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How much for a dime bag? An exploration of youth drug markets

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Abstract

Relatively little is known about how youth obtain marijuana and other drugs. The Drugs, Alcohol and Violence International (DAVI) study explored youthful drug markets among samples of school students, detained youth, and school dropouts (ages 14–17 years) in the greater metropolitan areas of Philadelphia, Toronto, Montreal, and Amsterdam. Students frequently reported sharing drugs, either getting them from others or giving them to others for free. Sharing was less common among the more drug-involved detainees and dropouts. Marijuana was typically obtained either outdoors or in a house or apartment. Few youth reported getting marijuana at school. In Amsterdam, where marijuana can be purchased in small quantities in coffeeshops, this was the most common place to get marijuana, even though 18 is the legal age for purchase. Alcohol was also most likely to be obtained in stores or restaurants across all the sites, even though none were of legal age except those in Amsterdam age 16 or older. Youth most often reported purchasing marijuana in nickel, dime or other small bags, which are not standardized units. The exception again was Amsterdam, where youth most often reported quantities in grams or joints, which is how it is sold in coffeeshops. The lack of standardization of units makes economic cost estimates suspect. Even standardized units such as alcohol present problems since youth report a wide range of 'typical purchases.' Survey data can, however, more aptly describe drug market characteristics such as general location of purchase, and relationship with the seller.

Keywords: Drug market; Youth drug use; Marijuana markets; Drug prices

1. Introduction

In the U.S., since the early days of Harry Anslingers' tales of 'drug peddlers' getting kids hooked on drugs, Americans have been concerned about youth's access to drugs (Anslinger and Cooper, 1937). Yet, relatively little is known about drug acquisition patterns among youth. If we are to understand illicit drug use, it is also necessary to understand the dynamics of how illicit drugs are obtained. Although epidemiological surveys are rich with information on prevalence rates and the characteristics of those who use, they provide little information on drug markets—or how illicit drugs are obtained.

The goal of this paper is to advance knowledge about drug markets among youth by providing descriptive information on drug market acquisition in four sites in three countries. This paper examines the type of location in which youth typically acquire marijuana and alcohol, and to a lesser extent crack cocaine, whether they obtain these drugs in social friendship networks or from drug dealers, and the costs of the drugs they typically purchase. The data are derived from the Drugs, Alcohol and Violence International (DAVI) study that includes a comprehensive cross-section of youth ages 14–17 years, with representative samples of school students and detained youth, and a diverse sample of school dropouts in Philadelphia, Amsterdam, Toronto and Montreal. (The Amsterdam site did not conduct a school survey.) Therefore, the DAVI study provides insights on drug acquisition from more normative (students) as well as more deviant youth (dropouts and detainees). As well, the international cities included in the study, differ on drug control

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polices including age of majority to access alcohol, and access to marijuana.

Detainees and dropouts may operate in different worlds when it comes to drugs compared with the more normative population of students. Therefore, it is important to examine the full range of youth. Of course, even among students there are outliers, and those who may move between the populations of student to those of detainee or dropout. The school setting may also provide access to drugs for students, but perhaps not as much for detainees or dropouts, who are rarely or no longer in attendance.

1.1. Drug markets and availability

Relatively little is known about the social and interpersonal context of how individuals obtain illicit drugs. Epidemiological survey data on the prevalence of drug use among youth and adults in the U.S. and Canada have been available for many years, and have become increasingly available in European countries over the past decade. Youth, and students in particular, have often been the focus of these surveys. Nevertheless, information on the dynamics of how illicit drugs are obtained is meager.

The U.S. national epidemiological surveys of drugs generally ask 'availability' questions that are basically 'how difficult do you think it would be for you to get drug [x], if you wanted some' with responses ranging from very easy to probably impossible. Interestingly, data from the U.S. national student survey – the Monitoring the Future (MTF) study – show that nearly 90% of high school seniors have reported marijuana is 'fairly easy' or 'very easy' to get since the study began in 1975. Many would argue this measure of availability is not very sensitive. Further, availability has *not* varied with the trends in marijuana use among seniors (while perceived risk of using the drug has) (Bachman et al., 1988; Johnston et al. 2006). However, analyses by economists have challenged these findings, suggesting that indeed, the price of marijuana has trended with usage (Caulkins, 1999; Pacula, 1998), and that marijuana use is more prevalent among U.S. students in the 10 states that decriminalized marijuana in the mid to late 1970s (Saffer and Chaloupka, 1998). These analysts suggest that previous analyses have focused on short-term changes when long-term changes are key. The MTF survey trend data show the pattern of cocaine availability has fluctuated a bit more than marijuana, but availability peaked about 5 years after cocaine use peaked (Bachman et al., 1990). While this would suggest there is not necessarily a linear relationship between availability and use, not surprisingly, the illicit drugs reported easily available by the highest percentage of students are the ones most frequently used–primarily marijuana, and of course, alcohol. Alcohol availability is generally not reported by MTF, although patterns of use and heavy use (5 or more drinks in a row in a setting in the past 2 weeks) are. About 80% or more of 12th grade high school seniors report alcohol use in their lifetime, even though the legal age for purchase in the U.S. is 21. High school seniors are generally age 18. About two-third of 10th graders and more than 40 percent of 8th graders report lifetime alcohol use (Johnston et al., 2006). It is generally known that alcohol is purchased by older friends and relatives, or by youth themselves, often with fake identification (ID). Many European countries allow youth to legally drink beer at age 16, and spirits at age 18.

Recent school surveys among student's ages 15–16 in 30 European countries (Hibell et al., 2004) examined patterns of illicit drug availability and acquisition among youth. Like their U.S. counterparts, the illicit drug most likely to be used by students was marijuana. Most students who had used an illicit drug had only used marijuana. The European School Survey Project on Alcohol and Other Drugs (ESPAD) study asked youth about the situation in which they first used an illicit drug. Youth generally initiated drug use with a small group of friends, an older friend, or an older brother or sister. Rarely did youth report purchasing drugs from a friend or someone else. Over half of the students (55%) reported knowing one or more places to purchase cannabis (marijuana or hashish) easily. Discotheques, bars, etc., were mentioned most often (27%), followed by public places such as streets and parks (23%), then houses of dealers (21%), schools (16%) and 'other' (13%).

The general population survey on drug use in the Netherlands asks youth where they acquire cannabis. The most frequent response was from friends and relatives (47%). However, a surprisingly large percentage of 12–17 year olds reported 'coffeeshops (37%)' (Abraham et al., 2002). Coffeeshops in the Netherlands sell small quantities of cannabis, up to a limit of 5 g, in small bags or pre-rolled 'joints.' However, the age to purchase cannabis is 18. Of course, these youth could have intended this answer even when an older friend or relative purchased the drug, which is suggested by a recent survey of youth cannabis users (Korf et al., 2005). As is common with alcohol, they could also have used a 'fake ID,' identifying themselves as older. The Netherlands National School Survey (ages 12–18 years) also includes questions on where cannabis users buy or get their cannabis. Most reported from friends (67%), followed by coffeeshops (35%), and then a 'dealer' (12%) (Monshouwer et al., 2004).

In the U.S., there are some comparable data on drug markets. In 1992, questions were first added to the U.S. National Household Survey on Drug Abuse (NHSDA) to assess how people obtained marijuana and cocaine. A series of specific questions asked detailed questions about use as well as acquisition patterns. At the time, the study was representative of the population of the coterminous U.S., ages 12 and older. Those who reported past month marijuana use (5.2%) were asked separate questions about how they obtained any of the marijuana they used in the past month. Most (3.1%) reported others shared it, 2.4% reported they bought it from friends or acquaintances, 1.8% said it was given to them, and 1.2% said they bought it from a dealer. Nearly half those who used (46%), reported they spent no money for it. The results suggest people most often share or are given marijuana. However, the low prevalence on these questions did not inspire a lot of confidence in the data. The questions were subsequently dropped in 1994.

More recently, the successor to the NHSDA, the National Survey on Drug Use and Health (NSDUH), has been asking a nationally representative sample of the U.S. population about marijuana purchases. The questions are directed to past year

users. Data from 2002 show that 19% responded to the questions about how they got the marijuana they used the last time, with 10.6% reporting getting it for free or sharing it with others, and 6.9% reporting buying it. Among those who 'bought' marijuana, the majority indicated they last purchased it in an apartment or home. When asked the quantity of marijuana purchased, a scant 3.1% reported purchasing marijuana in ounces (parts of ounces or pounds), 0.5% reported their most recent purchase was in grams, and 0.4% reported they last purchased marijuana in joints. In order to gain precision in measurement, questions on the various quantities were offered, but there are missing data on the questions about purchases, even allowing for those who reported their last use was free or shared. It appears that price questions may be especially sensitive. That it, respondents may be willing to report use, but less willing to report finer details about use—especially as it relates to black market purchases. However, the lack of standardization of units is also of concern. Illicit drugs are often marketed in weight/cost bags—so a nickel bag for US$ 5, and a dime bag for US$ 10. How would those who purchased nickels or dimes respond to the prior questions—did they purchase in grams, parts of ounces or joints (perhaps blunts in the case of marijuana)?

The drug markets for marijuana may be much different than the markets for cocaine and crack, just as they differ from alcohol due to its legality for adults. The raw products for cocaine and heroin – coca bushes and opium poppies – are not grown easily in the U.S., Canada, or northern European countries. These products are largely imported from countries with warmer climates. With respect to marijuana however, there appears to have been a different trajectory. Marijuana was imported to the U.S. and Canada primarily from Mexico in the 1960s, 1970s, and 1980s, but increased surveillance and the bulk of the drug increased the costs to traffickers. It appears that as pressure was placed on Mexico, Colombia became a major marijuana exporter. But, Colombian traffickers switched to cocaine that is worth more in weight than marijuana. It further appears the dearth in the marijuana market led to increased indoor and outdoor growing operations in the U.S. Marijuana consistently ranks in the top 10 cash crops (among corn, soybeans, and hay), and is easily valued in excess of 10 billion annually in the U.S. (National Association for the Reform of Marijuana Laws, 2006). Domestic marijuana production appears to be increasing and in 2000 it was estimated that 1.047 metric tonnes were consumed, and 1.24 million kilograms were seized (ONDCP, 2004). The United Nations Drug Control Program (UNODC, 2005) estimates that 1.224 million kilograms of marijuana were seized in the U.S. in 2003, about 21% of the world's seizures. According to UNDCP, 10 kg of marijuana were seized in Canada in 2003. The Royal Canadian Mounted Police (RCMP, 2002) seized an estimated 1.4 million plants in 2001, a six-fold increase since 1993. The Canadian Gendarmerie royale du Canada (2002) estimated cannabis production at about 800 tonnes. In the Netherlands, cannabis has been available in small-scale purchases for more than 25 years. However, imported hashish was traditionally the most common cannabis product, but domestically indoor cultivated marijuana has taken over in recent years. Over 1.1 million marijuana plants were seized in 2003 (NDM, 2004).

The available information across a number of surveys suggest marijuana is much more likely to be sold indoors, and that transactions are made between friends and acquaintances (Caulkins and Pacula, 2006). Rarely do reports suggest marijuana is obtained through street markets or stereotypical drug dealers. However, some recent survey data from the U.S. Department of Justice shows adult arrestees often report buying marijuana outdoors (ADAM, 2003). Data from a pilot study in six major U.S. cities conducted under the auspices of the Arrestee Drug Abuse Monitoring study (ADAM), found arrestees reported they most often purchased crack cocaine in outdoor markets in their own neighborhoods (Riley, 1997). The study also concluded that crack users increased their likelihood of arrest because the transactions were more frequent and more likely to take place outdoors. Nevertheless, more than 85% of crack and 88% of heroin purchasers made indoor purchases in residences. Additionally, crack users were less likely to buy from a main source and had more extensive networks of dealers, thereby introducing additional risks for arrest.

The ADAM study began asking questions about drug purchases in all 39 sites in 2000. Those who reported using drugs in the past 30 days were asked how they got them. The study confirmed that a substantial portion of the street level drug trade consists of combinations of goods and services being exchanged, in addition to or in place of cash (Taylor et al., 2001; Golub and Johnson, 2004). At many sites, marijuana was the drug for which cash-only transactions were proportionately lower than cocaine or crack. Among males who reported paying cash for the drug in the past 30 days, a median of 29% reported they had purchased marijuana outdoors, compared with 50% of crack and 55% of cocaine purchasers. There was substantial variation across the sites, with outdoor marijuana purchases reported by about 75% of adult male arrestees in three sites (including New York and Philadelphia, and New Orleans). Outdoor purchasing dominated the market for crack and cocaine in these sites too (Taylor et al., 2001).

Of course, since so little is known about youthful 'drug markets,' there is little source of comparison with adult markets. Youthful drug markets or drug acquisition patterns may resemble those in adult drug markets, or they may assume their own contours and dimensions. With the exception of the ADAM study, even adult drug markets are largely unexplored territory in the U.S. Most available data is from a few ethnographic studies, which largely focus on heroin or crack in New York or other large U.S. cities. The ADAM data is limited in well in that it only included recent arrestees, who are certainly an important population, but may differ in their drug market participation practices from more general populations. The contribution of this paper is to describe drug acquisition patterns and drug markets among a comprehensive cross-section of youth, and in 4 sites in 3 countries.

1.2. Drug prices

Another area ripe for increased research is information on the price consumer's pay for drugs in the illicit drug market (Anthony, 2005). In the U.S., two systems under the auspices

of the Department of Justice examine prices (along with other aspects of the drug market), but both are fraught with limitations. The System to Retrieve Information from Drug Evidence (STRIDE) includes data on the price and purity of drugs purchased by undercover agents. Drug buys negotiated by undercover DEA agents in the streets of major metropolitan areas are analyzed and records kept on the quantity, price, purity, and purchase location. These tend to be wholesale sales, and there is less coverage of marijuana—the most prevalent illicit drug in the U.S. (and other industrialized nations). This file is, however, available to the public, and widely used by economists in conducting analyses on the price elasticity of drugs. The STRIDE information is currently the best available indicator of the wholesale price of various drugs in the U.S. Another monitoring system, under management of the Bureau of Justice Assistance, is the Regional Information Sharing System (RISS). Emphasis is on drug trafficking and not drug users per se. RISS data are not available to the public.

Relatively little data are available from survey research on prices. The previously referenced 1992 U.S. National Household Survey on Drug Abuse (NHSDA) included questions to assess the money respondents spent on marijuana and cocaine in the past month. Of the 4.8% who responded to this question, 46% reported they spent no money for it. Of the less than 1% who reported past month cocaine use, 38% spent no money. The 2004 NSDUH found 56% reported their most recent acquisition was free. Sharing was also commonly reported among male arrestess in the ADAM study. This adds a huge wrinkle in trying to estimate costs, when so much of the consumption appears to be 'free' or shared. The ADAM study also included questions on cash expenditures for drugs. Of those who reported purchasing drugs, the most common units reported for marijuana, crack and heroin was the bag. Few users reported quantities in grams or ounces, with many respondents specifying nickel, and dime bags. Quantity (even ignoring purity) is not standardized, so precision would be lacking in estimates of price per gram. Nevertheless, a considerable body of literature has developed from economists in the U.S. generating estimates on the price-elasticity of demand for drugs using the STRIDE data. The argument (see Caulkins, 2007) is that with proper methods, data can be extracted from STRIDE, and "it is typically better to have some information than none".

The National Academy of Sciences recently convened a panel (Committee on Data and Research for Policy on Illegal Drugs) at the request of the Office of National Drug Control Policy (ONDCP) to examine existing research studies and statistical tools available to help inform policy decisions. The genesis of the committee resulted from articles published using economic cost modeling that arrived at different conclusions regarding the effectiveness of U.S. drug interdiction efforts—one by members of the armed services indicating it was cost-effective and the other by members of the RAND Drug Policy Center indicating interdiction was not (Manski et al., 2001). Most of the questions regarding the quality of current policy studies stem from the limitations of data on illicit drugs. Economic analysis uses various models and other tools to compensate for the limitations of the existing data by integrating information from a variety of sources to produce an overall picture. But, the capacity of even sophisticated analytical techniques to compensate for the limitations of the existing data has been questioned by many in the research and policy communities (Manski et al., 2001). Golub and Johnson (2004) demonstrate the effects of using different assumptions about the ADAM data to generate drug costs or expenditures for male arrestees. This paper explores illicit drugs costs reported among a comprehensive cross-section of youth in the DAVI study, to reflect on the nuances, adequacy, and ability of the data to produce prices estimates.

2. Methods

2.1. The DAVI study

The DAVI study employed uniform methodological procedures that were developed initially in Philadelphia and Toronto, and then applied across all sites with minimal adaptation for cultural and systemic variation. The same definitions of target populations, interview modes and survey techniques were used, as well as standardized questionnaires. These were translated into Dutch and French, as required, from the original English version. Fieldwork began in 2000 and was completed in 2003.

The geographical capture area of the four DAVI sites is larger than the city their names suggest. In the U.S. and Canada, Census Metropolitan Areas (CMAs) are defined by the statistical agencies of each country. The CMA is typically a very large urban area (urban core) together with adjacent urban and rural areas (urban and rural fringes) that have a high degree of social and economic integration. For example, the Philadelphia CMA includes 14 counties, of which Philadelphia county represents approximately a quarter of the population. The Amsterdam site included three provinces (Noord-Holland, Flevoland and Utrecht), an area that we call the Amsterdam TPA (Three Provinces Area). (See Adlaf et al., 2006, for more information on the DAVI study.)

In Philadelphia, Toronto, and Montreal, the student sample was drawn from high school classrooms in grades 9–12 in randomly selected schools in the CMA. Both school and student participation was acceptable. In Toronto, 8 schools and 72.8% of students participated, in Montreal, 8 schools and 84.3% of students participated, and in Philadelphia, 7 schools and 84.4% of students participated. Existing socio-demographic differences in the 3 sites are well represented in the samples. Although gender and age differ significantly across sites, the differences are generally nominal. As Table 1 illustrates, among students, there are approximately equal proportions of males and females in each site, although the Toronto site contains somewhat more females than Philadelphia and Montreal. As well, although there are fewer youth aged 16–17 in Montreal, the mean age does not differ much across sites. More dominant sample differences are evident from race, language, and SES variables. Although each sample shows racial variation, compared to other samples, the Philadelphia sample contains proportionally more Blacks, the Toronto sample contains proportionally more Asians, and the Montreal sample contains proportionally more Whites. Although each site contained low SES schools by design, the weighted percentage of students attending low SES schools was 29% in Philadelphia, 37% in Toronto and 38% in Montreal. The total sample of students was 2503 (Philadelphia $N = 712$; Toronto $N = 824$; Montreal $N = 967$), and has been weighted in the analysis to reflect the student sample overall in these sites (Table 1).

The detainees were recruited from secure institutions serving the Metropolitan areas of each site where youth who had been sentenced or were awaiting trial were held in custody. Youth were not selected in relation to any known history of drug use, and the researchers did not know the offense(s) for which youth were detained. In Philadelphia, where detention services are generally organized at a county level, a representative sample of 5 detention centers was drawn from the census of 12 institutions in the CMA. The goal was to interview 20 males and 20 females at each of the five institutions in the Metropolitan area, resulting in an oversampling of females. The sample was then weighted for sample selection characteristics to represent the population of detained youth in the Philadelphia CMA (based on the annual number of youth detained, but not controlling for gender differences). In Canada, detention services are organized at the provincial

Table 1
Sample demographic characteristics

	Philadelphia			Toronto			Montreal			Amsterdam	
	Detainee	Dropout	Student	Detainee	Dropout	Student	Detainee	Dropout	Student	Detainee	Dropout
N	184	181	712	162	200	824	215	139	967	205	189
Male (%)	55.7	56.4	52.9	81.5	58.0	47.0	68.0	70.0	54.5	65.9	60.8
White (%)	33.9	42.0	64.1	55.6	45.5	47.7	74.3	65.5	75.6	–	–
Black (%)	53.6	44.2	15.0	24.7	26.5	9.1	11.7	15.1	8.2	–	–
Asian (%)	0.5	0.6	5.0	3.7	4.5	26.1	–	–	5.5	–	–
Other (%)	12.0	13.2	16.0	16.0	23.5	17.1	14.0	19.4	10.6	–	–
16–17 (%)	50.5	87.3	59.8	63.6	84.0	58.9	77	65.0	43.7	40.0	59.3

level, and in the Netherlands, they are organized at a national level. Since some facilities housed youth from outside the target Metropolitan area, it was necessary to have staff assist with the initial eligibility criteria (i.e., residence and age) before permission was sought from individual youth. All those eligible who agreed to participate were interviewed privately in a one-to-one situation. There was very little refusal, and a small monetary stipend was offered to respondents. Detention centers were visited repeatedly until samples were complete. It took many more visits to secure the sample of females compared with males. The Toronto site had the fewest detained girls across the sites, but the 18.5% of girls compares to 9% of girls in custody overall—so still an oversample. Another important sample dimension is that in Toronto and Montreal, researchers were allowed access only to sentenced youth, whereas in Philadelphia and Amsterdam, detained youth awaiting disposition were also included.

The samples in Toronto, Montreal, and Amsterdam reflect a census of eligible youth in all local institutions housing detained youth from these cities during the time period of the fieldwork. Their demographic characteristics were more diverse than those of the student samples. Males comprised 82% of the Toronto detainees, 68% of the Montreal detainees, 66% of the Amsterdam detainees, and 56% of the Philadelphia sample of detainees. While 56% of Toronto detainees were White and 25% Black, this was reversed in Philadelphia where 34% were White and 54% Black; "other" race was a smaller proportion in both these cities. In Montreal, the majority of the sample was White (74.3%). Race was not recorded in Amsterdam as a matter of national practice. The age split for detainees was about the same in Philadelphia and Toronto, with 36–40% under 16 years; however 60% were under 16 in Amsterdam, and in Montreal, 23% were under 16, reflecting the provincial policy discouraging incarceration of younger youth. One of the limitations of the study is the unevenness across sites in sample composition by gender, race, and age. However, since this is intended as merely a descriptive paper, these differences are ignored.

The dropout samples numbered 181 in Philadelphia, 200 in Toronto, 139 in Montreal, and 189 in Amsterdam. A dropout was defined as a 14–17 year old youth who had left school for at least 30 consecutive days during the past 12 months. Most youth in the sample were located in agencies that provided educational, social or outreach services to youth, and the others were located on the 'street' or contacted through snowball sampling. Agencies were contacted by project staff and asked for permission to either allow researchers to make contact with youth on their premises or to have advertisements posted at their site. To ensure sample heterogeneity, in Amsterdam and Philadelphia, youth were contacted in various agencies across the CMA, or TPA. In Toronto and Montreal, due to the lack of field services located outside the core cities, the majority of dropouts were recruited in agencies in the city center. Although their residences spanned both the inside and outside city strata, the majority was from the core with lesser representation outside the city. The smaller number in Montreal is due to the fact that the Montreal team joined the DAVI study while in progress, and had an abbreviated field period to recruit dropouts. The percentage of males was 56% in Philadelphia, 58% in Toronto, 70% in Montreal, and 61% in Amsterdam. The Philadelphia and Toronto dropouts are the oldest, and the Amsterdam dropouts are the youngest. There were nearly even distributions of Whites and Blacks in Philadelphia, but Whites were again the majority in Montreal (65.5%). The Toronto dropout sample was predominantly White, but Black and 'other' races were also represented.

2.2. Drug use

Table 2 examines drug prevalence rates across the samples and sites for alcohol, marijuana, and cocaine/crack. It is obvious that the most prevalent drug is alcohol, especially among students. Marijuana is also found at high rates among detainees and dropouts. Cocaine and/or crack use is relatively rare across all the samples and sites. There are significant differences across sites by drug, and across gender by site. Among students, the highest rates of alcohol use in the past 30 days are found in Montreal, as are the highest rates of binge drinking (defined as 5 or more drinks in a row in a single setting in the past 2 weeks). The lowest rates are among Philadelphia students. Marijuana prevalence is also higher among Montreal students, and lowest among Philadelphia students. The prevalence of cocaine and/or crack use in the past 30 days, although modest at 1.3% among Philadelphia students, is

Table 2
Drug use by site and sample

	Philadelphia			Toronto			Montreal			Amsterdam	
	Detainee	Dropout	Student	Detainee	Dropout	Student	Detainee	Dropout	Student	Detainee	Dropout
Alcohol											
Lifetime (%)	76.1	92.3	54.7	97.5	95.5	67.3	96.7	95.0	78.8	90.2	85.7
Past year (%)	66.3	75.0	53.4	92.0	91.0	54.0	96.2	88.5	72.4	86.3	81.0
Past month (%)	44.6	50.3	33.2	74.1	65.0	39.8	82.5	69.1	56.0	63.2	64.0
Marijuana											
Lifetime (%)	96.6	82.3	38.9	86.9	93.0	40.3	95.8	90.6	54.0	81.5	76.7
past year (%)	79.2	68.0	30.4	93.8	88.5	34.7	90.0	84.9	49.2	76.6	70.2
Past month (%)	60.9	49.2	20.3	87.0	79.5	23.6	80.2	71.2	25.4	59.0	54.8
Cocaine/crack											
Lifetime (%)	10.3	19.9	3.6	37.7	30.0	3.2	56.6	32.4	7.2	16.2	11.1
Past year (%)	8.2	13.3	2.2	31.5	25.5	1.1	51.4	24.5	4.1	14.7	8.5
Past month (%)	3.9	3.9	1.0	18.5	10.1	0.1	36.3	12.9	0.8	6.4	3.2

significantly higher than the Canadian sites. Among the detainees, alcohol follows a similar pattern with the highest prevalence of past 30 day and binge drinking among Montreal detainees, and the lowest among Philadelphia detainees. Marijuana use is highest among Toronto detainees, and lowest in Philadelphia and Amsterdam, but 60% reported use in the past 30 days. The prevalence of cocaine is highest among Montreal detainees, and lowest among Philadelphia detainees—contrary to the pattern observed with students. The pattern of alcohol use among the dropouts show the highest rates of past 30 day and binge drinking in Montreal, with the lowest rates again in Philadelphia. Marijuana prevalence is highest among Montreal dropouts, as is cocaine, with the lowest prevalence of marijuana in Philadelphia and cocaine in Amsterdam. The Canadian sites show higher levels of drug and alcohol use across all three samples than in Philadelphia or Amsterdam, but the drugs the youth use are generally confined to alcohol and marijuana—even among the deviant samples.

3. Results

3.1. Drug market participation

The DAVI study asked close-ended questions about typical patterns of obtaining alcohol and other illicit drugs. Youth were also asked how much they typically paid for alcohol, marijuana and other illicit drugs. More detailed questions were asked of the detainees and dropouts because more time was available for the one-on-one interviews, compared with the self-administered questionnaires completed by students in a single class period. However, the students were asked several more general questions about drug acquisition that were not posed to the detainees.

The students were asked how often they were given drugs for free (data not shown). About 11% of Philadelphia, 9% of Toronto, and 6% of Montreal students said ‘often.’ Many students had never used illicit drugs, but even among those who had, the modal response was generally that they ‘don’t buy.’ Because no particular drug was specified, the students are responding more about general acquisition patterns. About a quarter of Philadelphia and Toronto students reported they sometimes or often were given drugs for free (or others shared their drugs), compared to 15% in Montreal. Students were also asked if they gave drugs to others for free. About 10% of Philadelphia, 6% of Toronto, and 13% of Montreal students responded they ‘often’ gave drugs away. In Montreal, 27% reported they sometimes to often gave drugs to others for free, compared to 18–19% in Philadelphia and Toronto. While drug sharing may be similarly prevalent among students in the three cities, Montreal students were more likely to report sharing their drugs than receiving drugs from others for free, while the reverse was true in Philadelphia and Toronto (data not shown). Somewhat smaller proportions, 8% in Philadelphia and 5% in Toronto, reported ‘often’ paying for drugs. But, in Montreal, 16% indicated they often paid for drugs. Paying for drugs at least some of the time was reported by 16–17% of students in Philadelphia and Toronto, but 30% of students in Montreal. Among student populations, it appears that sharing of drugs with others is very common.

Students were also asked who they mostly bought drugs from. As in previous questions, the type of drug was not specified. Response categories included (1) students at school, (2) students in another school, (3) relatives, (4) boyfriend or girlfriends, (5) friends, and (6) strangers. As shown in Fig. 1, most students reporting either never using or that they do not buy drugs—about 80% in Philadelphia and Toronto, but about 65% in Montreal. The most frequent source was friends, followed by students at their school—there is likely a lot of overlap in these categories. Very few reported purchasing drugs from strangers, students at another school, relatives, or their boyfriend or girlfriend (Fig. 1).

Detained youth and dropouts were also asked about their drug source; however, unlike the students, additional details were ascertained regarding specific substances. In addition, rather than focusing the question on ‘purchasing,’ the detainees and dropouts were asked “from whom do you most often obtain [marijuana]?” Response categories included (1) friends give it to me, (2) boyfriend or girlfriend gives to me, (3) relatives get it for me, (4) friends get it for me, (5) I get it, (6) some other way, or (7) never get. The purpose was to determine how much sharing was involved in drug acquisition patterns, as well

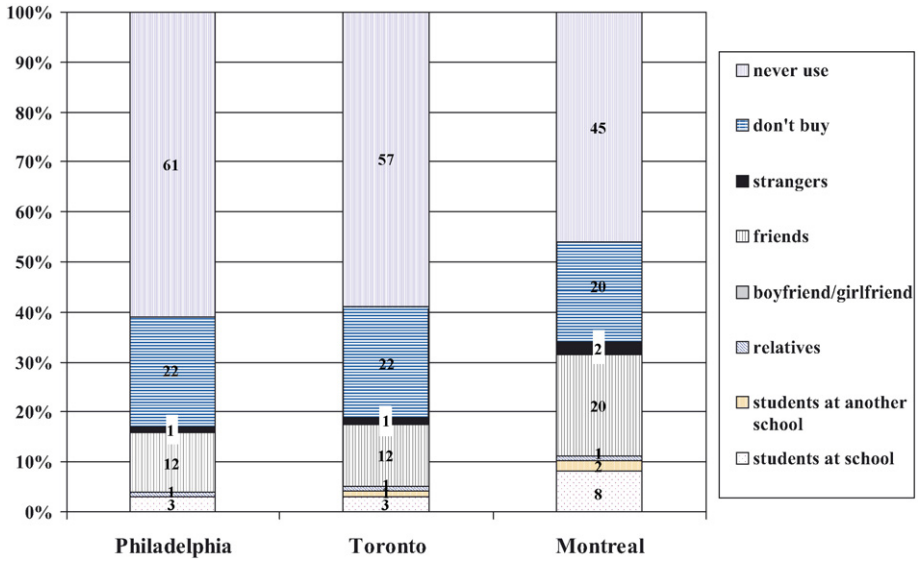

Fig. 1. Typical sources for drugs purchased by students in Philadelphia, Toronto and Montreal.

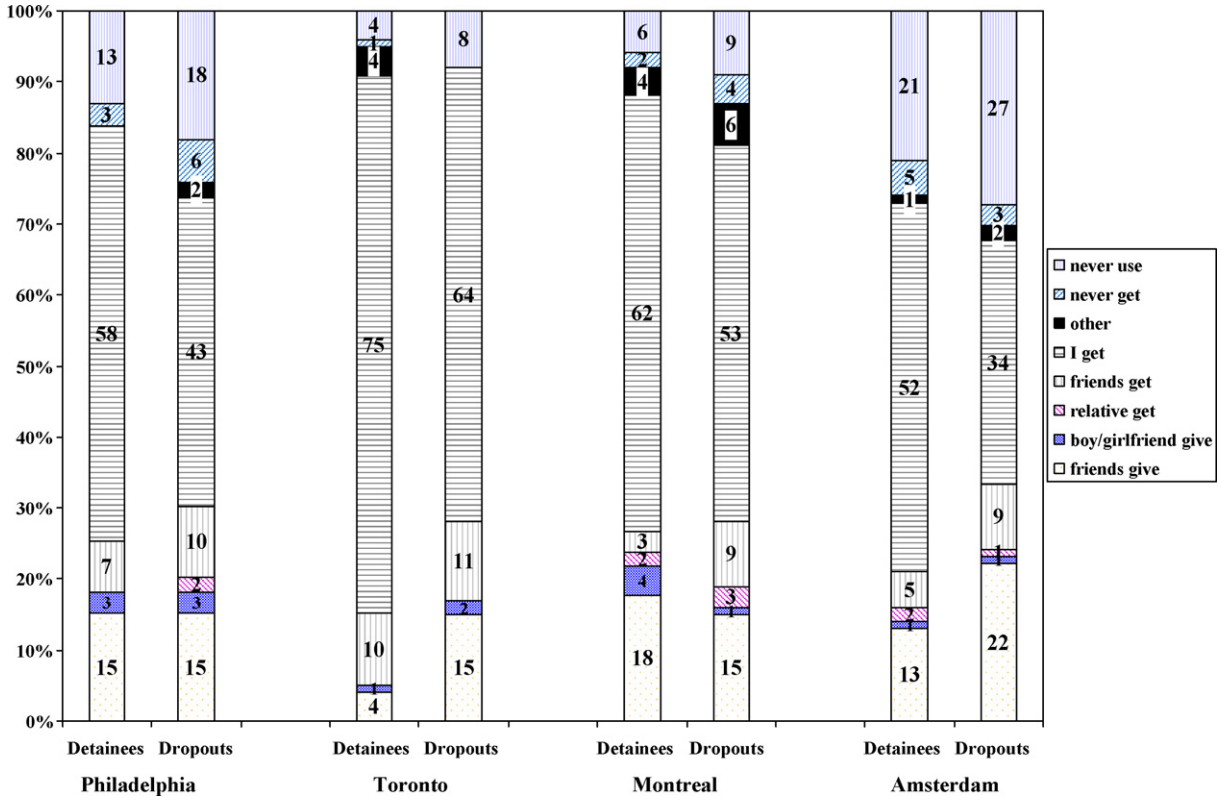

Fig. 2. Typical sources to obtain marijuana among detainees and dropouts in four cities.

as the relationship with 'sharers.' Fig. 2 shows the responses across the two samples and four sites regarding how marijuana was obtained. The prevalence of obtaining marijuana was a bit higher among the detainees than the dropouts, but their patterns of acquisition were very similar within the sites. The lowest acquisition rates were in Amsterdam, and the highest in Toronto.

Detainees and dropouts uniformly reported they were most likely to obtain the marijuana themselves, and not through friends or relatives. Fig. 2 shows among detainees, "I get it myself" was reported by 75% in Toronto, 62% in Montreal, 58% in Philadelphia, and 52% in Amsterdam. Among dropouts, the percentage rates are from 9 to 18% less, with similarities across the samples within each site. The next most frequent response across all the sites and samples was obtaining marijuana from friends who gave it to them, except among Toronto detainees. There were similar rates of sharing reported by dropouts compared with detainees in Philadelphia and Montreal, but more sharing reported by dropouts in Toronto and Amsterdam than by detainees. Another small percentage of the detainees and dropouts reported friends "get" marijuana for them. Very few mention that a boyfriend (or girlfriend among boys), or that relatives typically obtain marijuana for them. In Toronto, detainees were more likely to report that friends 'get' it rather than that friends 'give' it to them. It appears sharing is more common in the more normative population of students, but the presumably more experienced detainees and dropouts are more likely to report they get marijuana themselves. The majority of detainees and dropouts across all the sites also reported they could get marijuana in less than 1 hour.

The detainees and dropouts were also asked where they typically obtained alcohol using the same questionnaire responses as the marijuana question. "I get it myself" was the most common response across all the sites and samples, just as with marijuana. The exceptions were among dropouts in Philadelphia and Toronto, where the most frequent response was that "friends get it for me." However, friends' were more likely to 'give' or share alcohol than to 'get' it in the Amsterdam and Montreal sites in both samples, while among detainees in Philadelphia and Toronto, friends were more likely to 'get' alcohol than 'give' it.

Detainees, dropouts and students responded to the same close-ended question about the type of location they usually "go to get" marijuana. Fig. 3 shows the responses by sample and site. A much higher proportion of each student sample reports never using or never getting marijuana than the detainee and dropout samples, whose patterns look more similar within the sites. A house or apartment was the most frequent location for obtaining marijuana among detainees and dropouts in Montreal, and among detainees in Toronto, whereas 'outdoors' was the leading location among Philadelphia detainees and dropouts, and Toronto dropouts. 'Outdoors' is reported by nearly equally large proportions of students in Philadelphia as is a house or apartment; but outdoors and school are reported by equally large proportions of students in Toronto and Montreal. School is not a major point of purchase for marijuana, except perhaps among Montreal students. The school setting is rarely mentioned as a location for obtaining marijuana in Philadelphia across any of the samples, nor is much reported among detainees and dropouts at

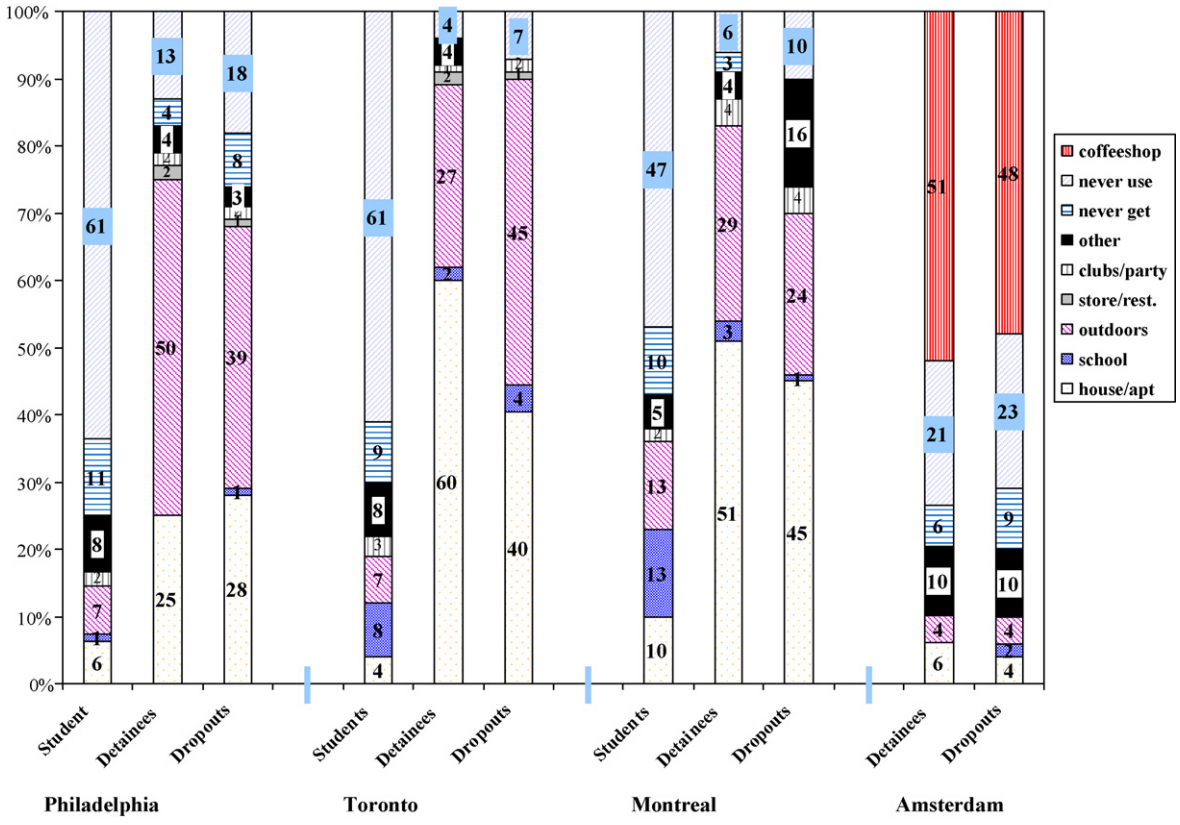

Fig. 3. Typical locations to obtain marijuana among students, detainees and dropouts in four cities.

the other sites. Perhaps this is because they were more marginally involved in school.

There are marked differences in the places where students compared with detainees and dropouts obtain marijuana in Toronto and Montreal. Larger proportions of students in the Canadian sites report obtaining it in houses or apartments, followed by 'outdoors.' In Philadelphia, the detainees and students show more similarity in that outdoors was the most prevalent location for both. A house or apartment was the second most prevalent location reported by both students and detainees in Philadelphia.

Since cannabis can be purchased in small quantities in 'coffeeshops' in the Netherlands, this was included as a response category in the Dutch version of the DAVI questionnaire. Perhaps not surprisingly, this was the most prevalent location reported by detainees and dropouts in Amsterdam, even though none of the Amsterdam detainees or dropouts is of legal age. Small numbers also report obtaining at a house or apartment and outdoors, but the 'other' category was noticeably large in Amsterdam, and among Montreal dropouts and Toronto students. In Amsterdam, this is largely due to mobile phone 'dealers.' In Montreal, the majority of other sources reported among detainees, was a youth detention center.

As a source of comparison, Fig. 4 shows that stores or restaurants are the most prevalent place for youth to obtain alcohol across all the samples and all the sites, even though alcohol is not legally permitted until age 21 in Philadelphia, age 19 in Toronto, age 18 in Montreal, and age 16 in Amsterdam (for beer and wine). Therefore, although nearly half of the detainee and dropout samples in Amsterdam are of legal age, none are of legal age in any of the other sites. Nevertheless, the detainees in the Canadian sites are about just as likely to report they typically acquire alcohol at stores or restaurants as the Amsterdam detainees. Stores or restaurants are also the most prevalent location reported by students in Montreal, but Philadelphia and Toronto students are just as likely to report houses or apartments, and clubs or parties as stores or restaurants. A sizable proportion of Amsterdam detainees and dropouts report they typically obtain alcohol at clubs or parties. Outdoors is rarely reported as a location to typically obtain alcohol among any of the youth, except perhaps among Toronto detainees and dropouts. It appears that youth typically obtain alcohol through distribution systems regulated for adults—stores and restaurants. This parallels the findings for marijuana in Amsterdam. Most youth who report accessing through adult markets that are not of legal age, respond that 'I get' the alcohol/marijuana.

A logistic regression model compared the characteristics of detainees and dropouts who reported they typically 'get' marijuana themselves, compared with those who reported someone else usually got marijuana for or gave it to them. The characteristics examined included age, gender, sample, marijuana use in the past 30 days, and ethnicity. Table 3 shows the results for the combined model with all 4 site, and each site separately. In the combined model including all four sites, all the variables were significant with the exception of ethnicity. Not surprisingly,

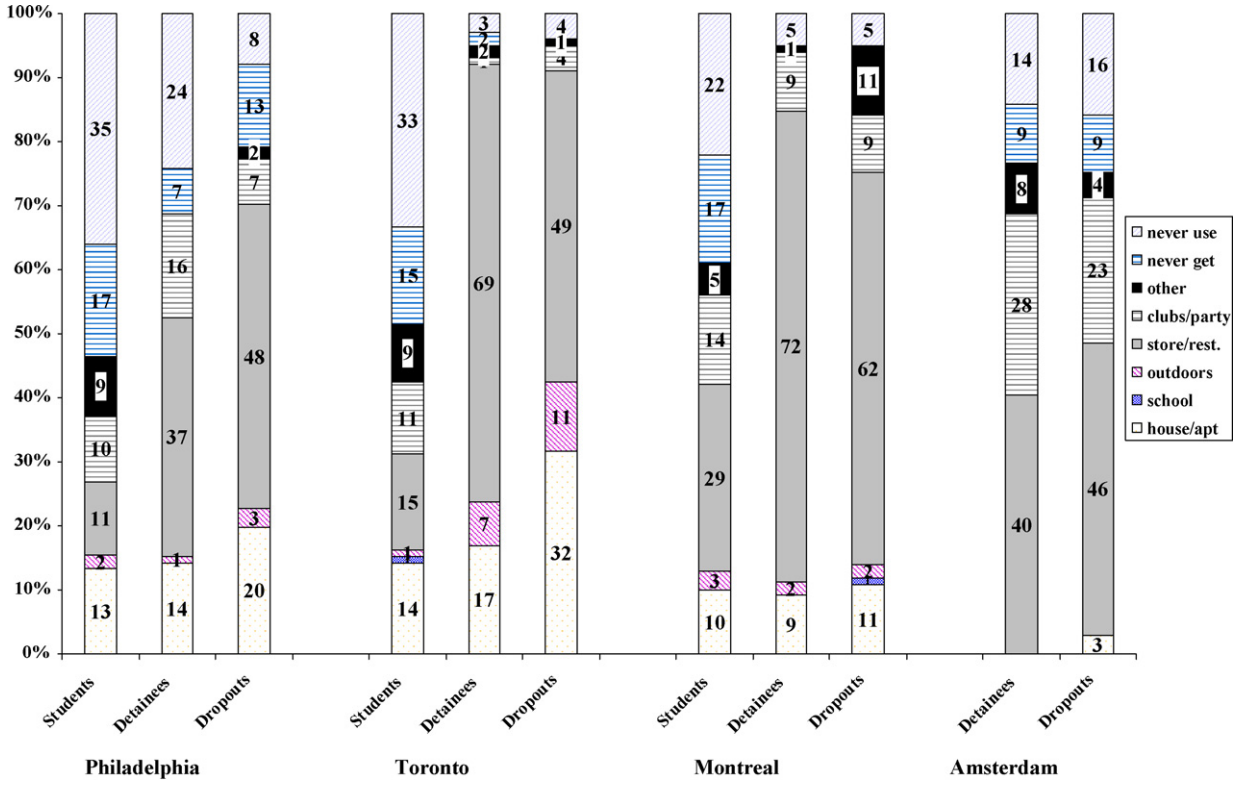

Fig. 4. Typical locations to obtain alcohol reported by students, detainees and dropouts in four cities.

16–17 year olds were more likely to report they got marijuana for themselves than 14–15 year olds. Girls were less likely than boys to 'get' marijuana themselves, as were dropouts compared to detainees. Those who used marijuana in the past 30 days were more likely to get it for themselves, and this behavior was less prevalent in Amsterdam and Montreal compared with Toronto. The model for Amsterdam resembled the model for all sites. In Philadelphia and the two Canadian sites, age was not an important correlate, nor were there significant differences between detainees and dropouts. In Montreal and Toronto, ethnicity was important and those of western ethnicity were more likely to report "I get marijuana myself" than those of non-Western ethnicity. In Philadelphia, there were no differences by ethnicity. The most robust correlates across all the models is gender, with males more likely to get marijuana for themselves than females, and past month marijuana users were significantly more likely to report getting marijuana for themselves.

3.2. Price data

The DAVI study questioned detainees and dropouts about the price they paid for specific drugs including marijuana, alcohol, and cocaine. Specifically, the open-ended questions asked youth how much they usually paid for the drug—allowing them to specify the quantity and price. Although this appears a sound strategy, the problem was organizing these data, since

Table 3
Logistic regression of marijuana obtainment among detainees and dropouts comparing "I get it myself" with "Some other Way"

	Three sites	Amsterdam	Montreal	Philadelphia	Toronto
Country (Toronto)					
Amsterdam	0.64^{+}				
Montreal	0.58^{++}				
Philadelphia	0.78				
14–15 years (16–17 years)	1.35^{+}	2.18^{++}	0.75	1.27	0.99
Male (female)	0.37^{+++}	0.37^{+++}	0.26^{+++}	0.39^{+++}	0.36^{+++}
Detainees (dropouts)	0.66^{+++}	0.40^{+++}	0.77	0.86	0.82
No past month marijuana (yes)	2.78^{+++}	1.90^{++}	2.70^{++}	2.28^{++}	7.69^{+++}
Western ethnicity (non-Western)	1.23	0.86	1.84^{+}	0.91	1.73^{+}
Constant	4.56^{+++}	4.53	7.28^{+}	3.14	1.98
Nagelkerke R^2	0.15	0.20	0.15	0.11	0.20

$^{+}$ $P \leq 0.05$.
$^{++}$ $P \leq 0.01$.
$^{+++}$ $P \leq 0.001$.

the quantity and price varied quite dramatically among the detainees and dropouts.

There was a relatively high response rate to these questions among the detainees and dropouts, since they are more involved in drug use than the students. Nevertheless, many who had used reported they had never bought, so there was 32% missing data on the cost questions for marijuana among detainees and dropouts in Philadelphia, which is larger than the proportion that report never getting marijuana. The modal response in Philadelphia by a large margin, was US$ 5 for a nickel bag. US$ 10 for a dime bag was the next most frequent response, and these two categories accounted for more than 60% of the detainees' and dropouts' responses. Costs ranged from US$2 to 750. Other units reported were ounces followed by part of ounces, along with units such as bags and sacks. Very few reported purchasing blunts, although blunt use was reported by the youth, suggesting they do not purchase pre-rolled blunts, but 'roll' their own. The only standardized units reported were ounces and parts of ounces, since the amount of marijuana in a nickel or dime bag is not standardized. The modal response categories among Amsterdam detainees were €5 and 10, and the range from €1 to 400. About 38% reported never buying marijuana, again greater than the proportion reporting never obtaining marijuana. Most reported buying 1 g for €5, 6 or 7. Units were reported primarily in grams and joints, which are the units they are sold in coffeeshops. There were still references to units purchased in small bags (zakje). The modal category in Toronto was Canadian $10, although there was a lot of missing data on the questions among Toronto detainees. The range in costs was US$ 4–1000. Those who responded reported dime bags, ounces, parts of ounces, and grams most frequently, but it appears that many of the respondents found the questions confusing. A dime bag is ten dollars by definition, so it appears much of the confusion was based on providing answers to unit and cost when they are essentially equivalent. Ten Canadian dollars was also the modal response in Montreal by a large margin, usually for a gram, followed by Canadian $5 for a half gram, although detainees and dropouts also reported buying dime bags for Canadian $10. The price for marijuana ranged from Canadian $1 to 3200.

The questions about alcohol created a plethora of responses across each of the sites. There were similar rates of missing data as with the marijuana questions, mostly due to detainees and dropouts reporting they had never bought, despite the relatively higher alcohol prevalence rates. The average price for alcohol varied even more than for marijuana, although the upper end of the range was greatly truncated. In Philadelphia, the modal response category was a 40 ouncer, which is the way some malt beers are packaged, followed by a pint. However, responses also included shot, 12 pack, 30 pack, bottle, beer, and the proper name of many different types of spirits. In Amsterdam, the modal response was a bottle, followed by a glass, then 'breezer,' and a 'flesje.' A 'flesje' is a small bottle, usually 25 or 33 cl, and a breezer is also a small bottle, containing alcohol and soda. Units were also reported in liters, beer, whiskey, or the names of specific alcohol products. The modal response in Montreal was a bottle, followed by a liter. In Toronto, a wide range of units was also reported from beers, to pints, to pitchers, to ounces, etc. Although with some painstaking attention to detail, these units could be converted to arrive at actual cost estimates for typical consumption and cost estimates of alcohol per pure unit, or an overall estimate of typical alcohol costs among the sample, the data demonstrate the complications of combining price data to make cost estimates.

The DAVI data illustrates some of the difficulties economists face with standardizing 'units' to make cost estimates, particularly for marijuana. In the U.S., marijuana is largely marketed in nickel and dime bags for youth, and the youth reported large discrepancies in prices (a range of from US$ 75 for an ounce to US$ 75 for a pound in Philadelphia). In Amsterdam, the prices reported are similar to the U.S., except more units are reported in grams and 'joints,' as they are sold in coffeeshops. Nevertheless, while coffeeshops sell small bags based on weight in grams, many sell pre-rolled joints with some quantity of tobacco. In all the sites, the modal costs for typical marijuana are 5 or 10 dollars (Euros) among the detainees and dropouts. The Philadelphia detainees reported the greatest range of units, and with the modal categories of nickel and dime bags, it would seem near impossible to develop valid and reliable cost estimates. What quantity of marijuana is in a dime bag? How can researchers apply an accurate and standardized measurement to imprecise quantities such as dime bags, joints or blunts (with or without tobacco)?

4. Discussion and conclusions

Descriptive information on drug markets is not readily available. Little of the available information addresses youth specifically. There is limited knowledge about the costs consumers typically pay for drugs (other than legal drugs). The DAVI study provides some insights about drug markets among a comprehensive cross-section of youth at several international sites for the drugs they are most likely to use—alcohol and marijuana. Alcohol is not uniformly prohibited to all youth at the same age across the sites, although marijuana is. Nevertheless, in the Amsterdam TPA, where marijuana is available in small quantities in coffeeshops, this is the location detainees and dropouts report they are most likely to acquire it. It may be that older youth are buying it for them, but most say they get it themselves. Detainees and dropouts in the other three sites – Philadelphia, Toronto, and Montreal – are also overwhelmingly more likely to 'get' marijuana for themselves than to rely on friends or others.

Alcohol is most typically obtained in a store or restaurant across all the sites and samples, even though (most) youth are not legally able to purchase it. Perhaps it should not be surprising then that in Amsterdam, marijuana is typically obtained through coffeeshops, which parallels the legal market for adults making the patterns very similar to the "alcohol market" among youth. Marijuana, on the other hand, is usually obtained either in a house/apartment or outdoors (other than Amsterdam). In Philadelphia, the majority of the detainees and dropouts reported obtaining marijuana outdoors, rather than at a house or apartment. The Philadelphia students were about equally likely to report outdoors, as house/apartment, or clubs/parties. There were more even splits among Montreal and Toronto students with house/apartment, outdoors, and school,

but house/apartment was mentioned more frequently than outdoors by Montreal and Toronto detainees and dropouts.

Perhaps the most interesting finding about marijuana is the fact that so many youth report outdoors as the most typical place they acquire marijuana. The high prevalence of youth reporting outdoors in Philadelphia may not be as surprising due to the outdoor markets for crack cocaine, but it may be surprising to find this pattern persisting among Toronto and Montreal youth. This suggests outdoor markets for marijuana are more available than prior research indicates. Even in Amsterdam, there is a small proportion reporting they obtain marijuana outdoors. Recall the ESPAD survey of students in European countries found marijuana was often obtained in public places such as streets and parks. It appears street drug markets exist for marijuana. However, this may also be indicative of the lack of privacy or other locations available to youth to gather to share or purchase drugs, so that they often do this outdoors. Alcohol is also illegal for most youth in the study, but outdoors is rarely mentioned as a place to typically obtain the drug. Instead, youth access it through venues where adults access it—in stores and restaurants.

Relatively small percentages of even the detainees and dropouts reported using cocaine or crack. Much attention in the U.S. has been focused on youthful involvement in the crack cocaine market, perhaps due to the epidemic of youth and young adult homicide in the 1990s among primarily African–American males that seemed to accompany the development of visible street outdoor crack markets. In the DAVI sample of Philadelphia detainees, only about 3% reported a location for obtaining crack; about 2% outdoors, and 1% in a house or apartment. In Amsterdam, only about 3% responded as well, but the majority reported a house or apartment. In Toronto and Montreal, about 13% of detainees reported a location they usually obtain crack. The most prevalent location in Toronto was a house or an apartment followed by outdoors, but in Montreal, equivalent proportions mentioned outdoors, house or apartment, and 'other' (data not shown). It thus appears that crack is typically acquired by youth in a house or apartment, or outdoors, but perhaps the most important point is that crack is rarely accessed by even the more deviant youth in any of the sites. Cocaine was a little more likely to be obtained than crack and was more often obtained in a house or apartment, although outdoors was the second most frequent response. This suggests similarities in the crack and powder cocaine markets by site. It also shows that outdoors and a house or apartment are the most likely sources for detained and dropout youth to obtain these drugs.

Many will be surprised the DAVI study shows very low levels of drug acquisition in school across the samples, including students, and at all the sites, although friends are a prime source of drug acquisition. The detainees and dropouts may be marginally involved in school, but the same pattern persists among students. They rarely obtain drugs in school. In general, it appears that while students are about equally like to share drugs with others as to purchase drugs, there is less sharing among the more drug-involved detainees and dropouts. A logistic regression model showed that past month marijuana users and males are more likely to get marijuana for themselves than in frequent users and females.

Another key variable on which information is missing with respect to drug markets are the costs to consumers. Information on the price (and purity) of illicit drugs is not generally available, with the exception of STRIDE data in the U.S., which is limited to wholesale prices. The Drug Enforcement Administration in the U.S. estimates that the wholesale prices of cocaine and heroin in source countries are only about 1% of U.S. retail prices (Caulkins and Reuter, 1998). Also, STRIDE has less coverage of marijuana, the most widely used illicit drug in the U.S. Information on prices and costs for illicit drugs, which undoubtedly varies across substances, is central to conducting economic research. Economists are resolute in their conviction that drugs are commodities and are subject to market influences like other commodities. Researchers associated with RAND's Drug Policy Research Center, Abt Associates, and the National Bureau of Economic Research have been the leaders in conducting economic research on price and the market influences in the U.S. with respect to illicit drugs. The research is limited however by data quality, necessary assumptions, and the sophistication of analytical techniques. Population surveys and other studies obtain information on prices, with some mixed results. Recall the price questions were dropped from the NHSDA shortly after they were added in the early 1990s, but the more recent iteration of the survey – the NSDUH – asks questions about the price of marijuana. The data are problematic due to the fact that over half of past year users report paying no money for marijuana. The modal response is that respondents got if for free or someone shared theirs. Units are asked in grams and ounces for the most recent purchase, but most did not purchase. Even allowing for sharing, how can disparate units be combined? The DAVI study showed that in Philadelphia, the most common unit for youth was a nickel bag—or US$ 5 for an unknown quantity. This problem is evident for alcohol as well, where perhaps the central unit is 'standard alcohol serving' (i.e., one beer equals one glass wine equals one mixed drink). However, for alcohol, there is good data, because data is available on sales, although it is not easy to estimate how much is consumed by underage drinkers. For illicit drugs like marijuana and crack, there is much less information, and less standardization for units the drugs may be sold in. How much quantity should be estimated for a nickel or dime bag? One of the strengths of the STRIDE data is that the samples are analyzed for purity, so that can be tracked over time.

For the DAVI study in particular, how do you combine the student, detainee and dropout to get a single estimate for youth? This is important since the detainees and dropouts are heavier consumers, although a much smaller proportion of the overall youth population. Also, perhaps more importantly, what about studies that only examine one particular subgroup? Their results may be misleading for the population in general. One of the lessons from the DAVI study is that drug acquisition methods may differ for different subpopulations, and differ across drugs.

Although it may be difficult to arrive at good price estimates, there is a role for survey research in examining drug markets. More research on where people obtain their drugs, like the DAVI study, can provide insights into drug markets and availability.

Perhaps it is not as important to know the prices, as it is to have basic information on whether people are obtaining the drugs from outdoor street drug markets or from friends in their homes. There appears to be much more violence associated with outdoor street drug markets, if you use the evolving street outdoor crack model from the U.S. in the 1990s as the model. It appears to have arrived in tandem with an epidemic of youth homicide in the country, which has thankfully subsided. However, anecdotal evidence suggests there has 'always' been some street markets for illicit drugs. In any case, the crack cocaine market may differ as much from alcohol as it does from marijuana.

The DAVI team[4] suggests our experiences can be important to future research. Youth (and probably adults) will respond to questions on the relationship they have with the person/people from whom they purchase or share drugs. They will also provide information on the typical places where drugs are acquired. Questions should probably be tied to typical acquisition/purchase patterns, rather than last purchase. These questions should probably be asked of past year users or those who have used in recent years (depending on the intended use of the data), since past month use of most illicit drugs is very infrequent. This was especially the case in the DAVI study for crack cocaine. However, the DAVI study got good information and good response rates among a cross-section of youth on questions about location and their relationship with whom they acquired alcohol, marijuana, and tobacco, which are the most prevalent drugs in any case. The importance of alcohol and tobacco is probably only an issue with youth, among whom their use is illegal. This is also a lesson from the DAVI study. Products that are sold in standardized units are much more appropriate for economic methods of modeling and forecasting. This is true for alcohol, although there is still a considerable amount of work and estimation assumption necessary to convert typical units to some standardized unit such as pure alcohol. Since market data on sales of these products are available, per capita consumption is more often estimated. With marijuana, which is marketed in more standardized units in the Netherlands, it may be possible to develop reliable costs estimates. One limitation however is shared with alcohol, which is how to account for underage consumption? Survey research can be a great aid to further understanding consumption and purchase patterns, and therefore, the nature of the illicit drug market.

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