

Darknet Market Usage Among Swedish Residents

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Abstract

Background: The aim of the study is to look at what Swedish residents are buying on darknet markets and why they use them, as well as to get an idea of what types of people use it. Sweden has very strict drug laws, that for example state, that being under the influence of an illegal substance is a punishable offense, this could make the use of legal drugs appealing to drug users in Sweden. **Design and settings:** Global Drug Survey: purposive sample collected between the 9th of November 2014 and the 3rd of January 2015. **Participants:** Swedish residents (n=570, median age 23, 88.9% male) who had used darknet markets (n=129) as well as those who had bought legal highs/research chemicals during the last 12 months (n=51). **Measurements:** Online questionnaire. **Findings:** The use of legal drugs was not common. The most popular purchases were MDMA, cannabis, and LSD. There seems to be a trend for psychedelic substances with young Swedish darknet users, especially with LSD. **Conclusions:** It was expected that sales of legal drugs or drugs that are not tested on standard drug tests, would be more popular in sales on darknet markets than the classic drugs, given the legal environment in Sweden, this did not seem to be the case.

Preface

This BSc thesis was written under the guidance of Anna Kristín Newton. She was an excellent advisor and showed me both patience and understanding on the chosen topic. I was also very lucky to get in contact with Dr. Adam Winstock, founder of the Global Drug Survey. The biggest drug survey in the world, collecting detailed data on the wide variety of drug users around the world. The survey has been growing since it started in 2011 and had over 100.000 participants, both in 2015 and 2016. Dr. Winstock granted me access to data, which would have been impossible to collect on my own. In the 2015 Global Drug Survey, it is estimated that the people who participated spent around 67.000 hours on the survey. Dr. Winstock also put me in contact with other members of his team: Dr. Monica Barratt, Dr. Jason Ferris, and Dr. Anders Håkansson. They have all given me valuable guidance and insight into the topic, in a depth that would have been hard to reach on my own. Many thanks to you all, I could not have done this without you.

Table of Contents

Abstract	3
Preface	4
The Dark Web	5
How does it work?	5
Why do people use the darknet markets?	5
Anonymity	6
Surfing the Silk Road	7
The Swedish drug approach	8
Methadone maintenance therapy clinics	8
Syringe exchange programs	10
Drug offences	10
Drug-free society	11
Drug harm	11
Legal highs	12
Why would these online marketplaces be of interest to the Swedes?	13
Aim of study	14
Methods	15
Design	15
Measures	15
Participants	16
Statistical analysis	16
Results	18
Discussion	25
Conclusion	28
References	29

The Dark Web

It is estimated that the World Wide Web that we know and use, also called the Visible Web, only represents 4% of networked web pages. These web pages have a direct approach and the information downloaded, is easily traced. The Deep Web represents the remaining 96% of networked pages, but these sites are on the other hand not easily found (Epstein, 2014). To prevent confusion, it is important to note early on that the Dark Web, is a part of the Deep Web, but not the same thing. The Dark Web refers to a collection of hidden websites that are publicly visible, but not accessible to search engines and hides the IP address of the server that runs them. So they are there, but hard to find or trace. The rest of the Deep web refers to all other web pages that search engines cannot find, this includes databases, webmail pages, registration-required web forums or pages behind pay-walls. A single Gmail account, for example, creates a big number of web pages on the Deep Web (Egan, 2016). So when we read that 4% of networked web pages are on the visible web, it is easy to think that there is a huge world of hidden exciting sites, but mostly it's just data, not meant to be accessible.

How does it work?

To visit the hidden sites of the Dark Web, one must use specific encryption browsers like Tor, I2P or Freenet, to reach the site they wish to visit (Egan, 2016). These sites are not approached directly and one must have an active link. Since they use a peer2peer networking system, where files are stored on many different computers, instead of one server, the sharing method of encrypted data makes it difficult to track (Epstein, 2014). Tor is the most commonly used browser for the Dark Web. Tor does not only hide the identity of the site but also the user (Egan, 2016). Instead of taking a direct route from source to destination, data packets on the Tor network take a random pathway, through many relays to cover one's tracks. Not all Tor users are customers of darknet markets, it is just a browser created to keep anonymity high. It is not made for illegal activities, but for people who want privacy, both for their safety or just as a matter of principle (The Tor Project, 2016). However, it is a very convenient field for illegal activities as well.

Why do people use the darknet markets?

Because of the easy accessibility of international online marketplaces and the various products available, plus the convenient possibility of having it mailed to your house, many are turning to this alternative method of buying drugs. It has increased in popularity with the

modern drug buyer. Many online marketplaces exist, and it only takes minutes to find links to dozens of them. The most famous of them was probably Silk Road, launched in February 2011 and shut down by the FBI in October 2013. Silk Road 2.0 opened soon after but was also shut down, many other sites opened as well, possibly starting a never ending stream of darknet marketplaces (Van Buskirk, Roxburgh, Farrell & Burns, 2014). In a way, Silk Road is similar to Napster (the program that sparked the file sharing movement), even though its lifetime was short, the peer2peer sharing method was there to stay. One of the reasons these online marketplaces are so popular is that they provide an infrastructure for sellers or buyers to conduct transactions. It is similar to eBay rather than Amazon since it is not the operators of the site who are selling, they just provide a service that connects the buyers to sellers and take a commission (Christin, 2013).

Anonymity

With Tor, almost anyone with basic computer knowledge can surf the internet anonymously. Silk Road only ran as a Tor Hidden service. When connecting, Tor nodes set up a meeting at a time and place inside the Tor network, so that the client and server can communicate while maintaining their IP address unknown from observers and each other (Christin, 2013). Vendors (sellers) can choose if they want their product to be public listing, so anyone who searches can find it, or stealth listing, where only those who get a special link, can buy the product (Christin, 2013). However, being anonymous isn't enough for marketplaces to work. The key ingredient is bitcoin, a digital currency, operating independently of a central bank. In most countries it is relatively easy to go and buy bitcoins without having to show identification (Christin, 2013). But bitcoin is not really anonymous. Every transaction is logged in the Blockchain, a public ledger of every bitcoin transaction ever made. The ledger cannot be edited and will never go away ("Blockchain", 2013). So if the wallet is ever linked to the identity of the owner, everything they bought can be looked up ("Anonymity", 2013). It is possible that in the future, everyone, including friends, family or law enforcement, will be able to track every transaction one has made in the past. So there is a good reason for using multiple wallets and third party services to wash the bitcoins, so the usage can be kept private in the future.

Surfing the Silk Road

The way Silk Road used the cryptocurrency, was with a system they called the Escrow System. The buyer paid Silk Road, but the seller did not get the payment until buyer confirms receiving the product. After 35 successful transactions, a seller could demand early payment, that is, finalizing the payment before the buyer gets the product. This is how markets make money, by taking a commission fee, ranging from 3-8.5%. This commission generated about 1.2 million dollars a month on Silk Road, in 2011-2012 (Christin, 2013). Even though 97.8% of sales (n=184.805) got 4 or 5 out of 5 in customer satisfaction, there had been examples of sellers who had gotten the right to demand early payments, sold a lot, got the payments and disappeared. This method of scamming is known as whitewashing, but this was very rare. Only 1.6% of those who finalized early (n=20.884) got a grade that was 1 or 2 out of 5 in customer satisfaction (Christin, 2013). On Silk Road, 16 of the top 20 products sold, were drugs. The majority of the items disappeared within three weeks and 25% within three days. Which means that either the sellers ran out of stock and de-listed their item or they went stealth when they had a big enough clientele and just focused on them (Christin, 2013). One positive thing these markets have over the streets is the grading system. On the street, it is hard to know how reliable the sellers are or how pure the product is, since they don't have feedback or rating for every future buyer to see (Van Hout & Bingham, 2014). Not many papers have been published about drug buying habits on the internet. One of the first was with data from 2012, and asked people from USA, UK and Australia (n=9470) who had recently bought drugs, if they knew about these online marketplaces (not just Silk Road) and if they had tried them. The main reasons participants gave for using these marketplaces were: *wider ranges of drugs, better quality, the convenience and the rating system*. The main reasons for not using it was: *not needing it or fear of being busted by police or customs* (Barratt, Ferris & Winstock, 2014).

The Swedish drug approach

Sweden has for decades fought hard against drug use and is the country in Europe, which relatively spends the second most on substance-related problems, after the Netherlands, about 0.47% of their GDP a year (UNODC, 2007). They had a problem with drug misuse in the 1940s, after amphetamine, primarily Bensedrine and methamphetamine (marketed as Pervitin) was heavily advertised and sold legally. It reached a peak in 1959 when the total of amphetamine users reached 6.4% of the population (UNODC, 2007). To put that in perspective, in 2006, the highest use of amphetamines in the world, was reported in the Philippines, with an annual prevalence rate of 6% (UNODC, 2006). In 2013 the annual prevalence rate for amphetamine use, for all adults in Sweden was down to 0.7% (EMCDDA, 2013). Though the usage has gone down a lot, it is very popular for intravenous drug users in Sweden, which is one of few countries in Europe where amphetamine has beaten heroin in popularity, 57% vs. 43% (Hakansson, Medvedeo, Andersson & Berglund, 2007).

Methadone maintenance therapy clinics

In 1968 the Swedes adopted The Narcotic Drugs Act (Narkotikastrafflag (1968:64)), making the transfer, unlawful manufacture, acquisition and possession of drugs, a punishable offense (UNODC, 2007). Two years before, in 1966 they had been the first country in Europe, to open a methadone maintenance therapy clinic, at the Psychiatric Research Center of Uppsala (UNODC, 2007). Showing clear interest for harm reduction, very early on. However, the criteria was strict and access limited. To get in, one had to be at least 20 years old, have a documented 4-year history of compulsive opioid abuse, at least three attempts in drug-free programs and other abuse had to be manageable (Gunne & Grönbladh, 1981). In 1989 there was a Swedish paper published about the success of the methadone-assisted rehabilitation, a long-term study of 20 years (n=174). It showed that 75% of patient abandoned their drug use and took up work, while 25% were expelled for breaking the rules of the program (Grönbladh & Gunne, 1989). The zero tolerance against the use of other drugs in some maintenance programs, where a single positive urine test, can cause discharge from the program has shown to have serious risks. One study showed that the mortality of opiate users in Stockholm who were discharged from the methadone treatment had 20 times higher risk of dying from unnatural causes, than those who remained (Heilig & Gunne, 2008; Fugelstad, Stenbacka, Leifman, Nylander & Thiblin, 2007).

The strict rules about the methadone clinics and limited access, called for another similar substance in Sweden, and in 1999, buprenorphine (Subutex) came on the market (Romelsjö et al., 2010). Like methadone, it is a mu-opioid agonist but with high receptor affinity. Which means, if taken, blocks the effects of opiates, but at the same time also activates the body's opioid receptor. It is said to have a lower dependence risk than methadone (Romelsjö et al., 2010; Kakko, Svanborg, Kreek & Heilig, 2003). Sales data from Apotek, the national pharmaceutical company, shows a +1300% increase in buprenorphine between the years 2000-2006. (Romelsjö et al., 2010). It wasn't until 2005 that a new national guideline for methadone treatment and buprenorphine treatment was issued. The strict rules about the methadone programs were eased, and the previous limit was abolished, the threshold for methadone maintenance treatment was lowered from four to two years of drug dependence so that more people could participate. In 2005 there were six programs in Sweden with 800 people but in 2012 there were 114 programs, with over 5000 people (Fugelstad, 2014). This change made access to methadone easier, but access to buprenorphine harder. The new criteria for buprenorphine treatment, was at least one year of documented heroin addiction, a drug-free living environment, an employment contract when beginning and discharge for the use of other narcotics or non-prescribed drugs (Öhlin, Fridell & Nyhlén, 2015). These criteria meant that more addicts had to buy buprenorphine illegally when coping with withdrawal.

A study from 2007 of intravenous drug users (n=350) from Malmö, showed that 89% of heroin users had used buprenorphine in the last year. Only 12% had gotten it legally from a doctor but 50% from the streets. Out of those who had used it, 87% used it against withdrawal symptoms or for detoxification and 11% used it for the euphoria. So for heroin users, only a small portion was using it for the pleasurable effects (Hakansson, Medvedeo, Andersson & Berglund, 2007). However, though most heroin users, use it to cope with withdrawal, for other groups, like intravenous amphetamine users, misuse is more common. Only 20% of intravenous amphetamine users, had used it against withdrawal symptoms or for detoxification, while 62% had used it for the pleasurable effects (Hakansson, Medvedeo, Andersson & Berglund, 2007). Buprenorphine has shown good progress in harm reduction in France, where one study showed a decline in opiate mortality by 85% when it was introduced in 1995 on a broad scale (Auriacombe, Fatséas, Dubernet, Daulouéde & Tignol, 2004).

Syringe exchange programs

Another important factor in harm reduction is good access to clean needles. Sweden has had syringe exchange programs for 30 years, the first one opened in Lund in 1986 and a second in Malmö in 1987, both cities are in low HIV prevalence regions of Sweden (Amundsen, 2003). Needle exchanges are especially needed in Sweden, since pharmacies are forbidden from selling syringes and needles, and possession of them is illegal, so people have to depend on the black market to get needles or reuse old ones. In 2011 a newly evaluated edition of the National Action Plan on Drugs (2011-2015) was made, and like the ones before, it focused on a drug-free society. Unlike the old ones, it suggests that county councils should broaden the range of evidence-based interventions, targeting drug users, including needle and syringe exchange (EMCDDA, 2016). Since 2010 four additional syringe exchanges have opened, with another four to open in 2016 and more counties looking into the possibility, making access to clean syringes easier (Berglund, 2015). Though there has been some evidence that HIV counseling and testing might be more efficient in preventing HIV than legal access to needles and syringes/needle exchange programs, there has also been evidence that those who have access to clean needles are many times less likely to get diseases like hepatitis B or C (Amundsen, 2003; Hagan, Jarlais, Friedman, Purchase, & Alter, 1995).

Drug offences

In 1988, Sweden became one of few countries, where drug use, not just possession, was punishable. At first by a fine, but in 1993 the offense became punishable by either fine or a prison sentence, but qualified as a minor offense (6 months or less) (UNODC, 2007). In 2009, minor offenses accounted for 88% of drug related crimes (Folkshälsoinstitutet, 2013). In 2009, 57% of drug related convictions, were for using, and another 26% was for possession, while distribution only accounted for 5% and smuggling 4%. Of those convicted 28% were young people under the age of 20 (Folkshälsoinstitutet, 2013). There was a 124% increase between 2002 and 2012 in drug convictions, which means that it more than doubled in a decade. But even though it doubled, the number of people being sent to prison declined, and went from 1580 people in 2002 to 1140 people in 2012 (Folkshälsoinstitutet, 2013).

Drug-free society

In 1998 a special committee was formed in Sweden, The Drugs Commission. Their mission was to revise, discuss and find options, to improve the goal of a drug-free society. They did not find reasons to think that changes to drug-related policy would improve the lives of users or the community. They wanted to focus on preventing drug use, rather than also looking at other methods of harm reduction, like changing the way drug problems are dealt with (UNODC, 2007). Statistically, it looks like their approach has managed to reduce the overall drug use. The lifetime prevalence of drug use among 15-16 year-old students in Sweden went from 15% in 1971 down to 3% in the late 80s. There was a significant increase in the 90s, as it went up to 9.2% around 2000, but it went down to 6% in 2006 (UNODC, 2007). It is worth noting that unemployment was high in the 90s, unemployment among young people (age 15-24) rose from 3.7% in 1990 to 16.7% in 1994, and at the same time drug prices declined, despite rising drug seizures (UNODC, 2007). If we look at substance use today for 15-16 year olds Swedes vs. the same age groups in Europe, we see that alcohol use in the past 30 days is less in Sweden, with 38% vs. 57%. But the alcohol volume the last drinking day is higher. That is, they seem to drink more on average, when they do drink, 7.0cl vs. 5.1cl of pure alcohol (ESPAD, 2012). The lifetime use of cannabis is low, 9% vs. 17% while the lifetime use of other illicit drugs than cannabis is only slightly lower, 4% vs. 6%. The lifetime use of inhalants (gasses, solvents, aerosols, and nitrites) is increasing and is a slightly higher than the average, 11% vs. 9%. The lifetime use of tranquilizers without prescription is also a slightly higher than the average, 8% vs. 6% (ESPAD, 2012).

Drug harm

While general drug use is low in Sweden, drug harm is not. Even though drug use has been declining, drug-induced deaths have been increasing. Rising steadily until around 2000, where there was a slight decrease until 2006, when it went from around 200 in 2006 to 460 in 2013. The drug-related mortality rate among adults (aged 15-64) in Sweden was 69.7 deaths per million in 2013, almost three times the European average of 17.2 deaths per million (EMCDDA, 2013). These numbers are confusing though and hard to compare to other countries, as not all countries measure this in the same way. In Sweden, about 98% of people that die and are registered in Sweden, are examined (Folkshälsöinstitutet, 2013). These high number of drug-related deaths reported from Sweden come from Toxreg, a register not based

on cause of death but rather on the presence of illicit drugs in their system at the time of death (Folkshälsöinstitutet, 2013). Which means, that is says nothing about the causality between the drugs and the death, as some drugs stay in your system for weeks and the person might have been fully sober when the accident occurred. Research on the cause of mortality of former inmates in Sweden with substance use showed that only about 27% was due to accidental poisoning (OD), a direct cause of the drugs. While for example, 13% died in traffic accidents and 10% committed suicide (Hakansson & Berglund, 2013). The methodology of the Swedish data has been the same through the years, so even though only a portion of the deaths is directly related, the increase is noteworthy.

Legal highs

One explanation for the decrease in drug use is that young Swedes are drinking less and using fewer drugs because they are taking other substances instead. Substances not classified as illegal drugs, like research chemicals/legal highs or prescribed opioids. A recent study showed that between 6-8% of Swedish high school students have taken analgesic opioids like Tramadol or Citadon, narcotics classified as medicine, not prescribed to them. It seems they do not perceive this as drug taking since it is legal (The Local, 2015). An example of a research chemical that has been causing harm in Sweden, is synthetic cannabis (The Local, 2014). Synthetic cannabis is a designer drug where herbs or other combustible materials are sprayed, with a lab synthesized liquid chemical, that mimics the effects of THC (the psychoactive ingredient in natural cannabis) (Anderson, 2014). When authorities try to ban it, it is easy to modify the chemistry behind it, so the new version is not classified as the same illegal drug. In 2011 the Swedish passed a law that made it legal for customs officers to confiscate drugs that are legal if they are likely to be dangerous (Nu beslagtar svenska tullen lagliga droger, 2011). The upside of using synthetic cannabis versus natural, was that it did not show up on regular urine tests, was legal in the beginning and had a similar high (EMCDDA, 2015). The downside is that it is far more toxic. The number of poisoning by synthetic cannabis has risen a lot in Sweden in recent years, going from around 100 in 2011 to over 300 in 2014 (Personne, Pettersen & Westerbergh, 2014) and two of those 300 in 2014, died (The Local, 2014). Research on synthetic cannabis users (n=2513) showed that 93% of synthetic cannabis users preferred natural cannabis. The pleasurable effects when high, were greater, and they found functioning afterward easier. Synthetic cannabis had more negative effects, symptoms of a hangover and increased paranoia (Winstock & Barratt, 2013). To compare the danger to regular cannabis, it

is estimated that one needs to consume 100-1000 times the effective dose of regular cannabis to cause death (Gable, 2006).

It is hard to find data about the use of legal drugs, but one way is to look at data from the Swedish Poisons Information Centre. Of all the calls made in 2014, 7% were concerning internet drugs or illegal drugs in the age group 10-19 year olds (n=6.219), while 6% were concerning internet drugs or illegal drugs in the adult group (n=40.790). A nearly 40% increase, in the *internet drugs or illegal drugs* category since 2013 (Swedish Poisons Information Centre, 2015). In 2015 the increase does not continue, and both groups had almost the same number of calls made as in 2014 but calls regarding the internet or illegal drug went down to 5% for both groups (Swedish Poisons Information Centre, 2016).

Why would these online marketplaces be of interest to the Swedes?

It seems like the mentality in Sweden is very anti-drugs, a survey by the Swedish Drug Union from 2008 showed that a majority of the nation supports the strict policy, about half of the population thought that possession or cultivation of cannabis for personal use, should be punished with prison (The Local, 2014). It must, therefore, be very stressful for drug users to buy and use drugs in public, buying online could be one answer. In Sweden, they perform around 30.000 drug tests a year, excluding roughly 10.000 random drug test for drivers (Johansson & L. DuPont, 2016) and withhold a law that states that using, not just selling or holding, is punishable by a jail sentence, up to six months. The police are also allowed to do “random” drug tests on anyone, 15 years or older (Folkshälsoinstitutet, 2000). It is also possible that people are taking legal highs to prevent getting caught by regular drug tests.

Aim of study

The aim of the study is to look at what Swedish residents are buying on darknet markets and why they use them, as well as to get an idea of what types of people use it. The main hypothesis is that non-mainstream (including legal drugs) drugs that are less accessible from regular street dealers are more popular than the mainstream (MDMA, cocaine, cannabis, amphetamine) drugs. There are also four sub-hypotheses 1) since these darknet markets and the variety that comes with them, are relatively new, and because younger people tend to be driven more by curiosity, the younger participants buy more non-mainstream drugs than older participants. 2) Swedish residents do not have experience of getting scammed when buying online. 3) Swedish residents buy legal drugs because they are less likely detected by drug tests. 4) Swedish residents who live outside the urban areas, possibly with fewer drug dealers and less variety, use darknet markets more than residents from urban areas.

Methods

Design

An anonymous annual online survey of drug use, was designed and has been conducted by The Global Drug Survey since 2011. The data used is from the 2015 Global Drug Survey, where a total of 101.311 records was collected between the 9th of November and the 3rd of January 2015. After cleaning of the data, the number of records were 97.855. The survey was very thorough and had approximately 2.700 questions. The data used, was restricted to people living in Sweden (n=570) and focuses on those who reported having bought drugs online (n=129) but also looks at data about those who had bought legal highs/research chemicals during the last 12 months (n=51). The wording of the questions can be found at http://www.globaldrugsurvey.com/archive/GDS2015/survey_display_version.php under the subsection *Darknet* and *Research Chemicals and Legal Highs*. The survey was promoted in partnership with many news sites around the world, it was distributed via social media like Facebook and Twitter, as well as in social news site like Reddit. Most heard of it through Facebook (45.6%), but ZEIT ONLINE (13.3%) was also quite effective along with Reddit (4.9%), Guardian (4.2%) and Vice (4.2%). The sample is purposive and should therefore not be seen as representative of Swedish darknet users in general. Ethical approval for the data was granted by The Psychiatry, Nursing and Midwives Ethics subcommittee at Kings College, London.

Measures

Participants filled out a questionnaire online. It was designed by the team behind The Global Drug Survey. Questions had predetermined answers but in many cases, an “other” field was also available if the participant had another answer than the predetermined one. The questionnaire asked detailed questions about drug purchases online and purchases of legal highs, both online and local. Another part used, was the demographics of the people who lived in Sweden, including age, sex, employment status, education, and living arrangement. It also asked how participants had heard of the survey.

Participants

Of the people who participated (n=97.855) 570 were from Sweden. They were asked if they had used darknet markets (n=565) and 129 (22.8%) had people done so, 16.3% had used it within the past 12 months and for 6.5% it was longer since. Even though most seem to be relatively new users, buying for the first time within a year (37.5%) or two (63.4%). A majority appear to be active users who have bought something in the last year (78.6%). The age range of the darknet market users (n=126) was from 16-59 years old, with a median age of 23 (IQR: 20-27). The participation of the genders (n=126) was uneven with 88.9% male, 10.3% female and 0.8% transgender. Almost all of the participants (n=126) defined themselves as white (92.9%). The level of education (n=123) of participants was relatively high, 33% had studied at university or college level and had either a college certificate diploma, undergraduate degree or postgraduate degree. A large proportion of the participants (n=125) was studying (49.6%) either part-time (10.4%) or full-time (39.2%). The working status (n=124) of participants, showed that 23.4% were in a full-time job, 28.8% were working part-time, and 28.2% were in school without work. A very small part was retired (0.8%) or permanently ill or unable to work (2.4%) and the rest was without a job but looking (14.5%). Participants were also asked about their living arrangements (n=129) and given the young average age, it was no surprise that most lived with parents, siblings or other family members (38.7%). A similar amount lived alone (31.8%) or with a spouse (25.6%).

Statistical analysis

The statistical analysis was done with the 20th version of the statistical program SSPS. The data used, was limited to respondents from Sweden (n=570), there was missing data from 5 participants, so the sample used for analysis was n=565. The groups looked at were two, the main group was those who had used darknet markets (n=129), but to get an image of the legal drug use, data about those who had bought legal highs within the last year (n=51) was also used. The darknet market users had some missing data, different amounts for different subgroups. The data about what substances had been bought (n=129) was missing from 7 participants, so the sample for analysis was n=122. There were also three participants who did not put in their age. The data about different age groups (n=126) was split into three groups. The 16-20 year olds (n=33) were missing no data, so sample for analysis was n=33. The 21-30 year olds (n=73) were missing data from 4 participants, so sample for analysis was n=69. The 31+ year olds

(n=20) were missing data from 2 participants, so sample for analysis was n=18. The data about reasons for using darknet markets was missing data from 45 participants, the sample for analysis was n=84. The legal high group was missing data from 16 participants, the sample for analysis there was n=35. Since the many substances people could choose from, were often very similar, new variables called (all) were created. Definitions for the new categories are as follows. 3,4-methylenedioxy-N-methylamphetamine (MDMA) (all) = MDMA powder or MDMA pills. Cannabis (all) = cannabis herbal or cannabis hydro or cannabis resin or cannabis oil. N-benzyl-oxy-methyl (NBOMe) (all) = 25I-NBOMe or 25C-NBOMe or 25B-NBOMe. Prescription drugs (all) = benzodiazepines or opioid painkillers or dexamphetamine or ritalin or viagra or buprenorphine or etizolam or methadone or zopiclone or modafinil or tramadol. Amphetamine (all) = amphetamine or methamphetamine. 2C(all) = 2C-C or 2C-D or 2C-T-7 or 2C-B or 2C-E or 2C-I. DMT = N,N-dimethyltryptamine. LSD = lysergic acid diethylamide. The merged categories (all) were not included if only one type within it had been bought.

Because of the sensitive nature of the data, IP addresses were not collected and therefore not possible to eliminate multiple entries from the same IP address. However, a series of random questions were asked, to make a code for each participant, to identify participants without a name, if he or she would participate again in later years. It is, of course, possible that someone took the survey twice, but because of the length (20-60 minutes) of the survey and no obvious gains, it is unlikely that someone would go through the trouble. Since the missing data was relatively low, available case analysis was used instead of inputting the missing data. It is usually justified if the proportion of the missing data is minimal (Penny & Atkinson, 2011). Some of the data show a 95% CI since the data presented, is drawn from a purposive sample, it should, therefore, be interpreted with caution when generalizing to broader populations.

Results

Table 1

*Top 20 drugs purchased (by all age groups)
by Swedish residents through darknet markets*

All age groups (n=122)		
Rank	Drug	%
1	Cannabis (all)	62.2
2	MDMA (all)	50.9
3	LSD	42.6
4	Cannabis Herbal	36.9
5	Cannabis Hydro	36.9
6	MDMA powder	36.1
7	Cannabis Resin	31.1
8	MDMA pills	31.1
9	Magic Mushroom	23.0
10	Prescription (all)	22.1
11	Amphetamine	18.9
12	Ketamine	15.6
13	Benzodiazepines Not Prescribed	15.6
14	NBOMe (all)	13.9
15	25I-NBOMe	12.3
16	DMT	11.5
17	2CB	11.5
18	2C (all)	11.5
19	Tramadol	9.8
20	Amphetamine Base Paste	9.0

Table 2

*Top 20 first-time drug purchases (by all age groups)
by Swedish residents, through darknet markets*

All age groups (n=122)		
Rank	Drug	%
1	Cannabis (all)	25.4
2	MDMA (all)	25.4
3	LSD	19.7
4	MDMA powder	19.7
5	Cannabis Hydro	13.1
6	NBOMe (all)	9.8
7	Magic Mushrooms	9.8
8	Ketamine	9.0
9	MDMA Pills	9.0
10	25I-NBOMe	8.2
11	Prescriptions (all)	8.2
12	Amphetamine	7.4
13	Cannabis Herbal	7.4
14	Cannabis Resin (Hash)	7.4
15	2CB	6.6
16	DMT	5.7
17	25CNMBOMe	3.3
18	5MeoDIPT	2.5
19	Amphetamine Base Paste	2.5
20	Benzo Fury	2.5

*Salvia also had a prevalence of 2.5% like ranks 18-20

Table 1 shows the top 20 most commonly bought drugs by Swedish residents, through darknet markets. The list does not contain any legal substances. The most commonly bought drugs were mostly mainstream drugs (MDMA, cannabis, cocaine, and amphetamine). Not all mainstream drug were equally popular, amphetamine did not make the top 10 list and cocaine

did not make the top 20. LSD, on the other hand, was very popular, as well as some drugs that the average person might not have heard of. Various psychedelics like the tranquilizer ketamine, the NBOMe drug family or the 2C drug family. Table 2 shows the top 20 first time drug purchases by Swedish residents. The list is similar to the top 20 most frequently bought drugs. MDMA, cannabis, and LSD are the most popular first-time purchases by Swedish residents, but the top 10 also includes NBOMe drugs, magic mushrooms, and ketamine.

Table 3

Top 20 bought drugs by Swedish residents through darknet markets by different age groups

Age	16-20 years (n=33)		21-30 years (n=69)		31+ years (n=18)	
Rank	Drug	%	Drug	%	Drug	%
1	MDMA (all)	60.6	Cannabis (all)	68.1	Cannabis (all)	50.0
2	Cannabis (all)	57.6	MDMA (all)	49.3	MDMA (all)	38.9
3	LSD	57.6	Cannabis Herbal	39.1	Cannabis Herbal	33.3
4	MDMA Powder	39.4	Cannabis Hydro	39.1	Cannabis Resin (Hash)	33.3
5	Cannabis Herbal	36.4	LSD	39.1	MDMA Pills	33.3
6	Cannabis Hydro	36.4	MDMA Powder	37.7	Prescriptions All	33.3
7	MDMA Pills	33.3	Cannabis Resin (Hash)	30.4	Cannabis Hydro	27.8
8	Cannabis Resin (Hash)	30.3	Magic Mushroom	29.4	Ketamine	27.8
9	NBOMe (all)	21.2	MDMA Pills	29.4	LSD	27.8
10	Magic Mushroom	15.2	Prescriptions (all)	26.1	Amphetamine	22.2
11	25I-NBOMe	15.2	Amphetamine	24.6	Benzo Not Prescribed	22.2
12	25C-NBOMe	12.1	Ketamine	20.3	MDMA Powder	22.2
13	2C (all)	9.1	Benzo Not Prescribed	18.8	2C (all)	16.7
14	2CB	9.1	Tramadol	14.5	2CB	16.7
15	DMT	9.1	AmphetamineBasePaste	13.0	5MeoDIPT	16.7
16	Presription (all)	9.1	2C all	11.6	Benzo Non Prescribed	16.7
17	Amphetamine)	9.1	2CB	11.6	Magic Mushrooms	16.7
18	Benzo Not Prescribed	6.1	DMT	11.6	DMT	11.1
19	Synthetic Cannabis	6.1	Opioids Not Prescribed	11.6	GBL	11.1
20	Many*	3.1	NBOMe (all)	10.0	25I-NBOMe**	11.1

*25INBOMe, 4acodmt, benzo fury, benzo non-prescribed, DPT, synthetic cannabinoids, synthetic cannabis, tramadol and Z-drugs all had 3.1%

** other drugs that also had 11.1% were Z-drugs and opioids not prescribed.

Table 3 shows the top 20 most commonly bought drugs, by different age groups. In all three age groups, Cannabis and MDMA were the most common. There was an interesting difference in amphetamine, which only 9.1% had purchased in the youngest group (16-20) compared to 24.6% of the middle group (21-30) and 22.2% of the oldest group (31+). Psychedelics were popular for all ages, especially with the youngest group. This is most obvious with LSD, where 57% of the youngest group had bought it (16-20), going down to 39.1% for the middle group (21-30) and then 27.8% in the oldest group (31+). This is also seen with the NBOMe drugs, which were quite popular with the youngest group (16-20), but barely made the list of the other two groups. For magic mushrooms, it was the middle group (21-30) that bought the most. The 2C drugs and DMT were similar for all ages. Ketamine was very popular for the oldest group (31+) but did not make the list for the youngest group (16-20).

Table 4

Drug purchases through darknet markets by different living areas

			city/urban area	regional area	remote area	Total
Have you bought drugs on darknet markets?	No	Count	322	88	24	434
		%	74,2%	20,3%	5,5%	100,0%
	Yes	Count	95	23	10	128
		%	74,2%	18,0%	7,8%	100,0%
	Total	Count	417	111	34	562
		%	74,2%	19,8%	6,0%	100,0%

A logistic regression was performed to see if Swedish residents who live outside the urban areas, in areas who likely have fewer drug dealers and less variety, use darknet markets more than residents from urban areas. The logistical regression model was not statistically significant, $\chi^2(2) = 1.118$, $p = 0.572$. As seen in table 4, the proportion of those who have bought drugs on darknet markets is very similar to the total proportion.

Table 5

Rated issues with darknet markets by Swedish residents

	N	Min	Max	Mean	95% CI	% of participants who reported 1 or more
Finalize early	84	1	10	3.60	2.84 - 4.35	46.4
Variable purity	84	1	10	2.29	1.89 - 2.68	48.8
Unreasonable price	84	1	7	2.13	1.76 - 2.50	38.1
Wait too long	84	1	10	2.06	1.73 - 2.39	51.2
Product unavailable	84	1	10	1.94	1.52 - 2.36	29.8
None	84	1	10	1.86	1.28 - 2.43	9.5
Low purity	84	1	10	1.75	1.43 - 2.07	33.3
Lost money: volatile currency	84	1	10	1.74	1.41 - 2.06	31.0
Lost money: seizure, scam, theft	84	1	6	1.70	1.44 - 1.97	34.5
Overspending	84	1	10	1.60	1.20 - 1.99	14.3
Product not received	84	1	5	1.57	1.32 - 1.82	26.2
Work/fam/friends discover use	84	1	10	1.35	1.08 - 1.61	10.7
Product stolen	84	1	5	1.35	1.15 - 1.54	17.9
Customs seizure of product	84	1	5	1.31	1.15 - 1.46	21.4
Personal health harms	84	1	7	1.29	1.07 - 1.50	11.9
Caught by law enforcement	84	1	10	1.19	0.95 - 1.43	4.8
Other	84	1	10	1.11	0.89 - 1.32	1.2
Unexpected substance	84	1	5	1.10	0.99 - 1.21	4.8
Threats to personal safety	84	1	4	1.07	0.98 - 1.16	3.6
Identity revealed – doxxed	84	1	3	1.04	0.98 - 1.09	2.4
Physical violence	84	1	1	1.00	1.00 - 1.00	0
Blackmail	84	1	1	1.00	1.00 - 1.00	0

In table 5, the participants were asked to rate issues, which they or people they knew, had experienced from 1 (none of the time) to 10 (all of the time). The issues listed in table 5, were not highly rated, and only one reached a 3 out of 10 in the 95% CI. That was finalizing early, or paying before getting the product. Some of the 95% CI are quite wide. The issues that most people had some problem with (rated higher than 1) was *wait too long*, *variable purity* and *finalize early*.

Table 6

How important are the following motivations were in trying a research chemical over illegal drugs

	N	Minimum	Maximum	Mean	95% CI
Value for money	35	0	10	5.71	4.66 - 6.77
Being able to buy online	35	0	10	5.43	4.09 - 6.76
Other drugs unavailable	35	0	10	3.60	2.30 - 4.90
Less easily detected by drug screens	35	0	10	3.91	2.55 - 5.28
Less likely to be detected by sniffer dogs	35	0	10	3.03	1.66 - 4.40
I thought they were not illegal	35	0	10	2.83	1.50 - 4.16
Prefer effect to illegal drugs	35	0	10	2.14	1.11 - 3.18
Being able to buy from shop	35	0	10	1.57	0.38 - 2.76
They are better than illegal	35	0	8	1.43	0.72 - 2.14
Quality of other drugs was poor	35	0	9	1.40	0.52 - 2.28
I don't know how to get illegal drugs	35	0	10	1.23	0.37 - 2.09
I think they are safer	35	0	2	0.17	0.02 - 0.33
Valid N (listwise)	35				

Table 6 shows how important, participants find the following motivations, in trying a legal drug over illegal. The highest rated reasons were value for money, being able to buy online, other drugs unavailable, less likely detected by drug screening and less likely detected by sniffer dogs. When asked where they had bought it from (n=51), most had bought it from the internet (70.6%) or a friend (39.2%), but some had gone the classic way of meeting a dealer (19.6%), and some had bought it straight from a store (2%).

Discussion

What kind of people use darknet markets?

One of the aims of this paper was to get an image of the typical darknet market user. The participants of the survey, in many ways, do not fit the stereotypical image of what many think of when imagining a drug user. The level of education ($n=123$) of participants was quite high, 33% had studied at university or college level and had either a college certificate diploma, undergraduate degree or postgraduate degree. This is not bad, considering that a high proportion of the participants ($n=125$) were studying (49.6%) at the time. Not to mention that the majority are under the age of 27 (73%), which is the average age for earning the first university degree in Sweden (OECD, 2014).

What are they buying?

The main hypothesis was that non-mainstream drugs (including legal highs) that should be less accessible from regular street dealers would be more popular than mainstream drugs (MDMA, cocaine, cannabis and amphetamine). This was not seen, as table 1 shows. One of the things that were most surprising was the popularity of cannabis, given it often has a very strong odor and should be the substance most easily detected by customs or law officials. It was also surprising that cocaine (4.9%) which is a pretty popular drug worldwide, did not make the list. It could be that the country's history of amphetamine use, played a part, as the effect of the two drugs is similar in many ways. It was suspected that synthetic cannabis (all) (6.6%), would make the top 20 list, which it did not, since it seemed to have been so popular in Sweden in recent years (The Local, 2014).

The list contains many psychedelics, LSD was very popular (42.6%) as well as magic mushrooms (23%). There are no legal substances, as was expected since it is illegal being under the influence of illegal drugs (UNODC, 2007). The list does contain drugs, though, that the classic drug test does not test for (Smith, 2016). Psychedelics like the 2C drugs, that were first synthesized in the 1970s (Benson, 2015) and were legal in Sweden until 2002, when the first types of 2C drugs were banned (Reuterstrand, 2002). Or the NBOMe drugs, that were first synthesized in 2003 (Heim, 2004). They were legal in Sweden until 2013 (Åsberg, 2013). So it is likely that many of the participants bought NBOMe while it was still legal.

The main hypothesis, which stated that participants mostly bought non-mainstream drugs, does not stand. It seems like Swedish darknet users buy what they like, whether the regular street dealer sells it or not. It could be that they feel safer buying online, since they go this way, which is undeniably more complex. Table 2 shows first-time drug purchases. With the variety that these various darknet markets provide, it should be easier to try new drugs. It would therefore not be surprising if the top 20 list of first time drug purchases was a list of non-mainstream drugs. The list, however, was quite similar to the top 20 drugs purchased list. The five highest ranked drugs are the mainstream drugs, aside from LSD, which was in third place. Not to say that participants were not buying various non-mainstream drugs, for the first time through darknet markets, but the top five substances are common drugs. One explanation would be that those who use this method of buying drugs do so because they lack the connection to regular street dealers, or are afraid of getting caught. But as seen in table 5, they do not seem to lack the skills for buying illegal drugs on the street, as the 95% CI for this reason, for buying legal drugs, was rated 0.37-2.09 out of 10.

Since these darknet markets and the variety that comes with them, are relatively new and because younger people tend to be driven more by curiosity, the younger participants buy more non-mainstream drugs than older participants

In table 3 the darknet market users were divided into three groups. 16-20 year olds, 21-30 year olds and 31+ years. Overall the most popular drugs were similar, with cannabis and MDMA as the most commonly purchased. It was surprising to see how little interest the youngest group (16-20) showed amphetamine compared to the two older groups (21+). There are signs of a psychedelic trend going on with young Swedes who buy drugs through darknet markets. This was especially seen in the popularity of LSD. Another main difference was with the NBOMe drugs, who were quite popular with the youngest group (16-20), but barely made the list with the other two groups (21+). Other than that, the groups were quite similar, and it should not be stated that younger participants buy more non-mainstream drugs than older participants. However, since the data presented, is drawn from a purposive sample, and the number of participants was in the lower end with two of the three groups, the 16-20 year olds (n=33) and 31+ year old (n=18), all generalization must be made with caution.

Swedish darknet users do not have experience getting scammed when buying on darknet markets

Overall, the issues participants or someone they knew had experienced, rated from 1 (none of the time) to 10 (all of the time), were rated quite low. But keep in mind that anything over 1, means that there has been some problem with the purchases. Finalizing early got the highest rating, which got a 95% CI of 2.84-4.35. It does not mean that they have experience with being scammed, it could mean that they had an issue with paying beforehand because they found it uncomfortable. Research has shown that though people often find it uncomfortable, very few have bad experiences with it. On Silk Road, only 1.6% of those who finalized early (n=20.884) gave a grade that was 1 or 2 out of 5 in customer satisfaction (Christin, 2013). Since the 95% CI is wide, it cannot be ruled out that Swedish darknet users have some experience of getting scammed online, but again, the data presented is drawn from a purposive sample, and the results should be generalized with caution.

Difference in darknet market usage by different living areas

It did not point to any noticeable difference between living areas and darknet market usage. But the results were not statistically significant, so not much can be said. It can't be ruled out and would need further research before making any statements.

Swedish residents buy legal drugs because they are less likely detected by drug tests.

Since many of the confidence intervals overlap each other, it is hard to say which motivation were truly highest rated. Since a large portion of the users rated some of the reasons 0, the 95% CI is quite wide. Less easily detected by drug screening (2.55-5.28) was not as highly rated as expected, with the fairly common drug screening in Sweden and the illegality of being under the influence (UNODC, 2007). Many voted the drug screening reason 0 (34.9%), which means that many also rated it very high. A reason that seemed more important was the value for money (4.66-6.77). However, as the intervals overlap, it cannot be stated that there was a difference.

Conclusion

Since the Global Drug Survey is the first to gather such detailed data of this size scale. It was first and foremost interesting to get a description of the average darknet market user. Who on paper looks more like an ideal citizen, rather than a menace to society. As well, as to see descriptions of the buying habits of Swedish residents and reasons for choosing this way of buying drugs. Though the data is drawn from a purposive sample, it gives an interesting view of a formally unknown reality for many. There are some shortcomings, like the limited number of participants that had experience with legal high purchases and the limited number of participants in the age 16-20 and 31+.

It was expected that sales of legal drugs or drugs that are not tested on standard drug tests, would be more popular in sales on darknet markets than the classic drugs, given the legal environment in Sweden, This did not seem to be the case. It would be interesting to do further research on different buying habits, between age groups, as there isn't always the same drug trends going on. As well as to make a comparison between Swedish drug users in general and Swedish darknet users. There could be a significant difference between drug users who buy on impulse and those who go through the trouble of learning how to use the markets and plan their drug taking ahead of time. It should be noted that the given results are only about Swedish drug user who have used darknet markets, but not Swedish drug users in general.

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