Cannabis retail purchases in a low-risk market: Purchase size and sex of buyers

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ABSTRACT
AIM – To analyse the composition of cannabis retail purchases in a representative sample of purchases made in Christiania, Copenhagen in 2004. MATERIAL – Transactions (n=1,123) were registered along four variables; type (loose resin or joints), quantum (n=957, grams or number of joints), sex (n=559, female or male) and payment (n=707, notes or coins). RESULTS – We found that more than half of all transactions were for joints only. The median transaction quantum was small, at two joints or three grams of resin, valued at DKK 100. Of the resin transactions, 88% were three grams or below. Women made 11% of the purchases. There was no statistically significant difference in the preferences for quantum or type between males and females. CONCLUSIONS – Buyers prefer joints over loose resin despite the higher price, which is interesting. The small median transactions size is consistent with findings in the international literature. Illicit drug buyers appear to prefer small acquisitions across drugs and social context. The share of purchases made by women is 11%, which is similar to the estimated proportion of women among daily cannabis users. This finding suggests an interesting question for future research. At what point in a cannabis-using career do users purchase their drugs? These findings contribute to the existing research by documenting the proportion of female buyers, and preferences for type and quantum in a sample that is representative of a market and is not based on self-reported purchases.

KEYWORDS – market, cannabis, retail, female, joint, Christiania, Denmark

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Law enforcement directed at illicit drug markets can primarily affect the shape of the market. More intensive enforcement forces buyers and sellers to perform transactions in a more discrete way (Dorn & South, 1990). We know very little about how this interaction takes place in practice. At what stage of a drug-using career do users actually begin making acquisitions themselves as opposed to only sharing among peers? Is this associated with enforcement intensity, and is it different for men and women? In order to understand what takes place we need more research on the behaviour, preferences and rational adaptations of market participants (Becker et al., 1991). Such questions are complex, because acquisition methods for illicit drugs differ across types of drugs and sub-populations, as well as across countries. The available research is based on self-reported purchases, which risks sampling users instead of transactions.

In Copenhagen, Denmark, cannabis has been sold openly for many years in an area known as Christiania. In 2004 police cracked down on the market and arrested 75 persons. Prior to this crackdown
the police installed video surveillance in order to achieve criminal indictments against the sellers, look-outs and runners (Moeller, 2012). This data constitutes a representative sample of transactions in Christiania and enables us to examine purchase type and size as well as the sex of buyers. Both law enforcement and criminological research can benefit from further insights into the particularities of illicit drug distribution.

Contrary to what one might expect we actually know very little about how cannabis users purchase their drugs, as opposed to the users of the more expensive drugs cocaine and heroin. Internationally most cannabis distribution is embedded in social networks. This is true for the USA (Pacula et al., 2007; Caulkins & Pacula, 2006; Griffin & Rodriguez, 2011; Sifaneck et al., 2008), New Zealand (Wilkins et al., 2005), Canada (Harrison et al., 2007) as well as for Europe (Coomber & Turnbull, 2007; Sandberg, 2012; Killias et al., 2011; Wouter & Korf, 2009). It implies that transactions take place in indoor settings, which elude direct observation by both researchers and enforcement. The available research finds that illegal acquisitions are typically in small amounts and most of them are made by men.

Caulkins and Pacula (2006) analysed the NHSDA 2001 household survey of past-year cannabis users in the USA (n=8,339) and found that one third of the purchases made most recently by annual cannabis users were under 5 grams and that 72% of the purchases were under 10 grams. They suggest that an average purchase has a value of around USD 25, noting that this is similar to the average retail transaction size for all illicit drugs, including the more expensive drugs. Caulkins and Pacula (2006) also noted that fewer than 5 per cent reported purchasing joints. Among those who bought joints, 40% reported buying a single joint, while 81% bought five or fewer joints. Wilkins et al. (2005) found even smaller purchases to be the norm among their “tinny” house sample (n=145) from New Zealand: 97% of self-reported purchases were 4 grams (NZD 50) or less and 78% were 1.5 grams (NZD 24) or below. Sifaneck et al. (2008) found that 82% of the most recent transactions reported by users (n=99) in New York City were 3.5 grams or less, valued between USD 40 and USD 50.

Who makes these purchases? Coomber and Turnbull (2007) note that it is the “older”, i.e. heavier, users that actively seek out a seller. In a longitudinal study on cannabis use among Ontario students (n=3,990), Butters (2004) found that over two thirds of those who reported using cannabis at a risky level were males. Gender was the only demographic variable that significantly predicted problem use. A few studies on cannabis acquisitions have included the sex variable. Griffin and Rodriguez (2011) specifically examined how drug acquisition behaviours in marijuana and crack markets are affected by gender. Their sample (n=50,991) comprised adult arrestees who had obtained cannabis or crack within the past 30 days. They found that 14% of those who had obtained cannabis were women (n=5,173). This underrepresentation among buyers was more pronounced for cannabis than for crack, where 25% were females. Killias et al. (2011, 535) conclude that the most robust correlate for “getting marijuana for themselves” is male gender.
Wouter and Korf (2009) found that males were twice as likely to acquire cannabis from a non-lawful seller, i.e. outside of the formal coffee shop system in the Netherlands. Low age, male sex and low local coffee shop density were found to be significantly and positively associated with buying outside the system. These studies by Caulkins and Pacula (2006) and Wouter and Korf (2009) estimate the female share of purchases to reflect the past-month ratio between the sexes. In Griffin and Rodriguez’ (2011) sample, 14% of those who had obtained cannabis were female. The theoretical explanation for this pattern is that cannabis use is similar to deviancy in general, where women are typically found to be less delinquent than men (Kaplan et al., 1986). Cannabis use, like other forms of delinquency, occurs mostly in an experimental phase from which adolescents mature out (Pedersen et al. 2001). This maturing out is more pronounced among females, and social disapproval also appears to be a factor (von Sydow et al., 2001; Butters 2002).

Aims

Our review of the existing research indicates that cannabis transactions internationally are generally small, around or smaller than USD 25. Also, males are overrepresented among cannabis users, and the overrepresentation increases with intensity of use. Our review indicates that the cannabis users who actively seek out a commercial seller are found among the heavier users.

The research questions are posed as follows:

1) What is the size of a mean purchase?
    a. Do buyers purchase loose resin or joints?
    2) What proportion of purchases is made by women?
    a. Do women display different purchase preferences than men?

These questions are interesting because they have only previously been researched by using self-reported data. Self-reported studies risk sampling users instead of purchases, may suffer from recall issues and generally have the problem of unwillingness of participants to disclose illegal behaviours, especially black market purchases (Pacula et al., 2007, Harrison et al., 2007). These issues are pertinent to illicit drug acquisitions, because a minority of the heaviest users account for the majority of all purchases, so last acquisition type questions will misrepresent total acquisitions. The surveillance data that we use constitutes an actual representative sample of purchases in Christiania. The follow-up question on buyer preferences contributes to the existing research in two ways. First, it highlights cannabis buyers’ willingness to pay for pre-rolled joints. The existing research on this specific question (Caulkins & Pacula, 2006) did not use a sample where all buyers actually had the option to purchase joints. Second, it informs us on buyers’ preference on amounts. Cannabis is a comparably cheap drug so buyers can potentially stock up when making purchases. Alternatively they may prefer to only buy what they need here and now and avoid having larger amounts of cannabis at home. Reinarman (2009) studied cannabis users’ preference for high-potency product and found that when buyers can freely choose between a larger amount of...
low-grade cannabis and a smaller amount of high-grade cannabis, they do not care much about the quality. Reinarman notes that the impetus to purchase high-grade cannabis appears to be driven by concerns over inconsistent supply. This argument may extend to accessibility in general. In a stable market like Christiania buyers may choose to purchase small amounts at a time for lack of concern of consistency of supply. The low-risk setting where our data was collected therefore indirectly informs us on the relationship between purchase size and enforcement intensity. Low risk is understood not only as the absence of enforcement, but also as the presence of trust that the seller will sell a good-quality product (Reuter & Caulkins, 2004; Killias et al., 2011; Moeller, 2012).

Finally, and maybe most importantly, our sample allows for an objective assessment of the share of females among cannabis buyers in Christiania. This question has not been previously examined in any cannabis market. From population-level prevalence studies we know that women constitute a decreasing share of users with increasing intensity of use. The share of female buyers in our sample therefore directly provides a supplementary angle on the prevalence studies. Indirectly, the share of females gives us a hint at what stage of a cannabis-using career users actually begin to make purchases as opposed to only sharing among peers.

**Design**

**Method**

Copenhagen police video-taped cannabis transactions in Christiania during the months of December and January in 2003–2004. The observations detail individual purchases with information on quantity, type and sex of the buyer. In total, the material consists of 24 reports describing individual transactions from one of four different sales positions which are visible to the surveillance cameras. During the period of observation, there were approximately 40 active sales positions in the Christiania market. The observations were made both during the day and at night, but only the outdoor daytime observations contain detailed information on individual transactions.

The method used by the police to estimate individual transaction quantity was to observe the sum of money paid, and note the type and amount of product given in return (resin or joints). Subsequently, undercover police made field observations and 300 purchases to establish the quantities of resin and the number of joints associated with various rounded monetary amounts. From these undercover buys it was established that there was a standard quantity discount provided throughout the Christiania market of DKK 100 (approximately 13 euros) for 3 grams of resin or two joints (Dürr, 2004). The primary unit of observation is therefore the monetary amount. This is a common method for establishing street prices for illicit drugs, and is considered viable because transactions are “frequently clandestine and hurried” and “the act of returning change is a luxury that persons seeking to avoid detection cannot afford” (Reuter & Caulkins, 2004, p. 145). The purchase size of illicit drugs is commonly adapted to rounded monetary values to facilitate this process, e.g. “dimes”, “nickels” etc. (Wilkins et al., 2005; Sifaneck et al., 2008). The denominations of Danish bills are 50, 100, 200,
500, and 1000 crowns (presented here as DKK).

**Data**

The video surveillance was coded into reports by seven different police officers. Six of the 24 reports only describe the number of transactions within various time intervals and do not contain information on individual transactions; these reports have been edited out of the sample. The final sample consists of 18 reports with observations from three different sales positions. The contents of the reports were coded by the researchers.

First, we identified the police reports with consistent observations on purchase type and quantity. This is presented as descriptive statistics based on the variables of grams of loose resin, the number of joints per transaction or a combination of the two. The sample is bifurcated between resin and joints, but some transactions contained both. Subsequently, we examined the distribution of purchases between the sexes. Here we first counted the proportion of transactions that were made by female buyers. Next we examined the follow-up question if their purchase preferences were statistically different from the male preferences. To do this, we grouped the observations according to gender. In observations where there was more than one buyer (n=6), groups of men were coded as male, groups of females were coded as female, and mixed-gender groups (n=3) were excluded. The type of product purchased was analysed using a χ² test. The amount of cannabis purchased was analysed using the Mann-Whitney U test because the data did not show a normal distribution. The differences were examined by non-parametric bivariate statistical analyses.

Each report details observations on individual transactions over the course of the day. The first day of observation was 2 December 2003 and the last day was 20 January 2004. The observations last a total of 5,355 minutes, specifying individual transactions (n=1,123). Most of the observations report an estimated purchase size (n=957), grams of resin (n=372), number of joints (n=644) or both (n=59). Note that this bifurcation between purchase types does not include cannabis herb. Only very few of the purchases were noted as consisting of cannabis herb. This is unusual compared to other countries where herbal cannabis is widespread, but Denmark’s cannabis market has traditionally been dominated by resin (Police 2005).

The observations are relatively evenly distributed over the 18 reports in the sample (no. of transactions per report: mean 62, median 55, min. 7, max. 147, SD 41). Similarly, but slightly lower, for the transactions that include a quantity assessment (no. of transactions with quantity per report: mean 53, median 38, min. 0, max. 140, SD 44). More than half of the observations present information on the sex of the buyer (n=559). This sub-sample consists of observations that are described in nine police reports and are evenly distributed in these reports (no. of observations of sex of buyer in nine reports: mean 62, median 58, min.: 22, max.: 119, SD: 29). Form of payment is noted inconsistently across all 18 reports (n=707). A little less than half of the observations have information on all the variables, i.e. purchase size, type and sex of buyer (n=450).

In very few of the reports there is further
information on individual buyers’ appearance and clothing. This information was removed from the sample in order to avoid ethical problems with using surveillance data. Copenhagen Police have not been involved in the research process other than supplying the data. All of the analysis and conclusions drawn in this article are made by the researchers alone.

**Study setting**

Danish drug control policy rests on two objectives that were decided upon in the late 1960s and the early 1970s: to spare drug users from excessive penalisation by not criminalising the use itself and to keep the markets for harder drugs and cannabis separate by not actively policing cannabis possession and retail sale offences. A set of prosecutorial guidelines formalised this policy by instructing the police to focus resources on “professional sellers” and “harder drugs” (Public Prosecutor, 1969). The prosecutorial guidelines specify an expediency principle of optional prosecution so that first-time offences prompted a police caution. In practice this meant that users and even dealers were not proactively investigated. Even in instances where the police cannot ignore flagrant crime, the associated statutory penalties are lenient.

In 2003–2004, when the data used in this study were collected, the starting-point sanction for possession of under 10 grams was a fine of DKK 500. Volumes of up to 100 grams can be considered for personal use (Public Prosecutor, 2006). This policy has inadvertently facilitated the existence of Christiania’s cannabis market (Moeller, 2012, 2009). Danish authorities have begrudgingly tolerated cannabis sales under the condition that no other types of drugs are sold. The Chief of the Copenhagen Police has verified that this “cannabis only” policy was actively enforced by the locals (Bech-Hansen, 2003). The market, bars and restaurants in the immediate vicinity are popular among local Danes, and the overall unique characteristics of the area have made it the second largest tourist attraction in Copenhagen. This combination of a stable, public and accessible market with low statutory penalties signals a low-risk transaction opportunity for cannabis buyers. As such, the market in Christiania can be compared to an illicit version of the coffee shop system in the Netherlands. To buyers the continued existence of the market in Christiania has signalled a lenient sentiment on behalf of the government towards cannabis retail sales similar to how “Dutch coffee shops play a symbolic role as a paradigm of liberal cannabis policies” (Sznitman et al., 2008). This policy reduces the representativeness of the findings. The Christiania market is an anomaly in international comparison because it is an illicit market, yet with low enforcement levels and lenient statutory penalties. During the period when the data were collected, enforcement had been low for years and the market was very stable (Moeller & Hesse, 2013).

**Results**

**Purchase size**

The first question pertains to the buyer’s preference for product type and quantity. From the literature we suspect that cannabis buyers prefer to purchase small quantities. Table 1 shows the number and distribution of the different types of purchases that were made.

From these transactions, it can be ob-
served that buyers would typically purchase 3 grams of hash or two joints. More than half of the purchases (55%) were strictly joints and almost two thirds of the purchases contained at least one joint. The mean purchase was slightly greater, with 2.7 joints or 6.6 grams of resin. This variation between the median and mean purchase size is down to a few large purchases. The median purchase is more interesting to us. We found that 88% of 338 resin transactions were of median purchase size or below. The joint transactions were similarly small with 67% of 509 transactions being the median two joints or less. This median purchase size corresponds to DKK 100 worth of joints or resin.

There were a few outliers that affected the mean and median purchase sizes. For resin, there were two transactions of 200 grams, another two of 100 grams and eight of 50 grams or more. These were exceptions, as only 12% of the resin purchases were more than the median of 3 grams. For the joint-only purchases, we found one transaction of 40 joints and 14 transactions with 10 joints or more. One third of the sample bought more than the median two joints, but only 5% of the 509 transactions were for more than seven joints.

As many as 92% (n=651) of payments were made in notes, i.e. rounded amounts. Coins were used in 8% of the transactions (n=56), and change was given in 18% of the transactions (n=124). We interpret this returning of change as an expression of the low legal risks in the market. An interesting titbit that relates to this is that the seller’s assistant is not allowed to touch the money. In a handful of instances it is noted in video-surveillance transcriptions that the seller leaves the booth, leaving the assistant in charge. When buyers approach the assistant they are allowed to leave money on the counter and take some joints, but this assistant consistently leaves the money lying on the counter. When the seller returns he picks up the payment.

Sex of buyers

Few Danish surveys have included the sex variable, so we have only sparse information on cannabis use by females. A study of students aged 15 and 16 found the lifetime prevalence to be 11% for boys and 9% for girls, which corresponds to a ratio of 1.2:1 (Hibell et al. 2007). For the slightly older group, those aged 16 to 20, the ratio is 1.4:1 for lifetime prevalence (Danish Health and Medicines Authority, 2007). Annual prevalence for ages 16 to 44 is 11% and 6%, respectively (Danish Health and Medicines Authority, 2006), corresponding to a ratio of 2:1. As such, the Danish figures are consistent with European figures for variations in cannabis prevalence between the sexes (Hibell et al., 2007; EMCDDA, 2006). That is, 40% of those who had ever tried

Table 1: Purchase type and amount

| Table 1: Purchase type and amount | Loose resin | Joints | Both (resin/joints) |
|-----------------------------------|------------|-------|-------------------|
| N                                 | 338        | 509   | 74                |
| Share (%)                         | 37         | 55    | 8                 |
| Sum                               | 2230       | 1384  | 639/179           |
| Mean                              | 6.6        | 2.7   | 8.6/2.4           |
| Median                            | 3          | 2     | 3/1               |

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cannabis are females. Males are overrepresented among heavier users. For lifetime, the ratio is estimated to be 1.5:1, which increases to 2:1 for past-year use and to 3.5:1 for past-month use (EMCDDA, 2006). A report on “daily” cannabis use includes an assessment of the sex ratio despite the small numbers. For the age group 16 to 34 years, 1.2% of males are estimated as daily users, while the corresponding figure for females in the same age group is 0.2% (EMCDDA, 2012), a 6:1 ratio. In nine of the reports (n=559) it was noted whether the buyer was male or female. We found that about 11% of the buyers in this subsample were female.

Finally, we wanted to examine if female buyers showed a different preference for buying joints or whether their purchase quantities varied from those of the men. To do this, we used the observations with information on both purchase type and the sex of the buyer. This means that our sample is slightly reduced (n=450).

First, it must be noted that the proportion of “both,” i.e. resin and joints purchased at the same time, is higher for both the sexes than that shown in Table 1. This is because the sub-samples that are applied for the questions are slightly different. It can be observed from the data presented in Table 2 that women do not appear to be more prone to buying joints than men. Furthermore, 50% of the purchases made by women were joints, compared to 46% for men, and 12% of the purchases made by women were both joints and resin as opposed to 10% by men ($\chi^2 = 0.491; p = 0.78$). There was no significant difference in the number of joints purchased by women, when compared with men (men: 2.58; women: 2.69; Mann-Whitney U test, $z=-0.073; p=0.94$).

Also, there was no difference in the proportion of men and women who purchased resin. We found that 44% of men and 38% of women bought only resin ($\chi^2=0.24; p=0.63$). Similarly, there was no significant difference in the quantity bought, especially when the outliers were removed. Men were found to buy 3.4 grams on average and women were noted to buy 3.1 grams (Mann-Whitney U test, $z=-0.045$, $p=0.96$). The Mann-Whitney U test was used because the limitations in the data prevented a t-test. There were very few groups of people who made purchases to allow for comparison with individuals; however, the groups did not appear to be more prone to buying joints ($\chi^2=0.46, p=0.5$).

### Table 2: Purchase preference by sex

|          | Joints | Resin | Both |
|----------|--------|-------|------|
| Male ($n = 408$) | 46%    | 44%   | 10%  |
| Female ($n = 42$) | 50%    | 38%   | 12%  |

$\chi^2 = 0.491; p = 0.78$

### Discussion

It is interesting that more than half of the transactions involved joints. This is noteworthy in itself because the only finding in the literature on joint purchases is that they constitute 5% of the purchases made by past-year users (Caulkins & Pacula, 2006). It seems implausible that all buy-
ers investigated in the study by Caulkins and Pacula (2006) had the option of purchasing joints at their last transaction, but technically we do not know. Here, the local context and available selection probably play a significant role. In Christiania, there were as many different joints to choose from as there were types of resin. Apparently, retail buyers are willing to pay for the service of having someone roll the joints for them. This is interesting with respect to questions of cannabis buyers’ demand elasticity and willingness to pay. If we accept the estimate by the Department of Forensic Medicine, University of Aarhus, of 0.33 grams of resin in a joint bought in Christiania as a rough estimate of actual content, then this implies that the price of resin bought in a joint is about 4.5 times higher than that bought loose. Two joints contained 0.66 grams of resin, which corresponds to DKK 150 per gram. When bought in loose portions of DKK 100 for 3 grams, the price was only a little more than DKK 33 per gram. Even if the joints contained 0.5 gram each, as observed by Wilkins et al. (2005), the joints would still be priced three times as high as the loose resin. This observation is overtly simplified, but it is still noteworthy. It is simplified because the median purchase of 3 grams for DKK 100 includes the standardised quantity discount. Furthermore, we do not know the quality of the resin in the joints. This is a relevant consideration for the rest of the discussion of our results.

Our dataset is an administrative one that has not been collected for research purposes. The characteristics of the data reflect their original purpose – to achieve criminal indictment of the cannabis dealers. The basis for the severity of a drug conviction in Denmark is the aggregate quantity involved and the revenue obtained. This entails certain problems for our present study. First, as seen in the descending number of observations for the different variables as described in the data section, not all of the police officers that coded the original reports were equally diligent in noting auxiliary information like the sex of buyers. Second, the visual assessment of the quantity in individual transactions noted in the reports is not precise, because the observations are based on the amount of money exchanged. This is problematic because there were as many as six different types of resin for sale, retailing from 7 to 15 euros per gram, and at least as many different types of joints. These products were laid out in front of the seller and were clearly marked with names and prices (Moeller, 2012). A purchase valued at DKK 100 will therefore elicit rather different quantities, depending on the quality of the product chosen. We suspect that the quantity discount must have been for the cheaper forms of resin that were available. In the literature on cannabis prices and purity (Trimbos Institute, 2002; EMCDDA, 2004; Kilmer et al., 2010), a close correlation has been established between the content of the primary psychoactive constituent, Δ-9-tetrahydrocannabinol (THC) in different cannabis products and their price. We assume that this linearity between price and THC content holds for the Christiania market as well. The implication is that a purchase of DKK 100 will roughly elicit the same amount of THC, regardless of whether a lower-quality or higher-quality resin is bought. In our study, it will be counted primarily as DKK 100, or 13 euros.

Similarly, for joints, the data on the
quantity of resin in the joints sold are sparse. Following the crackdown, 10 confiscated joints were examined by the Department of Forensic Medicine (2007), and were found to contain between 0.11 and 0.46 grams of resin of an undisclosed quality, with a mean of 0.33 grams, but with no further information included. Caulkins and Pacula (2006, p. 13) note that there is “no consensus on how to translate quantities in joints to grams”, which is concurred by Legget (2006). ONDCP (2001) estimated a joint to contain about 0.4 grams of resin, while Wilkins et al. (2005) estimated a joint to contain 0.5 grams. For the calculations in our study, we counted the number of joints. For discussion purposes the joints are assessed as between 0.33 and 0.5 grams of resin in a few places, but they will mainly be seen to represent a purchase value of DKK 100. Finally, the Christiania market is unique in international comparison and we also do not know the extent to which the three sales positions visible in the surveillance footage are representative of all 40 sales positions.

This low-risk environment will likely affect the results but we do not know how. If buyers experienced a more intensive enforcement pressure, they might be more inclined to purchase loose resin that is easier to conceal. On the other hand, this finding may suggest that cannabis buyers are simply not very responsive to price increases because the per-dose price is so low. If this is indeed the case, then the finding is relevant for the discussion of possible evasion rates under a legal regime (Kilmer et al., 2010). Would buyers find the impetus to buy from the black market if high-potency cannabis were heavily taxed in a legal regime? Our finding suggests that this would not be the case. Apparently, buyers are not very concerned with the per-dose price when there are no legal risks and there is a wide selection to choose from and a steady supply.

This preference for purchasing small amounts is interesting in itself. Why would buyers make smaller purchases more often and run the risks associated with a transaction when they could easily buy larger amounts? Our assessment of the literature is that buyers appear to adapt their behaviour rationally in the light of legal risks. Reinarman (2009) asserted that the demand for high-potency cannabis was driven mostly by concerns about irregular supply. Internationally, most will buy from a seller they know and trust, preferably making the actual transaction in an indoor setting. In countries where other modes of distribution are available, buyer behaviour reflects these options. Thus, most users in the Netherlands will use the coffee shops and those who do not are either not old enough or are dissatisfied with the distance to a location (Wouter & Korf, 2009). Buyers in Christiania do not have the same impetus to purchase larger amounts as those in the USA where transactions are more complicated and are associated with stricter formal penalties. If we consider buyers to be rational actors then it is not surprising that buyers in a stable and accessible market prefer smaller quantities than in higher-risk markets. However, the explanation for this preference is more difficult to guess. One possible theory is that it is an expression of disdain for having larger amounts of drugs lying around when you can easily purchase small amounts. Despite these reservations, it is still surprising that users...
are willing to pay such a high monetary price to get intoxicated. Again, this may be interpreted as an anomaly following from the local context. In close proximity to the cannabis market in Christiania there are several bars that tolerate cannabis use. This may influence the purchase preferences. We do not think that drug tourism has affected our results much because the observations were made during the dead of winter, in December and January, when there are few tourists in Copenhagen.

On our next question on the proportion of female buyers, we were somewhat surprised to find that only about 11% of the purchases were made by women. This is closer to the estimated proportion of 13% of daily female users, a 7:1 ratio (EMCDDA, 2012), than the previous findings of around 20% in the literature. From the available research, we know that most casual users use cannabis in social settings and share the available drug between friends and acquaintances. Some of these users, maybe 9% (Pudney, 2007) will go on to become regular or heavy users over time. However, we do not have a clear idea about when and who among the cannabis users will resort to buying their own drugs from anonymous sellers. This stage will most likely vary between countries and regions, depending on how the local market for cannabis is structured. Individual risk aversion or risk-taking propensities will also affect this. For a low-risk and stable market, like Christiania, it will be less stigmatised to purchase cannabis than in a more clandestine arrangement in a country with stricter penalties and more intensive enforcement. An alternative, or perhaps complementary, explanation could be that men tend to be designated to make the purchase on behalf of a peer group. Our finding may indirectly demonstrate that measures intended to counteract drug use, such as increasing penalisation, may be more effective in deterring women, or as noted by Bushway and Reuter (2008), people with higher education, i.e. those with more to lose from criminal sanctions. Griffin and Rodriguez (2011) suggest that some women rely on their male partners or acquaintances to purchase drugs as a risk minimisation strategy.

Another explanation is that our sample reflects conditions specific to Copenhagen and the surrounding area. There is very little information on regional cannabis use rates and no information on regional prevalence rates by sex for Denmark. Illicit drug prevalence rates are usually found to be higher in urban areas. This high prevalence rate in the cities may disproportionately reflect male drug use, i.e. that males in urban areas not only have a higher prevalence but are also overrepresented among the more intensive users. Since the heavy users account for the majority of all transactions, this would explain why female buyers are underrepresented in our sample compared to the literature where the ratio is closer to the past-month ratio of users. Finally, the bivariate analysis of purchase preferences between male and female buyers did not disclose any statistically significant differences. Both males and females preferred buying joints, and both also preferred rather small amounts, regardless of the purchase type. Interestingly, the 11% that we found is similar to the ratio of females charged for minor drug-related offences in Denmark from 2000 to 2007 (Moeller, 2010).
Conclusion

We found the median transaction in Christiania to have a monetary value of DKK 100. For this amount of money, buyers could choose either 3 grams of resin or two joints. A total of 88% of the resin transactions were of the median 3 grams or below, while 67% of the joint transactions were only two or one joint. The small size of the median transactions is consistent with our expectations based on the available literature. Caulkins and Pacula (2006) note that retail purchases across all illicit drugs are generally small, around USD 25. In New Zealand, Wilkins et al. (2005) reported even smaller purchases to be the norm in New Zealand. The market in Christiania was an anomaly in international comparison as far as cannabis markets go in that it was stable, publicly accessible and offered a wide range of cannabis products. In the light of the low legal risks associated with purchasing cannabis here, it is not surprising that buyers typically purchased small amounts. Cannabis users appear to prefer buying small amounts when they are not concerned about the consistency of supply, and they trust the seller to sell quality products.

It was more surprising that more than half of the transactions were joints. As many as six different types of joints were sold in Christiania, but the per-dose price for the cannabis they contained ended up being at least three times higher when bought in this form compared to buying loose resin and rolling the joints themselves. A local context of low legal risks combined with a setting in which cannabis use is accepted seemed to have affected buyer preference for joints. The option of actually being able to smoke the canna-

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bis right after purchase may have encouraged some buyers to opt for joints instead of the loose resin they might have bought at a more clandestine street market. We take this finding to suggest that users’ willingness to pay for cannabis bought from a trusted seller is high.

Finally we found that women were responsible for about 11% of the transactions and that their purchasing preferences were not statistically different from those of men. The literature on cannabis transactions suggests that females are represented in similar proportion as the past-month use rates between the sexes, i.e. at about 22%. Our finding was closer to the ratio of females among daily users, i.e. about 13%, but this may be a result of the local context. The Christiania market is situated in the heart of Copenhagen, the capital of Denmark. Drug use rates are commonly found to be highest among men in the larger cities, so there will also be more heavy users among men, and we know that heavier users account for most of the transactions. Consequently, the finding of 11% women is primarily representative of cannabis buyers in Christiania and only indirectly of cannabis buyers in Copenhagen in general.

Declaration of interest None.

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