesis. We could reason that only particular minimum experience conditions give rise to the stepping stone phenomenon. For this line of thought, we developed stepping stone hypotheses 2-5. In these hypotheses we associate a growing level of experience with cannabis with the probability of having life time experience with other drugs.

We might also reason that just life time experience, of maybe only experimental kind, with other drug use, does not really count. Instead, the stepping stone theory should imply that "moving from" cannabis to heroin and or cocaine should not only be visible as life time experience, but also as more recent

experience, like last year prior to interview, or even last month prior to interview. In other words, in a stricter expression of the stepping stone hypothesis cannabis use should be associated with more than experimental use of other drugs. For instance, expressing cocaine or heroin experience in number of times, the cannabis experience should at least have resulted in *25 times of experience* with these other drugs. For minimum levels of other drug use we developed stepping stone hypotheses 6-8.

Table 6. Data on cannabis use and the prevalence of cannabis of respondents who reported cannabis use in the 1990 and 1994 household surveys in Amsterdam divided by old age cohort (born before 1958) and young age cohort (born in or after 1958). Total N = 8,809.

	N	%	average duration of cannabis use in years	average age of first cannabis use	percentage with LTP of cocaine	percentage with LTP of heroin	percentage with LTP of ecstasy
LTP cannabis							
born in or after 1958	1,427	100.0	5.6	17.9	19.7	4.3	10.0
born before 1958	941	100.0	9.7	22.6	24.9	3.9	4.7
total	2,368	100.0	7.2	19.8	21.7	4.2	7.9
significance*			p<0.001	p<0.001	p<0.01	n.s.	p<0.001
LTP cannabis < 25 times							
born in or after 1958	768	53.8	3.5	18.8	8.7	0.4	3.8
born before 1958	524	55.7	5.2	24.6	10.3	0.2	1.7
total	1,292	54.6	4.2	21.1	9.4	0.3	2.9
significance*			p<0.001	p<0.001	n.s.	n.a.	p<0.05
LTP cannabis ≥ 25 times + no LMP							
born in or after 1958	300	21.0	7.0	17.2	31.0	7.0	9.0
born before 1958	266	28.3	11.9	20.3	34.6	5.3	4.1
total	566	23.9	9.3	18.7	32.7	6.2	6.7
significance*			p<0.001	p<0.001	n.s.	n.s.	p<0.05
LTP cannabis ≥ 25 times + LMP cannabis 1-19 times							
born in or after 1958	253	17.7	8.6	16.9	32.0	11.1	23.3
born before 1958	101	10.7	20.2	20.5	61.4	12.9	15.8
total	354	14.9	12.0	17.9	40.4	11.6	21.2
significance*			p<0.001	p<0.001	p<0.001	n.s.	n.s
LTP cannabis ≥ 25 times + LMP cannabis ≥ 20 times							
born in or after 1958	71	5.0	10.6	16.2	50.7	14.1	32.4
born before 1958	38	4.0	24.1	18.2	57.9	23.7	18.4
total	109	4.6	15.2	16.9	53.2	17.4	27.5
significance*			p<0.001	p<0.05	n.s.	n.s.	n.s.

* average duration and average age: Students t; prevalences: chi square test with Yates correction

We will present other drug use data for each of the two age groups of cannabis users we described earlier. We define the stepping stone theory to be "proven" if 75% or more of all cannabis users - irrespective of level of involvement - show any experience with heroin, cocaine or MDMA.[4] *This hypothesis is our stepping stone hypothesis number 1.* It might be that we will find the stepping stone hypothesis number 1 proven for the old cohort (who lived through transition), but not for the young, or vice versa. Of course, the other condition is that we find very little or none of other drug use with respondents who have never used cannabis. We have already shown that this condition is met and we will not repeat this every time we introduce a new stepping stone hypothesis.

Because we find far less than 75% of all cannabis users per age cohort to report experience with cocaine, heroin or MDMA (see Table 6), this does not necessarily mean the stepping stone theory is disproved. Finding smaller percentages than 75% might simply indicate that we are looking at the wrong sample. It might be that many cannabis users have so little experience with marijuana that the dynamics behind the stepping stone mechanism have not been able to come into play. *The stepping stone theory might apply only for those who have a certain minimum experience with cannabis.*

In order to check this possibility, we will divide our cannabis users in different classes of experience. The fist category is made up of users whose life time experience is relatively restricted, less than 25 times of use. We call them the "low experience group". The second category is made up of those who used 25 times or more, but who are not current users i.e. have no last 30 days experience. We call them "experienced users". The third category consists of those, who used cannabis more than 25 times during life time, and also have last 30 days experience of 1 to 19 times of use. We call them "experienced current users". The last category is made up of those who have a life time experience of 25 times or more and have used 20 times or more during the last 30 days. They are our "experienced current heavy cannabis users".

Our stepping stone hypothesis number 2 is, that at least 75% of low experience cannabis users will have some experience with either cocaine, heroin, or ecstasy. Low experienced users number 768 persons for the young and 524 for the old cohort, together 15% of all respondents and 55% of all cannabis users. For low experienced cannabis users we found an average period of 3.5 years of cannabis consumption for the young age cohort and of 5.2 years for the old cohort. Average age of onset is 19 years for the young and 25 for the old cohort. Just less than one tenth (9.4%) of the low experienced cannabis users have life time experience with cocaine. Life time experience with heroin is 0,3% and 2,9% for Ecstasy. We do not even come close to 'proving' our stepping stone hypothesis nr 2.

We will not rest, and move on to a category who *is experienced but not current user (no last 30 days consumption) of cannabis*. These experienced cannabis users have used at least 25 times and may be considered so experienced that if the stepping stone theory has any value, it should show in this category. Stepping stone hypothesis number 3 states that at least 75% of all experienced cannabis users have at least life time experience with one of the other drugs.

This type of user numbers 300 persons for the young and 266 for the old, together 6% of all respondents and 24% of all cannabis users in both samples. They have an average experience of 7 years of cannabis consumption for the young and of 11.9 years for the old cohort. Average age of onset is 17.2 for the young and 20.3 years for the old cohort. The old age cohort with this type of user shows a life time experience with cocaine of just 35%. The young age cohort reaches a cocaine life time experience of 31%. Although life time experience with cocaine in this group of cannabis users is higher than among the low experience group, it remains far removed from the 75% we set as support criterion for the stepping stone hypothesis number 3. Experienced cannabis users show a life time prevalence of 6,2% for heroin and 6,7% for Ecstasy.

We will now formulate stepping stone hypothesis number 4, stating that at least 75% of experienced and current (but less than 20 times during the last 30 days) cannabis users will have at least life time experience with other drugs. Of this category we found 253 among the young age cohort and 101 of the old, together 15% of all cannabis users and 4% of all respondents. Average age of onset of cannabis use is 17 years for the young cohort and 20.5 years for the old. The young cohort has been using cannabis for an average of 8.6 years, the old of 20.2 years. Among the old cohort, 61% have life time experience with cocaine, with 32% among the young. Experience with heroin among this category is 11.6%, and with Ecstasy 21.2%.

The most experienced cannabis users we can find in our samples are those who are experienced (life time 25 times or more) *and* report cannabis use on 20 occasions or more during the last 30 days prior to the interview. They consume cannabis (almost) daily and we call them the experienced current heavy cannabis users. This type of user numbers 71 persons for the young and 38 for the old cohort, together 1.2% of all respondents and 4.6% of all cannabis users in both samples.

This type of user has an average experience of 10.6 years of cannabis consumption for the young cohort and 24.1 years for the old cohort. Average age of onset is 16.2 years for the young and 18.2 years for the old cohort. Stepping stone hypothesis number 5 would assume that 75% or more of experienced current heavy cannabis users would have some kind of experience with cocaine, heroin or MDMA.

We find that about 53% has life time experience with cocaine, and 17% has life time experience with heroin. MDMA has been used by 28% of this group. For this small group of the heaviest cannabis users in our sample, we still can not prove the stepping stone hypothesis (number 5), although we approach such proof for cocaine more than with any of the other categories of cannabis users. The old age cohort of this small group of experienced current heavy cannabis users has a life time experience of 24% with heroin. Although this still is a minority, it is the highest value we found in this investigation.[5]

We may actually be finding a sub group of cannabis users where the stepping stone hypothesis approaches some positive evidence. Although we do not reach a proportion of 75% of them, around 50% of the most experienced cannabis users have life time experience with cocaine. Life time experience with heroin and with MDMA is considerably lower than the experience with cocaine But, heroin life time experience among the most experienced cannabis users is higher than in populations with less experience with cannabis.

We already reported that life time prevalence of cannabis use is 18.8% in the old age cohort, and 37.6% in the young. This also suggests, that in accordance with the stepping stone hypothesis, we should find that cocaine prevalence among the young age cohort of cannabis users is much higher than among the old. However, we consistently find that cocaine LTP among the old cohort of cannabis users is higher than among the young age cohort of cannabis users. For heroin, LTP is approximately equal, except for the highest levels of cannabis experience. There, we find heroin LTP higher among the old cohort of cannabis users. We consider this finding interesting because it so clearly contradicts the view that decriminalizing cannabis would increase prevalence of other drug use.

Continuing our series of stepping stone hypotheses we may reason, that the stepping stone theory does not really apply if cannabis users of any level of cannabis experience have no more than just life time experience of other drugs (the measure we used when testing stepping stones hypotheses nr. 1 till 5). If one would rather say that just any life time use of other drugs is experimental and does not really count as serious experience, we would have to modify the wording of our stepping stone hypotheses. We would have to say that the stepping stone hypothesis is confirmed if 75% of cannabis users (of any kind of experience level) show at least 25 times or more life time experience with an other drug, in our case heroin, cocaine or ecstasy. This is stepping stone hypothesis number 6. In fact, looking at our data we find that cocaine experience of at least 25 times applies to only 65 persons from the old cohort and 73 from the young, together 1.6% of all respondents and 5.8% of all cannabis users. Heroin experience of at least 25 times was attributed to 19 persons from the old cohort and 18 from the young, together 0.4% of all respondents and 1.6% of all cannabis users. For ecstasy a minimum LTP of 25 times can be found with 3 persons out of the old cohort and 23 out of the young, together 0,3% of all respondents and 1,1% of all cannabis users. This means, that in Amsterdam stepping stone hypothesis nr 6 also, cannot be confirmed.

We arrive at the next stepping stone hypothesis, if we say that 25 times during life time use of cocaine or heroin is simply not enough to speak of. If one would interpret the stepping stone hypothesis as making sense only if it predicts *current other drug use* (of at least once during last 30 days) by at least 75% of cannabis users, or *current heavy other drug use* (at least 20 times during last 30 days) of at least 75% of cannabis users we would have formulated stepping stone hypotheses number 7 and 8.

Looking at our data for support for hypothesis number 7 we find that 48 persons are current users of cocaine (20 among the old and 28 among the young). This is 0.5% of all respondents and 2.0% of all cannabis users. For heroin we only find 2 current users in the old cohort and 2 in the young cohort. With ecstasy the numbers are 28 current users in the young and 4 in the old age cohort, together 1.4% of all cannabis users and 0.4% of all respondents. Hypothesis nr 8 (75 % of cannabis users have used cocaine or heroin more than 20 times during last 30 days) would be confirmed for heroin as for cocaine for 2 persons out of 2,368 only, and therefore cannot be confirmed either.

We provide details about characteristics of cocaine use (Table 7) of cannabis users per generation cohort and per level of cannabis experience.

Table 7. Data on cocaine use in sub samples of cannabis users who reported lifetime experience with cocaine in the 1990 and 1994 household surveys in Amsterdam divided by old age cohort (born before 1958) and young age cohort (born in or after 1958). Total N = 8,809.

	N	%	average duration of cocaine use in years	average age of first cocaine use	average interval first cannabis use - first cocaine use
LTP cannabis					
born in or after 1958	281	100.0	2.6	20.6	3.6
born before 1958	234	100.0	3.2	27.3	7.5
total	515	100.0	2.9	24.1	5.6
Students t significance			n.s.	p<0.001	p<0.001
LTP cannabis < 25 times					
born in or after 1958	67	23.8	1.1	22.2	2.5
born before 1958	54	23.1	1.1	29.4	6.7
total	121	23.5	1.1	26.1	4.8
			n.s.	p<0.001	p<0.05
LTP cannabis ≥ 25 times + no LMP					
born in or after 1958	93	33.1	1.9	20.8	4.0
born before 1958	92	39.3	3.3	26.5	7.2
total	185	35.9	2.7	23.7	5.7
Students t significance			p<0.1	p<0.001	p<0.001
LTP cannabis ≥ 25 times + LMP cannabis 1-19 times					
born in or after 1958	81	28.8	4.1	20.2	3.7
born before 1958	62	26.5	4.1	27.2	7.7
total	143	27.8	4.1	23.9	5.9
Students t significance			n.s.	p<0.001	p<0.001
LTP cannabis ≥ 25 times + LMP cannabis ≥ 20 times					
born in or after 1958	36	12.8	5.0	18.4	4.0
born before 1958	22	9.4	7.2	26.2	9.6
total	58	11.3	5.8	21.7	6.3
Students t significance			n.s.	p<0.005	p<0.005

Table 7 shows that *duration* of cocaine use in years is very similar between the age cohorts but that the young cannabis users experience their period of cocaine use at an earlier time in life than the old cannabis users.

For heroin the situation is a little different (Table 8). The period of heroin use for the 99 cannabis users who participated in this experience is longer for the old than for the young cohort, unlike what we saw with cocaine. But again, the young cohort has its (heroin) experience earlier than the old.

Table 8. Data on heroin use in sub samples of cannabis users who reported lifetime experience with heroin in the 1990 and 1994 household surveys in Amsterdam divided by old age cohort (born before 1958) and young age cohort (born in or after 1958). Total N = 8,809.

	N	%	average duration of heroin use in years	average age of first heroin use	average interval first cannabis use - first heroin use
LTP cannabis					
born in or after 1958	62	100.0	2.2	20.5	4.4
born before 1958	37	100.0	5.0	25.5	7.3
total	99	100.0	3.3	22.4	5.5
Students t significance			**p<0.05**	**p<0.001**	**p<0.005**
LTP cannabis < 25 times					
born in or after 1958	3	4.8	5.0	22.7	3.7
born before 1958	1	2.7	-	25.0	5.0
total	4	4.0	3.8	23.3	4.0
Students t significance			n.a.	n.a.	n.a.
LTP cannabis ≥ 25 times + no LMP					
born in or after 1958	21	33.9	1.3	19.5	3.1
born before 1958	14	37.8	3.3	23.8	6.2
total	35	35.4	2.0	21.2	4.3
Students t significance			n.s.	**p<0.05**	**p<0.05**
LTP cannabis ≥ 25 times + LMP cannabis 1-19 times					
born in or after 1958	28	45.2	1.2	21.7	5.8
born before 1958	13	35.1	4.0	27.1	8.2
total	41	41.4	2.2	23.6	6.7
Students t significance			**p<0.05**	**p<0.100**	n.s.
LTP cannabis ≥ 25 times + LMP cannabis ≥ 20 times					
born in or after 1958	10	16.1	5.6	19.1	3.8
born before 1958	9	24.3	9.4	25.6	8.0
total	19	19.2	7.4	22.2	5.8
Students t significance			n.s.	**p<0.05**	**p<0.100**

The situation with ecstasy is very similar to the situation with cocaine, inasmuch as duration of average career is concerned (Table 9). Ecstasy use career is similar in length (short!) but begins earlier for the young cohort and average interval after first cannabis use is shorter for the young cohort than for the old. Since ecstasy appeared on the market in Amsterdam in the late eighties, these outcomes are almost inevitable.

Table 9. Data on ecstasy use in sub samples of cannabis users who reported lifetime experience with ecstasy in the 1990 and 1994 household surveys in Amsterdam divided by old age cohort (born before 1958) and young age cohort (born in or after 1958). Total N = 8,809.

	N	%	average duration of ecstasy use in years	average age of first ecstasy use	average interval first cannabis use - first ecstasy use
LTP cannabis					
born in or after 1958	143	100.0	1.1	23.0	6.1
born before 1958	44	100.0	1.1	35.7	17.0
total	187	100.0	1.1	26.0	8.6
Students t significance			n.s.	**p<0.001**	**p<0.001**
LTP cannabis < 25 times					
born in or after 1958	29	20.3	1.1	25.3	6.3
born before 1958	9	20.5	-	38.8	14.1
total	38	20.3	0.8	28.6	8.1
Students t significance			n.s.	**p<0.001**	**p<0.05**
LTP cannabis ≥ 25 times + no LMP					
born in or after 1958	27	18.9	1.5	22.1	5.9
born before 1958	11	25.0	0.6	34.1	15.0
total	38	20.3	1.2	25.6	8.3
Students t significance			n.s.	**p<0.001**	**p<0.001**
LTP cannabis ≥ 25 times + LMP cannabis 1-19 times					
born in or after 1958	59	41.3	0.8	22.5	5.9
born before 1958	16	36.4	1.8	35.3	18.6
total	75	40.1	1.1	25.3	8.7
Students t significance			n.s.	**p<0.001**	**p<0.001**
LTP cannabis ≥ 25 times + LMP cannabis ≥ 20 times					
born in or after 1958	23	16.1	1.1	22.9	7.0
born before 1958	7	15.9	2.5	35.5	19.2
total	30	16.0	1.4	25.5	9.5
Students t significance			n.s.	**p<0.001**	**p<0.001**

Discontinuation of other drug use by cannabis users

Now we turn our attention to a different group again. Up until now, we first investigated how many respondents in large household surveys used cannabis as a proportion of the total population. We then restricted our perspective to users of cannabis in this population to find out if, and to what extent they have other drug use experience as well.

In the part that now follows we will further narrow our angle of observation by looking only at the sub group of cannabis users who do have life time experience with other drugs. If cannabis users do use other drugs, how deep is their involvement with these other drugs? Is discontinuation the rule or the exception among cannabis users who also seek other drug experience?

By presenting discontinuation rates for last year and for last 30 days use, we hope to indicate the proportions of other drug using cannabis users who do *not continue* life time drug use experience. We will present discontinuation data for cocaine (Figure 1), heroin (Figure 2), and ecstasy use (Figure 3)

during last 12 months and for last 30 days for several sub-samples of respondents with cannabis experience, per generation cohort.

Discontinuation of cocaine use by cannabis users

We define the last 12 months or last 30 days discontinuation rate of a drug as the percentage of persons that report life time prevalence of a drug but do not report the use of that drug during the 12 months prior to interview, or during the last 30 days prior to interview.

In Figure 1 we present the discontinuation rates of cocaine use for five sub samples of cannabis users ranging from all respondents with life time prevalence of cannabis use (that is at least one reported occasion of cannabis use ever) to respondents with a high level of past and current cannabis involvement.

Figure 1. Discontinuation rates of cocaine use
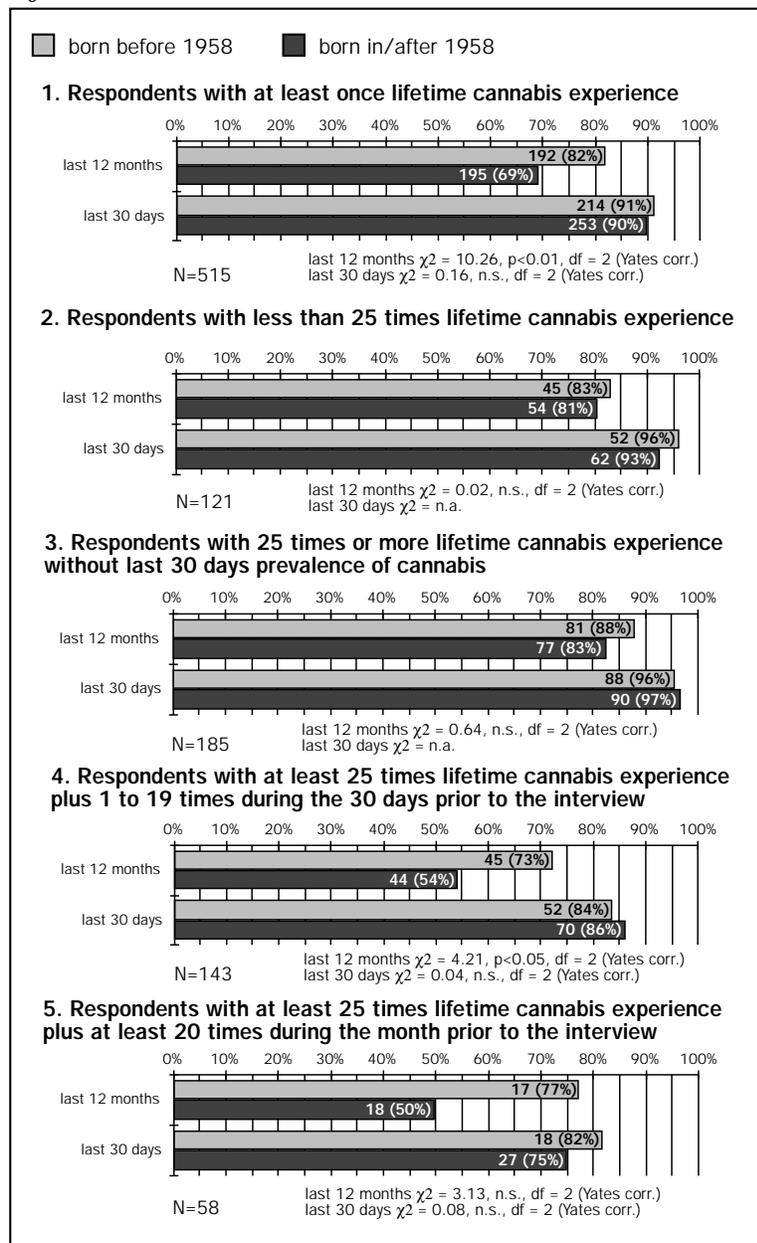
There are no differences in the discontinuation rates of cocaine use for *the last 30 days* prior to the interview between the young and the old age cohort. However, the discontinuation rates of cocaine use *during the last 12 months* prior to the interview differ significantly between the cohorts. Respondents who were born in or after 1958 report somewhat lower discontinuation rates than those who were born before 1958. This means that if we look at a period of 12 months, cannabis users in the young age cohort use cocaine more frequently than those in the old age cohort.

We do not necessarily have to attribute these differences to the fact that the young cohort experienced far less active law enforcement against individual drug use. The differences between the young and the old cohort may very well be related to age related variables that determine cocaine use. We found e.g. in our research of cocaine users in Amsterdam that cocaine use is strongly related to life-styles in which outgoing and socializing behavior is dominant (Cohen 1989, Cohen and Sas, 1995). In the two independent samples of experienced cocaine users, one of 160 respondents and one of 108, "going out", "partying", and "being with friends" were the three most reported situations in which cocaine use occurs (Cohen and Sas 1995, p. 71). Average age at initiation to cocaine is 22,2 years (Cohen and Sas, 1994). A follow-up study in 1991 of 64 cocaine users from the 1987 sample showed, that after an average drug career of about ten years (average age 31 years), 64% of the cocaine users did not report any use during the last three months prior to the follow-up interview in 1991 (Cohen and Sas 1993, p. 29). This leads us to conclude, that the slight but significant differences in last 12 months discontinuation rate of cocaine between the old and the young age cohorts of cannabis users could very well be explained by differences in life style and age. Young cocaine users have an outgoing life style which simply tapers off when growing older. The older the group of cocaine users, the higher the discontinuation rate. Also, before 1970 cocaine was almost unknown in Amsterdam. Respondents from the old cohort stood much less chance to meet people who could introduce them to cocaine than the members of the young age cohort. We notice, that for the young age cohort the discontinuation rates of cocaine use are lowest in the sub samples of *most experienced and current cannabis users.* This does not apply to the old cohort. Again, age and lifestyles may explain this.

Discontinuation of heroin use among cannabis users

From Figure 2, we conclude that in contrast to our findings about cocaine, there are no significant differences in (the very high) discontinuation rates of heroin use between the old and the young cohort. This means that neither changes in the Dutch drug policy nor differences in age or life style lead to high prevalence of heroin use.
These data are interesting because they show that current heroin use is very low even among the most cannabis involved persons. They also show that there is a small group of people who recreationally use heroin over a period of 12 months, irrespective of the age cohort (cf. Blackwell, 1982).

Discontinuation of ecstasy use among cannabis users

As shown in Table 1, ecstasy use in Amsterdam, in general tripled between 1990 and 1994 from 1.2% of the population of 12 years and older to 3.4%. Among cannabis users life time prevalence of ecstasy doubled between 1990 and 1994 from 4.9% to 10.5%. This increase is approximately the same among people with a life time prevalence of at least one occasion of cannabis use and among experienced current heavy cannabis users. Among non users of cannabis, the consumption of ecstasy remained nil (life time prevalence in 1990 and 1994 is 0.1%). The ecstasy discontinuation rates for the young cohort tend to be

Figure 2. Discontinuation rates of heroin use
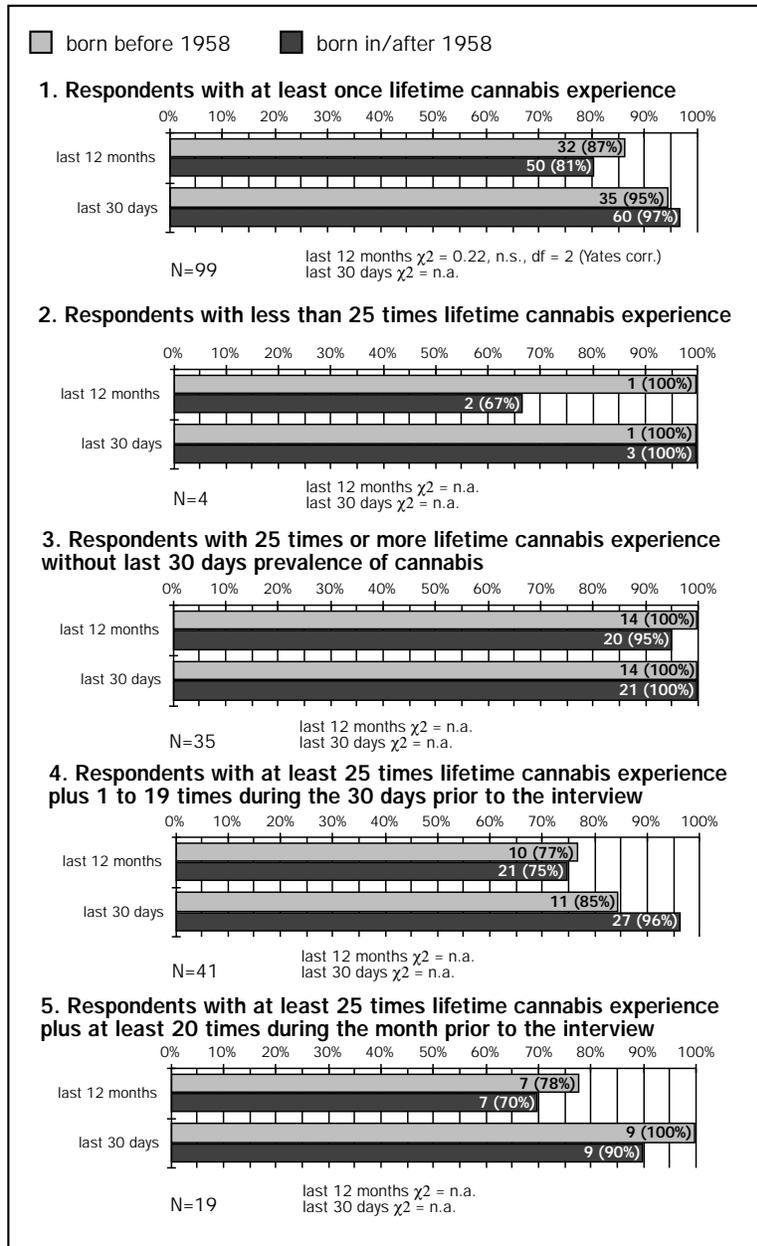
slightly lower than for the old, but the differences are not significant. The discontinuation rates of ecstasy do not tend to be lower in the sub samples of experienced current cannabis users, which suggests that there is no direct link between level of use of cannabis and the use of ecstasy.

If we look at discontinuation rates of all three drugs for the last 12 months prior to interview, we see lower rates for ecstasy compared to heroin and cocaine. Apparently, ecstasy is used more often than cocaine or heroin in both cohorts when looked at within a 12 month time frame. However, the discontinuation rates for ecstasy for the last 30 days prior to interview are very high. This might mean that, although ecstasy is used more often than cocaine on a yearly basis, few people tend to use it more frequently than once a month.

Figure 3. Discontinuation rates of ecstasy use
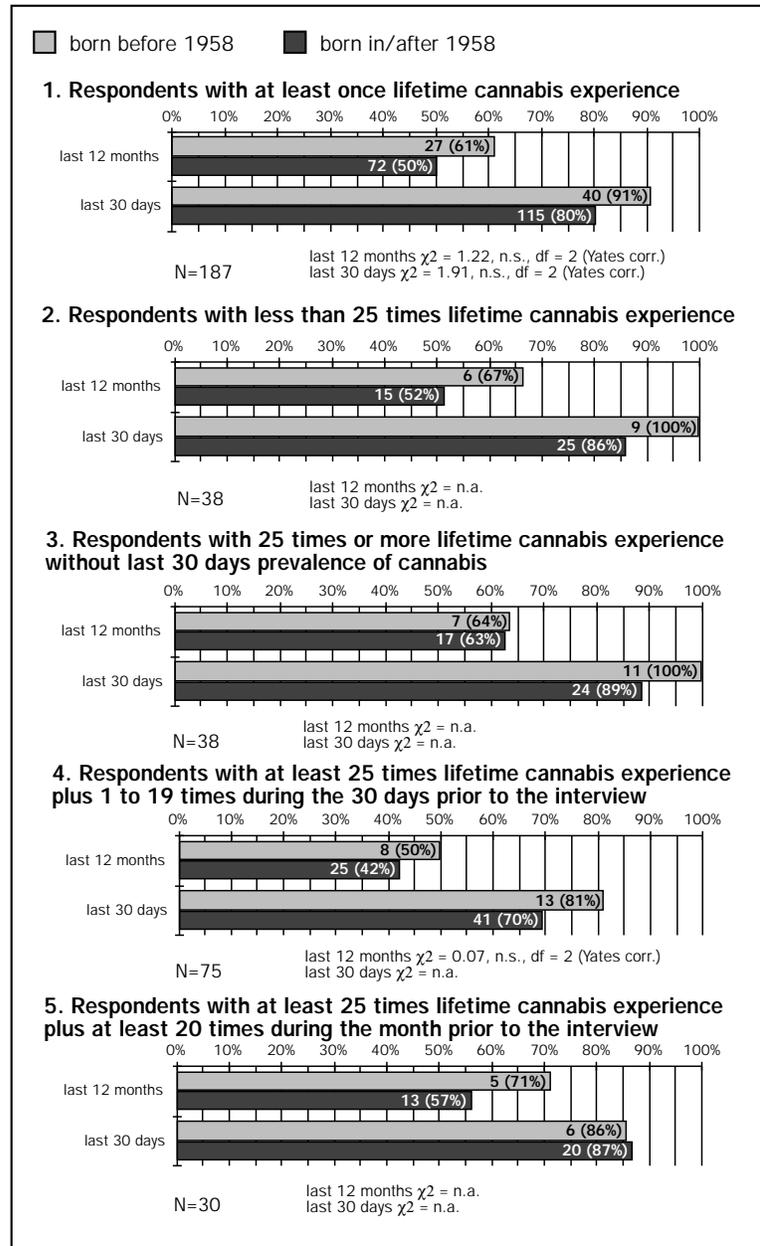
Time intervals between drugs

In Table 7, 8, and 9 we found that average age of first use is lower for the young age cohort for all drugs, cannabis included. The young age cohort users of cannabis also take less time between first cannabis use and first use of any other drug than the old age cohort of cannabis users. Apparently any drug use occurs earlier in time for those born after 1958 than those born before. However, irrespective of age cohort we find that cannabis use, on average, *always precedes use of any other illicit drug*. The precise number of years between first cannabis use and the use of another drug may vary, along age cohort or along level of cannabis involvement.

Except for current experienced cannabis users, life time prevalence figures for the old and young age cohorts are quite similar for cocaine. With slight modifications this is true for heroin as well. This means that the young and the old age cohorts build up about the same over all levels of experience, only the time

frame in which they do so is different! Because initiation into drug use diminishes after people reach the age of 35 we might expect that LTP of ecstasy for the old age cohort will never reach the level we find among the young age cohort.

Maybe we could argue that in a population, availability of a drug creates prevalence up to a particular level and no more. Drug enforcement regime has very little influence upon the ultimate level of prevalence. If this were true, we might speak of a kind of drug use saturation phenomenon, that might be different between historic periods and between cultures. When cultures have relevant similarities, as exist between The Netherlands and Germany, differences in methods of cannabis distribution and large differences in drug policy are of less importance than absolute availability. In fact, life time prevalence of cannabis use is similar between the two countries (Reuband, 1992, 1995).

Table 10. Lifetime prevalence (LTP), last 12 months prevalence (LYP) and last 30 days prevalence (LMP) of cocaine and heroin use of respondents of 1990 and 1994 household surveys in Amsterdam divided by old age cohort (born before 1958) and young age cohort (born in or after 1958). Total N = 8,809.

	N	%	LTP of cocaine & heroin (%)	LYP of cocaine & heroin (%)	LMP of cocaine & heroin (%)
LTP cannabis					
born in or after 1958	1,427	60.3	20.1	6.4	2.0
born before 1958	941	39.7	25.5	4.7	2.1
total	2,368	100.0	22.3	5.7	2.1
chi-square*			**9.22**	2.74	0.00
			(p<.01)	(n.s.)	(n.s.)
LTP cannabis < 25 times					
born in or after 1958	768	59.4	8.7	1.8	0.7
born before 1958	524	40.6	10.3	1.7	0.4
total	1,292	100.0	9.4	1.8	0.5
chi-square*			0.74	0.01	0.07
			(n.s.)	(n.s.)	(n.a.)
LTP cannabis ≥ 25 times + no LMP					
born in or after 1958	300	53.0	31.3	5.7	1.0
born before 1958	266	47.0	35.7	4.1	1.5
total	566	100.0	33.4	4.9	1.2
chi-square*			1.03	0.41	0.03
			(n.s.)	(n.s.)	(n.a.)
LTP cannabis ≥ 25 times + LMP cannabis 1-19 times					
born in or after 1958	253	71.5	34.0	15.4	4.3
born before 1958	101	28.5	63.4	17.8	9.9
total	354	100.0	42.4	16.1	5.9
chi-square*			**25.79**	0.16	3.05
			(p<.001)	(n.s.)	(n.s.)
LTP cannabis ≥ 25 times + LMP cannabis ≥ 20 times					
born in or after 1958	71	65.1	50.7	26.8	14.1
born before 1958	38	34.9	60.5	15.8	10.5
total	109	100.0	54.1	22.9	12.8
chi-square*			0.60	1.11	0.05
			(n.s.)	(n.s.)	(n.s.)

* df=1, Yates' correction

Let us summarize. In Amsterdam a minority of all cannabis users (21.7%) have had experience with cocaine (Table 6). If we compute life time prevalence of cocaine, heroin, and ecstasy together, the proportion of cannabis users who have life time experience with one of those three other drugs rises to 24.9% (Table 10). But, three-quarters to two-thirds (dependent on age group) of those who have ever used cannabis have *never* used any other illicit drug. *The majority of all cannabis users are like the 'never cannabis users' whose experience with other drugs is negligible* (0.5%).

Looking at the 21.7% of cannabis users that do develop experience with cocaine, we see that life time experience with cocaine increases as level of cannabis involvement increases. Cocaine experience exists with almost 22% of all cannabis users, but if we look at the small group with the highest levels of cannabis use and experience, we find life time cocaine use with more than half (53%). For heroin we see much lower values. Life time experience with heroin is 4.2% for cannabis users in general but 17.4% for the small group of experienced current heavy cannabis users (equals 4.7% of all cannabis users). Taking into account the very high discontinuation rates of cocaine, heroin, and ecstasy (Figures 1-3), we should add that out of the small number of cannabis users that gain life time experience with these other drugs, only very few develop into current or regular users. And from our detailed investigations into the use of cocaine in Amsterdam we concluded that even regular use of cocaine is almost never sustained when looking into a ten year cocaine use career. As with heroin and cocaine, we find experience with ecstasy only with cannabis users. Level of experience with cannabis plays a minor role or none at all in determining the probability of ecstasy experience among cannabis users.

In other words, in Amsterdam's population there is a minority wanting to experience illegal drugs but for a large majority of these people experience with cannabis suffices. Although heroin as well as cocaine current use is very low among cannabis users, it is *not non existent as is the case for non cannabis users*. This difference may be responsible for the tenacity of the stepping stone hypothesis.

Alcohol and cannabis

Before winding up this article and reaching our conclusion, we would like to look at cannabis use among users and among non users of alcohol. Kandel et al. (1992) showed that alcohol and or tobacco use often precedes the use of marihuana. In fact only about 4.5% of her respondents had used marihuana without prior use of a licit drug.

In Amsterdam we found that among respondents without life time experience of alcohol (=1,230) only 2.7% have life time experience with cannabis. Among respondents who have life time experience with alcohol (N = 7,566), 30.8% have life time cannabis experience. But here too, the main phenomenon is that almost 70% of alcohol users do *not* develop cannabis experience. It seems that alcohol use is a necessary condition to develop cannabis experience, but not a sufficient one. This is very similar to our finding that cocaine experience, if found at all, is observed with respondents who have some cannabis experience; but that most cannabis users never develop any cocaine experience. In table 11, we will show some data about alcohol experience at cumulative levels and associated cannabis experience.

Conclusion

In Amsterdam, the access to cannabis type drugs developed from highly suppressed to almost universal and hassle free in the period between 1965 and 1980. We tested the theory that cannabis use will - almost automatically - result in (heavy) use of other drugs. Indeed, we found among almost 9,000 respondents out of 2 large household surveys in 1990 and 1994, that in Amsterdam cannabis use is an almost necessary condition for developing other drug use. However, most cannabis users in Amsterdam (75%) do not

Table 11. Lifetime prevalence (LTP), last 12 months prevalence (LYP) and last 30 days prevalence (LMP) of cannabis of respondents of 1990 and 1994 household surveys in Amsterdam divided by old age cohort (born before 1958) and young age cohort (born in or after 1958). Total N = 8,809.

	N	%	LTP of cannabis	LYP of cannabis	LMP of cannabis
no LTP alcohol					
born in or after 1958	604	8.0	3.3	1.7	1.3
born before 1958	626	8.3	2.1	0.8	0.6
total	1,230	16.3	2.7	1.2	1.0
chi-square*			1.35	1.23	0.87
			(n.s.)	(n.s.)	(n.s.)
LTP alcohol					
born in or after 1958	3,194	42.2	44.0	20.0	12.1
born before 1958	4,372	57.8	21.2	5.5	3.4
total	7,566	100.0	30.8	11.6	7.1
chi-square*			**450.30**	**378.59**	**208.66**
			(p<.001)	**(p<.001)**	**(p<.001)**
LTP alcohol < 25 times					
born in or after 1958	501	57.0	14.2	6.2	4.0
born before 1958	378	43.0	5.3	1.3	0.8
total	879	100.0	10.4	4.1	2.6
chi-square*			**17.34**	**11.76**	**7.43**
			(p<.001)	**(p<.001)**	**(p<.01)**
LTP alcohol ≥ 25 times + no LMP					
born in or after 1958	71	16.8	29.6	7.0	2.8
born before 1958	352	83.2	10.2	1.1	1.1
total	423	100.0	13.5	2.1	1.4
chi-square*			**17.31**	**7.25**	**0.29**
			(p<.001)	**(p<.01)**	**(n.a.)**
LTP alcohol ≥ 25 times + LMP alcohol					
born in or after 1958	2,555	42.0	50.4	23.2	14.0
born before 1958	3,534	58.0	24.3	6.5	4.0
total	6,089	100.0	35.3	13.5	8.2
chi-square*			**440.40**	**353.92**	**193.96**
			(p<.001)	**(p<.001)**	**(p<.001)**

* df=1, Yates' correction

report other drug use. Also the 'never cannabis users' in Amsterdam do not consume other illicit drugs. Curiosity inasmuch as it develops in cannabis users to use other drugs is confined to cocaine and ecstasy, while heroin is almost excluded.

In order to test the 'stepping stone hypothesis' we formulated a testable series of such hypotheses, varying the terms but keeping the criterion stable. We arbitrarily stated that any of our stepping stone hypotheses would be confirmed if we could find 75% of the cannabis users to behave according to the hypothesis. None of the stepping stone hypotheses could be confirmed although data that approached confirmation could be found for a minority of users with the highest levels of cannabis involvement. Some statistical / epidemiological evidence for a stepping stone phenomenon that associates cannabis use to some type of use of other drugs is available for a small minority of cannabis users only.

Apparently, in Amsterdam where use of illicit drugs is made possible due to of hassle free (illicit) availability of that type of drug, the use of cannabis satisfies almost all curiosity. Small numbers of experienced cannabis users try other illicit substances, mostly cocaine and ecstasy. This is true for cannabis users who never experienced active law enforcement against individual drug use (the 'young'

age cohort born in 1985 or later) as well as for cannabis users who were raised during the then existing regime of active law enforcement against cannabis and other individual drug use (the 'old' age cohort born before 1958). We confirmed that, if it occurs, other drug use always succeeds use of cannabis. We did not try to explain why this is so, nor why the large majority of cannabis users do not develop curiosity to use other drugs.

Levels of experience with other drugs than cannabis are very similar between different cannabis users in age cohorts raised during different regimes of law enforcement in relation to drugs.

Notes

1   Our household survey random samples of inhabitants of 12 years and older are taken from the Municipal Registry of Citizens, and are around 4,400 *net* persons each year, with a non response of around 45% of the gross sample. For a detailed overview of the sampling procedure and the results of the non response analysis, see Sandwijk et al., 1995.

2   For a detailed history of this state of affairs, see Leuw (1994), Korf (1995) and Cohen (1994).

3   We should, however, not attach too much value to these analyses, however interesting they may be. This analysis does not account for variables associated with fashion and development of subcultures which may have little connection with drug policy or age. The influence of the drug use fashion of the sixties, for instance, is not captured in this model, and unless we have found ways to account for the alleged influence of such variables, the gross analysis of drug use behavior in the two different drug policy exposed groups will be of limited value.

4   The criterion of 75% having to show other drug use is arbitrary to a certain extent. We have chosen it because 75% represents a clear majority. Less than a clear majority to show this phenomenon would have been unsatisfactory. We could also have chosen a higher proportion (like 90%) but this would have made a positive outcome of the test too improbable. Suggesting that any percentage higher than the one found among non cannabis users is proof of the stepping stone hypothesis is equally unsatisfactory. We would still not account for the percentage of cannabis users that does not develop other drug use (and which is, in this respect, by definition similar to non cannabis users).

5   Among experienced cocaine users, we found that almost 40% have lifetime experience with opiates (heroin, morphine, methadone, etc.). Cohen, 1989.

6   I am very grateful to David Shewan, Caledonian University Glasgow, Scotland, to draw our attention to this publication.

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