

Instantly Hooked? Freebies and Samples of Opioids, Cannabis, MDMA, and Other Drugs in an Illicit E-Commerce Market

Journal of Drug Issues
2018, Vol. 48(2) 226–245
© The Author(s) 2017
Reprints and permissions:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0022042617746975
[journals.sagepub.com/home/jod](http://jod.sagepub.com/home/jod)



Isak Ladegaard¹ 

Abstract

Do drug dealers entice nonusers with free samples? Police, the popular press, and social media users say so, but crime researchers have found little support for this theory and argue instead that sample distribution is an unsound strategy for illegal market business. But what about in digital drug markets, where operational logics are based on sophisticated anonymization technology and reputation systems? The author collected data from a large e-commerce website for drugs over 305 days in 2014 and 2015 and documents that (a) drug dealers give away samples of all major substance categories and (b) sample distribution increases vendor sales for prescription drugs and opioid-based painkillers. To explore possible explanations of these findings, the author collected data from the market's online forum and analyzed 175 discussions (2,218 posts) about samples. Among the findings is that samples are preferably given to reputable review writers, or "drug critics."

Keywords

illegal markets, addiction, cybercrime, marketing, drug trade, cryptomarkets

Introduction

For nearly 100 years, the drug dealer has been portrayed as someone who is "pushing" products onto prospective customers (Coomber, 2003). In the 1920s, both the *New York Times* and an authoritative source on opium addiction stated that a common practice in drug markets is to give away free drugs to get people "hooked" (*New York Times*, 1924), or "addicted" (Terry & Pellens, 1928). Similar claims were made in the following decades, also after Coomber wrote about this in 2003. In 2016, for example, a drug prevention program official claimed that contemporary drug dealers use "free samples" as a "marketing" strategy. Anecdotal evidence was provided: Allegedly, an Arkansas dealer visited a former drug user in his home and gave him a free sample. "Naturally, [he] became a customer again" (Birkenshaw, 2016). In 2017, a Philadelphia police officer said that "dealers will occasionally give out samples to get the buyers to frequent them" (Farr, 2017). Social media has also perpetuated the pusher image. In September 2015, a Kentucky-based man posted a picture of colorful pills on Facebook and warned that "if your kids get these for halloween, it's not candy" (Bagwell, 2015). The message traveled overseas, including to

¹Boston College, Chestnut Hill, MA, USA

Corresponding Author:

Isak Ladegaard, Boston College, 140 Commonwealth Avenue, Chestnut Hill, MA 02467, USA.
Email: isak.ladegaard@bc.edu



Jackson, MS Metro Police Department
Police Station · 2,809 Likes · October 19 at 9:05pm · [View on Facebook](#)

[Like Page](#) [Share](#)

If your kids get these for Halloween candy, they ARE NOT CANDY!!!
They are the new shapes of "Ecstasy" and can kill kids through overdoses!!!
So, check your kid's candy and "When in doubt, Throw it out!!!"
Be safe and always keep the shiny side up!!!

2,325 Likes · 1,280 Comments · 17,266 Shares

[Like](#)

[Comment](#)

[Share](#)

Figure 1. Police warning: These are not Halloween candies.

South Africa, where a social media user shared the same picture and warned that a “deadly new drug” was given out at schools. Cape Town police investigated the issue, but quickly concluded that there were no specific cases of such drugs being distributed (Serra, 2015). The following month, a Missouri Police Department tweeted the same picture and wrote: “If your kids get these for Halloween candy, they ARE NOT CANDY!!! They are the new shapes of ‘Ecstasy’ and can kill kids through overdoses!!!” (Figure 1). The post was picked up by numerous media outlets

(e.g., Fox 13 News, 2015), but the veracity of the Halloween threat was questioned (e.g., Thump, 2015). The same police department now said the message reflected a “general warning” rather than a concrete threat, but the backpedaling did not stop the story. At the time of writing, the original social media post has been shared more than a million times. A similar story spread in 2017, when British media reported that four young teenagers had taken pink, teddy-bear-shaped ecstasy pills. The article, titled “CHILD PILL ALERT,” was illustrated with a stock photograph (Lake, 2017) that 5 months later appeared in the Facebook post of a woman in Moss, Norway. She warned that ecstasy was being offered to elementary school students: “Kids think these [pills] are cool and funny and are enticed to taste. This way, drug dealers make customers out of children and youth . . . WAKE UP NORWAY!!” Her post was shared more than 20,000 times in three days, and an online newspaper picked up the story. Interviews with four school principals, two police officers, and a school nurse failed to corroborate the rumor (Nordseth, 2017).

The logic of the pusher myth is that dealers have an economic incentive to get potential customers to sample their drugs, especially more addictive drugs such as opioids (Coomber, 2003). Once the prospective customer is “hooked,” he or she will start buying what the dealer is supplying and the marketing cost will be recouped (Coomber, 2003; Jacobs, 1999; Kaplan, 1983; Lindesmith, 1940). This is arguably a sound business strategy. The tobacco industry has some experience with youth-targeted and addiction-generating marketing (Pierce, Choi, Gilpin, Farkas, & Berry, 1998), including giveaways of cigarettes (Altman et al., 1996), and Philip Morris allegedly continues to offer free tobacco in the growing Indian market (Reuters, 2017). However, there are ample reasons to believe that the business model will fail in illegal drug markets. First, it takes time for new users to get addicted to drugs, even in the case of heroin (Coomber & Sutton 2006; Lindesmith, 1940). Second, drug dealers might be forced to withdraw from the markets on short notice, for example due to arrests or other problems, and cannot expect to stay in business long enough to profit from cultivated addicts. It would therefore be irrational for a seller of drugs to spend time and resources on potential customers. Instead, there are reasons to believe that drug sellers use considerably less pressure and inducement to market their products compared with sellers in legal markets (Kaplan 1983). Coomber (2003) is to my knowledge the only scholar who has published empirical data on the prevalence of samples in illegal drug markets. Drawing on interviews with convicted users and dealers in London and Sydney, he concluded that it is rare for dealers to offer samples of their drugs, and that the few exceptions are trusted customers, not unknown nonusers.

One possible reason there is scant evidence of drug dealers offering free samples to potential future customers is that much drug trade in the Anglo-Saxon world has moved from open to closed markets, which is to say that people now trade with friends and acquaintances, rather than street dealers (Andrade, Sifaneck, & Neagis, 1999; Bright & Sutherland, 2017; Coomber & Turnbull, 2007; Curtis & Wendel, 2000; Dorn, Murji, & South, 1992; Jacobs, 1999; May, Harocopos, Turnbull, & Hough, 2000; Parker, Aldridge, & Measham, 1998; Parker, Williams, & Aldridge, 2002). This social supply arrangement, which is often characterized by friendly ties between exchange partners, non-commercial motivations (Coomber & Moyle 2014), and even anti-capitalist ideologies (Sandberg, 2012) seems incompatible with the cynical theory that dealers create addicts to make money. As the organization of markets affects economic practices, it is possible that distribution of free samples is more prevalent in markets that are arranged differently from those in the literature above. And in recent years, it so happens that a new kind of drug market has emerged: the cryptomarket (Martin, 2014).

Cryptomarkets resemble e-commerce websites like Ebay, but are only accessible with anonymization software such as The Onion Router (Tor) and all transactions are done in cryptocurrencies, usually Bitcoin (Barratt, 2012). Market actors are also encouraged to encrypt communication (Ladegaard, 2017b). Law enforcement has in some cases circumvented such obstacles (Apuzzo, 2016), but as long as participants use available tools correctly, it remains

difficult for law enforcement to connect online activities to real-world identities (NSA, 2007; Van Hout & Bingham, 2013). Successful law enforcement operations over the years appear to be based on evidence accrued from human error (Christin, 2014), a view shared by market users (Ladegaard, 2017a).

Is it possible that dealers use samples to cultivate customers in cryptomarkets? Answering this question will generate knowledge of how drug dealers operate in large e-commerce markets, where they are able to connect and communicate anonymously and engage in a kind of impersonal trade that is difficult to organize in conventional drug markets (Arlacchi, 1998). Moreover, data on the prevalence, usage, and commercial effects of samples will add to the debate regarding cryptomarkets as facilitators of drug use that otherwise would not occur (Barratt, Lenton, Maddox, & Allen, 2016). This is a salient issue in the context of the North American opioid epidemic, which is driven by abuse of heroin, fentanyl, and prescription drugs like oxycodone (Kertesz, 2017), and now kills more people per year than traffic accidents (Rudd et al., 2016).

Changing Trade Practices

The predominant distinction between drug markets in the criminology literature is their level of openness. In open markets, dealers can maximize their customer access by selling to “strangers” and customers know where to find vendors, but both groups are vulnerable to policing (Eck, 1995). A study of a typical open market in the United States found that drug dealers lived close to the streets in which they worked. Dealers usually sold from street corners, to be easily visible to buyers and close to escape routes in case law enforcement appeared. High competitiveness between dealers suggested that they were not organized as gangs, but small groups of independent entrepreneurs (Duck & Rawls, 2012). Actors in open markets seek knowledge of the background of each other, but such information is difficult and costly to obtain, and many opt to keep trade within closed market networks, where people know each other directly, act through trusted intermediaries, or look for signals of insider status (Anderson, 1999; Arlacchi, 1998; Gambetta, 2009; Paoli, 2004). Research suggests that such closed markets dominate contemporary drug trade (Coomber & Turnbull, 2007; May & Hough, 2004; Parker et al., 2002). The central advantage of selling in closed circumstances is that the risk of attracting police attention is greatly reduced, but the opportunity costs are significant, as vendors are unable to pickup passing trade (Eck, 1995). Customers, meanwhile, can only choose between the products that “their” sellers have at hand (May & Hough, 2004).

Illegal markets are distinguished from legal ones by their failure to adopt impersonal forms and sophisticated communication and distribution methods. Only large organizations with access to military, political, and economic capital are able to operate on a large scale, for example, the Italian mafia (Arlacchi, 1998). However, drug markets have demonstrated a keen adaptability and responsiveness to changing market conditions (McSweeney, Turnbull, & Hough, 2008); sometimes in response to law enforcement operations (Guerette & Bowers, 2009), and also technological advances, such as in the 1990s, when the emergence of low-cost cellular phones supported the shift of drug dealing from street corners and into closed distribution networks (May & Hough, 2004). Recent innovation and dissemination of software solutions for e-commerce, for example, reputation systems for customer reviews (Tadelis, 2016), and verifications and payment systems (Sundararajan, 2016), have resulted in a newfound and transformative ability of strangers to connect, exchange, share information, and cooperate (Schor, 2016), also in illegal markets.

Cryptomarkets

Cryptomarkets connect individual buyers and sellers in online platforms for mail-ordering that looks and works much like conventional e-commerce websites. Besides legality issues,

cryptomarkets differ from legal platforms such as Ebay and Amazon in two important ways: All payments are done in digital currencies such as Bitcoin, which can be used without going through banks and conventional payment-processing networks (Meiklejohn et al., 2013), and Internet traffic is rerouted through anonymization systems such as Tor, which in simple terms make it very difficult for Internet service providers and law enforcement to connect online activities and real-world identities (Tor Project, 2017). This sophisticated setup enables large-scale, anonymous mail-order trade across the world. The pioneering market Silk Road had a monthly revenue of US\$1.2 million per month in 2012 (Christin, 2013), and a year later, US\$7.48 million (Aldridge & Décary-Hétu, 2014). Although law enforcement has targeted the markets, and has been able to shut down several of them, trade has continued in others (Demant, Munksgaard, & Houborg, 2016; Décary-Hétu & Giommoni 2017; Ladegaard, 2017a; Soska & Christin, 2015).

Buyers and sellers in cryptomarkets are guided by some measure of institutional trust. Available products are publicly reviewed by customers, much like Amazon's star-rating system, and people can thereby learn from the repeated games of other market actors (Akerlof, 1970; Reuter & Caulkins, 2004). This business climate, where the underlying technology provides anonymity (Barratt, 2012) and ratings guide customer behavior (Hardy & Norgaard, 2016), differs substantially from the conventional arrangement of illegal markets, where trade is largely kept within closed networks (Beckert & Wehinger, 2012). Thereby, one could expect market practices to change, and several studies suggest that it has. Customers report fewer problems with violence and drug quality in cryptomarkets than in closed and open markets (Barratt, Ferris, & Winstock, 2016), the convenience of e-commerce initiated drug use for some (Barratt, Lenton, et al., 2016), and customers have access to a wide range of substances, often of better quality (Van Buskirk, Roxburgh, et al., 2016), where key determinants for quality include purity, potency, and predictability of effect (Bancroft & Reid, 2016). Individual sellers, meanwhile, have access to an unprecedentedly large market. Worldwide shipment of drugs is not without risk (Décary-Hétu, Paquet-Clouston, & Aldridge, 2016), but many vendors do sell to multiple countries (Van Buskirk, Naicker, Roxburgh, Bruno, & Burns, 2016). Market actors monitor vendor behavior in active, public communications, for example, in forums and feedbacks on the market websites (Van Hout & Bingham, 2014), and dealers are thereby advantaged by having good customer service skills, well-written profiles, and good reputations via feedback (Tzanetakis, Kamphausen, Werse, & von Laufenberg, 2016) rather than having access to "muscle" (Aldridge & Décary-Hétu, 2014) and street capital (Sandberg, 2012).

In the context of these new opportunities and changing practices for market actors, I ask: Is it possible that dealers offer free or low-cost samples of their products, which they do not in conventional drug markets (Coomber, 2003)?

Mixed Methods

In earlier research, I had noticed that at least some cryptomarket items were labeled as samples. To explore this finding in a separate article, I decided to undertake what Creswell (2013) calls a "sequential explanatory strategy" for mixed-methods research. I first quantified the distribution of samples, and statistically measured the relationship between samples and other sales. After these steps, I was left with quantitative findings and several questions that I could address with qualitative data (e.g., who can buy samples?). I searched for conversations pertaining samples in Agora's discussion forum; reviewed, coded, and analyzed them, and returned to the quantitative data for additional analyses to support the qualitative findings that this process had produced. For example, I found in the forum conversations that some sellers used samples to introduce themselves in the market. Back in the market data, I measured if samples were indeed sold in the early stages in a seller's time in the market. Overall, the weight of the analysis was on the quantitative data, but the qualitative data were invaluable in the interpretation and data validation.

Table 1. Descriptive Statistics.

	Vendors (N = 2,116)				
	Mean	Median	Minimum	Maximum	Sum
Vendor rating	96%	99%	30%	100%	—
Days in the market	136	305	1	305	—
Revenue	US\$36,168	US\$8,236	US\$1	US\$1,756,267	US\$76,531,266
Sales (incl. samples)	218	71	2	4,619	460,552
Sale of samples (<US\$50)	4.01	0	0	1,053	10,327
Sale of samples (<US\$10)	1.63	0	0	240	5,106

Data Collection

I collected trade data from Agora, which was among the three largest available markets when I started this research project in late 2014 (Soska & Christin, 2015). First, I created Python web scraper programs with BeautifulSoup (Richardson, 2007). The programs downloaded and extracted data on all available items in the market and were executed every day, in the period November 4, 2014 to September 6, 2015, a little more than 10 months. Of particular importance was product feedback, which customers were required to enter upon finalizing a transaction in the cryptomarket website. These data points were used as proxies for transactions, like other scholars have done before me (e.g., Aldridge & Décarie-Hétu, 2014; Christin, 2013). I converted bitcoin-denominated prices to dollars by matching historic exchange rates with the timestamp of the downloaded files. As is fast becoming standard practice for quantitative cryptomarket research, I used the median price for each unique item rather than mean price, because vendors sometimes increase the price of their product when it is unavailable. I also deleted duplicates, based on item title and vendor username, and manually verified that items were correctly categorized. When they were not, which was often the case, I made corrections with regular expressions. The resulting dataset numbered nearly half a million transactions by 2,365 sellers. After excluding sellers who did not sell drugs, the tally was reduced to 2,116.

Next, I searched through all item titles for variations of the words “sample,” “promo,” and “freebie.” This resulted in 7,782 transactions. Several were removed as the pricing and description did not match my definition of a sample, which was small and cheap (less than US\$50.50), and “doses” described as an opportunity for customers to test the drug before placing a substantial order. For example, I removed items like “3 LB Sample Pack Blackberry Kush, Cheese, Blue Dream [cannabis],” priced at nearly US\$6,000. The dataset of samples was trimmed to 868 unique item listings. One could argue that items priced at nearly US\$50.50 are not “samples” and certainly not “freebies,” but to include samples of expensive drugs such as cocaine, which were the priciest samples, I decided that US\$50.50 was an appropriate cutoff point. Moreover, revenue from sales in this low-cost category amounted to less than 0.25% of the total revenue for all major drug product categories discussed in this study, which suggests that they were distinct from typical items in the cryptomarkets. Nonetheless, I created a second variable for free and nearly free samples, that is, items priced at less than US\$10.50. Descriptive statistics are listed in Table 1.

Regression Models

A review of residual plots of independent and dependent variables suggested that linear regression was appropriate for testing the relationship between sample distribution and sales, but there were problems with kurtosis and skewness. The culprits were several influential outliers. Three observations were removed: one because all sales were marked by customers as unfulfilled (i.e., the seller allegedly did not ship any of the ordered products), and the other two because they had

Table 2. Examples of Drug Samples.

Nearly free samples (<US\$10)	Price	Category
Free 1 gram sample of the best weed on the darknet!	US\$0.10	Cannabis
Original STILNOX Sanofi (known generics are as follows: Ambien Zolab Zolpiderm) FREE SAMPLE 1 PILL	US\$0.05	Prescription
LSD Blotter 125ug (Free Sample)	US\$0.10	Psychedelics
oxycodone 80mg—FREE SAMPLES	US\$1.00	Opioid-based painkillers
3 Fentanyl Blotters—500mcg-SAMPLE	US\$1.50	Opioids
*US\$1.00 PROMO*Acetyl Fentanyl in Saline Nasal Spray 150mg	US\$1.00	Opioid-based painkillers

zero nonsample sales, which indicates that they never really got started. Because I could not justify the removal of a few other influential observations, I decided to perform robust regression analyses, which are highly resistant to overly influential observations while being nearly as efficient as least squares regression (Andersen, 2008). To control for the location of the 2,116 vendors, I created three regional variables: North America (982), Europe (780), and Oceania (264). The vendors who were located elsewhere (90) did not make up distinct geographic areas and were therefore coded as “Other.” I log-transformed positively skewed variables, and executed all as both robust regressions and ordinary least squares models for comparison. Robust regressions on vendor sales are presented in tables, whereas additional regressions on revenue are only discussed in the text, to save space. I interpret the regression results as percent change of sale/revenue when the independent variable—distribution of samples—increase by $x\%$ (I chose 10%, for clarity), as is standard practice for “elastic” models, that is, models where independent and dependent variables have been log-transformed (e.g., Benoit, 2011).

Qualitative Analysis

Why did dealers offer samples of their products? To answer this question, I collected discussion threads from Agora’s forum website. Unlike the market data, I initiated these downloads only 3 times in the 10-month data collection period. This means that all posts and threads that were deleted by users or moderators between the data collection points were not captured by this method. To compensate for the potential loss of data, I included Agora forum data made available by Branwen (2015), which covers dozens of time points and 169 GB of text. After extracting data from the assembled HTML files I created a subset of all threads that included at least one of the keywords that were used to find samples in the market data. This resulted in 918 unique discussion threads (e.g., “*FREE SAMPLES* of our fantastic quality weed”) which had a total of 9,427 posts. To render the data manageable for manual content analysis, I randomly picked 25 threads (and all their responses), for each drug category emphasized in this study, which amounted to 175 threads and 2,218 posts. The number “25” was admittedly an arbitrary choice, and I was prepared to increase the sample size, if necessary, but I reached data saturation after reading through about two thirds of the dataset.

Next, I drew on ethnographic research methods and reviewed the material in sequential steps of open and focused coding (Emerson, Fretz, & Shaw, 2011). Specifically, I read all posts, line by line, and tried to capture as many ideas and themes related to the subject matter as time allowed, and wrote down potential codes for more detailed analysis. Quotes that were relevant to my research question were copied to a separate document for more focused coding, and I frequently returned to sections of particular interest in the original dataset to compare initial codes and test them against the original data. I gave all quoted vendors additional pseudonyms and fully anonymized customers. Quotes were only minimally edited for clarity, to preserve author style.

Table 3. Drug Categories: Total Sales and Revenue (N = 305 days).

	Cannabis	Stimulants	Prescription	Opioids	MDMA	Psychedelics
Sales (incl. samples)	139,300	75,600	70,900	27,700	65,500	56,000
Revenue	US\$23.3 million	US\$15.6 million	US\$8.2 million	US\$3.7 million	US\$17.4 million	US\$5.3 million
Sales of low-cost samples (<US\$50)	2,222	2,451	575	537	1,361	636
Sales of nearly free samples (<US\$10)	888	630	462	89	641	299

Sale of Samples

I found items described as samples or promotional offers in all major drug categories in the Agora marketplace. In many cases, the samples were presented as “free,” although no single item had a cost of zero, but rather a low, inconsequential price, in part because it was not possible to set nonpositive prices in the marketplace. Often, item descriptions suggested that the samples were priced low relative to its market value, and depending on whether shipping was included or not, sometimes amounted to a cheap, discounted deal, rather than a freebie (Table 2). Samples priced below US\$50.50 are henceforth referred to as low-cost samples (median price US\$12.00), whereas nearly free samples—a more conservative sample category—refer to samples priced below US\$10.50 (median price US\$4.01).

Vendors of cannabis, MDMA, and stimulants sold more than 1,000 low-cost and nearly free samples per category in the 10-month data collection period, whereas vendors of opioids, prescription drugs, and psychedelics sold hundreds of samples per category (Table 3). The proportion of samples to other sales was highest for stimulants (3.24%), followed by MDMA (2.08%), cannabis (1.59%), opioids (1.45%), prescription drugs (1.14%), and psychedelics (0.85%). One possible explanation of the high sample-to-sales ratio for stimulants is that the high price of cocaine and other drugs in that category makes customers reluctant to place large orders without having a sense of the product quality. For opioid drugs, the sample-to-sales ratio suggests that vendors did not exploit the perceived addictive characteristic of these drugs (i.e., to get users “hooked”). In the context of the ongoing opioid epidemic in North America, it is nonetheless sobering to note that low-cost and practically free doses of opioids can be ordered through cryptomarkets such as Agora. The delay between placed orders and delivery might discourage serious addicts from market participation (Van Hout & Bingham, 2013), but many vendors offered next day delivery, and it is entirely possible that seriously addicted opioid users ordered from Agora to supplement alternative sources, for example, doctors who are reluctant to increase painkiller prescriptions beyond certain limits, or after prescription monitor programs are introduced to control “doctor shopping” (Pradel et al., 2009).

Regression Results

For most categories, distribution of samples did not increase other sales, or vendor revenue, but there were two exceptions: prescription drugs and opioid-based painkillers.

In the prescription-drug category, which excludes opioid-based painkillers, the relationship between sample distribution and sales was positive and significant (Table 4). A 10% increase in sales of nearly free samples increased a vendor’s sales in the same product category by 2.40%. A 10% increase in sales of low-cost samples produced a 3.40% increase. The relationship between distribution of samples and individual vendor revenue—not shown in tables due to space constraints—was positive, but not significant. However, when I exclusively looked at North America,

Table 4. Regression Results: Do Individual Vendor Sales of Nearly Free (<US\$10) and Low-Cost (<US\$50) Samples Increase Individual Vendor Sales in the Same Categories?

	Psychedelic sales		Stimulant sales		MDMA sales		Cannabis sales		Opioid sales		Opioid painkiller sales		Prescription sales	
	Nearly free samples	Low-cost samples	Nearly free samples		Low-cost samples		Nearly free samples	Low-cost samples	Nearly free samples	Low-cost samples	Nearly free samples	Low-cost samples	Nearly free samples	Low-cost samples
			Nearly free	Low-cost	Nearly free	Low-cost								
Sample sales	-0.195	-0.141	-0.131	-0.047	-0.156	-0.078	0.078	0.067	-0.165	0.044	0.231	0.264*	0.240***	0.340***
Rating	2.662***	2.637***	1.453***	1.437***	0.582	0.542	1.256***	1.195***	-0.307	-0.393	1.067*	1.060*	0.568	0.683*
Marketdays	1.081***	1.083***	0.967***	0.969***	1.028***	1.032***	0.960***	0.970***	0.955***	0.977***	0.825***	0.822***	0.898***	0.890***
Europe	1.274***	1.299***	0.539***	0.549***	1.176***	1.146***	1.392***	1.451***	1.176***	1.131***	0.327	0.316	0.316	0.316
North_America	1.415***	1.458***	0.602***	0.653***	0.854***	0.829***	1.290***	1.363***	1.487***	1.428***	0.527	0.525	0.27	0.229
Oceania	1.178*	1.239*	0.207	0.251	0.614*	0.609*	1.234***	1.313***	1.178***	1.174***	-0.001	-0.022	0.01	-0.03
Constant	-2.282***	-2.348***	-0.787***	-0.861***	-1.645***	-1.672***	-1.519***	-1.643***	-1.925***	-1.822***	-0.813	-0.799	-0.526*	-0.771
Observations	365	585	585	585	508	508	791	791	268	268	278	278	512	512
R ²	.519	.518	.484	.468	.471	.467	.465	.468	.418	.429	.404	.406	.422	.435
Adjusted R ²	.511	.51	.479	.462	.465	.46	.461	.464	.405	.416	.39	.393	.415	.428
Res. SE	1.085	1.092	1.183	1.211	1.175	1.184	1.178	1.181	1.172	1.172	1.069	1.063	1.166	1.148
(df = 358)	(df = 358)	(df = 578)	(df = 578)	(df = 501)	(df = 501)	(df = 784)	(df = 784)	(df = 261)	(df = 261)	(df = 271)	(df = 271)	(df = 505)	(df = 505)	(df = 505)

Note. Reference for region categories is "other", log-transformed variables = dependent variables, sample, rating, marketdays.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Europe, and Oceania, and excluded all other countries, the relationship between distribution of low-cost samples and revenue was significant ($p < .05$): A 10% increase in distribution of samples produced a 2.46% increase in revenue (not displayed in tables, available upon request).

I put opioid-based painkillers such as Oxycodone, Tapentadol, and Tramadol in a separate category—drawing from both opioids and prescription drugs—as they are highly relevant to the ongoing opioid epidemic in the United States. Distribution of low-cost samples of opioid-based painkillers was a significant predictor of increased sales. A 10% increase in sales of low-cost samples increased other sales of opioid-based medicine by 2.64%. Samples of opioid-based painkillers were also positive, significant predictors of vendor revenue. A 10% increase in distribution of nearly free and low-cost samples increased vendor revenue in the same category by 4.47% ($p < .001$) and 4.71% ($p < .01$; not displayed in tables, available upon request).

Purpose of Samples

Market Introductions: Hello, I am a new vendor here

Many vendors who offered nearly free or low-cost samples were newly registered. Vendor QualCoke, for example, introduced himself in a forum thread titled “Cheap samples: Flakes cocaine, MDMA, Heroin”:

QualCoke: I'm a lucky guy who got to know some people and now can you offer you high quality products for low prices . . . I will start with samples of the following products: flakes cocaine, heroin #3, MDMA.

QualCoke: Not much people seem to be interested what could be the reason?

QualCoke: My coke is excellent you should try it.

Customer_1: I always do it with my girl and only 1 sample per person so no point till I can order half a gram or something.

QualCoke: You can take 2×0.2 g no problem.

Customer_1: I'll take the 2 samples for now if that's cool still?

In a similar thread titled “Cocaine flake samples purity 87%,” vendor Nero offered cocaine samples:

Nero: Just setting up shop please apply here and I can direct you to the samples on my page will be an incredibly small fee like 5 p or something. U.K. only.

Nero: Wow no one wants coke samples for 5 p [less than \$0.10].

Nero: Any experienced samplers on the forums out there? Looking for reviews please.

Customer_1: I've done reviews including reagent test reviews for various products for some of the biggest vendors.

Customer_2: I'm interested.

Customer_3: I'm in the UK and very interested in trying a sample!

QualCoke and Nero noted that distributing samples was harder than expected, but both connected with customers in the end. Vendors also gave away samples to reintroduce themselves following migration from other cryptomarkets. FlyingMD introduced himself/herself as a new Agora vendor with past experience from four other markets:

FlyingMD: Hello, I am a new vendor here with past experience selling on BMR Utopia Sheepmarket and Atlantis. I will be giving away free MDMA samples you only pay for the shipping. . . The [normal] price for the MDMA is: 1g €16, 5g €75 . . . EVERYTHING will be packed with the best stealth possible.

Customer_1: Good price.

FlyingMD: Thanks we try to be the cheapest here so we can get some credits.

FlyingMD: There are still 9 samples left be quick.

Customer_2: Would be happy to take a sample of this and write a review but could you tell me what weight the sample is?

FlyingMD: The sample is 0.2 gram.

Cryptomarket trade continues after big markets are shut down (Soska & Christin, 2015), presumably as vendors migrate to other markets in which many customers are unfamiliar with them. Agora had more than 2,000 sellers at its peak, and vendors like QualCoke, Nero, and FlyingMD sold nearly free and low-cost samples to carve out a market share for their operations.

Market data support the claim that new vendors are more likely to offer samples than established vendors. Nearly free samples were distributed to customers a median of 34 days into a vendor's market career, in the 10-month data collection period. For low-cost samples, the median was 64 days. For sales of nonsamples, the median was 119 days.

The Drug Critic: This vendor has serious potential if he keeps it up

Low-cost and nearly free samples were sold through the market website and announced in the discussion forum, where vendors also detailed their terms and conditions, if any. In the excerpt below, vendor RealPharma offer samples of oxycodone, an opioid-based and frequently abused painkiller medication (Butler et al., 2013):

RealPharma: We are giving away 10x free 100mg Oxycodone samples for feedback on the forums and feedback on our Agora account. Please make sure before purchasing that you are willing to consume on arrival and leave detailed feedback to get us going. 100mg is a good amount for a sample so please put in the bit of work for us to do the favour on your side.

The promotions are “free,” but RealPharma expects samplers to “consume [the pills] on arrival” and do “a bit of work” by writing “detailed feedback.” Reviews on the space-constrained market website are short—usually about the length of a Twitter message—whereas reviews in the forums can be lengthy and are often embedded in active discussions with customers and vendors. Customer reviews of RealPharma’s oxycodone samples, for example, were posted in a dedicated review thread, and among more than 50 comments in the original sample thread:

RealPharma: Your sample went out in the morning Customer_1.

Customer_1: Thanks mate that's excellent.

Customer_1: Mine arrived promptly . . . I've taken 25mg oral. Will report back later. Thanks man.

RealPharma: Please remember that Oxycodone is a slow release chemical. Also buy some scales to weigh out your doses rather than estimating your doses out.

RealPharma: All samples sent out.

Customer_1: I've done the whole 100mg mate . . . U'll get a review when I'm fit for it.

Customer_1: I'll post a copy here of what I'll put on my vendor review thread: . . . Seller was very quick to send (we chatted at 7am he'd sent by 11am) so prompt there, the package arrived less than 24 hours later . . . Inside the letter (crafty by the way) was the sealed foil wrap bit of a nightmare to cut open and not lose anything but got the sample all out licked the foil wrap and it weighed up. At that point I started with a 25mg cap and a 10mg line 20mins later. Went for a walk in the sun never had much effect off it . . . other than a kind of peacefulness from the initial dose so I redosed another 25mg cap and had another line

... Still lacking the punch I emptied the last capsule I had left out and sniffed half up each nostril. After this I was fucked ... Stealth 5/5 Comms 6/5 if I could Product 5/5. This vendor has serious potential if he keeps it up. Peace guys.

RealPharma: Thanks for the feedback. Is it worthy of being in your review thread?

Customer_1: It already is mate.

RealPharma advised Customer_1 on how to use the product (“Oxycodone is a slow release chemical . . . buy some scales to weigh out your doses”), hid the product well, and shipped it shortly after he received the order. Customer_1 fulfilled his/her a part of the contract. As per RealPharma’s request, he or she consumed the drug “on arrival” to get his/her review in quickly, and even wrote the full review while experiencing the drug’s effects. As is typical for reviewers, he or she assessed product quality, customer service, delivery speed, and packing.

Review writers arguably represent a role that does not exist in conventional drug markets. Recreational drug takers have long shared “experience reports” online (e.g., Davey, Schifano, Corazza, Deluca, & Psychonaut Web Mapping Group, 2012; Halpern & Pope, 2001), and like such reports, cryptomarket reviews contain information about physiological and psychological experiences and consumption methods, but cryptomarket reviews also assess vendors and products that are directly accessible, at least by those who are located in a region the vendor ships to. Reviews build seller reputation and help customers make more informed decisions, like how film journalists connect potential moviegoers and the cinema industry, “drug critics” and their product sampling supports market efficiency and stability.

Sample Hunters: There is going to be one in every crowd that ruins it for everyone

Vendors’ preference for “established customers” who have been “active in forums” suggests that although samples are handed out for promotional purposes, vendors are not trying to get inexperienced users “hooked.” On the contrary, some vendors explicitly eschew addicted customers. In a thread titled “30mg oxycodone roxycodone samples . . . NOT,” vendor Ghost denounces “junkies”:

Ghost: I will not ever give out any free samples anymore because some of the junkies have taken advantage and will not ever probably do them again. Just saying thanks everyone who’s actually about the business and not the freeloaders just trying to score their fix.

Customer_1: Ghost is legit as fuck. No free samples required.

Customer_2: Haha I remember helping Ghost out with his PGP exactly one month and 7 days ago. You’ve grown a lot my friend. Keep up the good work!

Ghost: Yes you all need to thank Customer2 for teaching me a couple things nice to see you old friend!!

Customer_3: Karma [to you] for your previous generosity mate shame people spoil it.

Customer_4: That’s sad but it’s like everything else in this world. There is going to be one in every crowd that ruins it for everyone. And of course junkies ruin a lot of shit for everyone anyways.

Customer_5: I can honestly say that ghost is the best roxi dealer I have EVER dealt with.

Ghost created a separate thread to express his frustrations with “freeloaders” who doesn’t care about “business” and only tries to “score their fix.” Customers compliment the vendor’s business practices and condemn those who “ruin it for everyone” by selfishly exploiting the availability of samples. The collective rejection of “junkies” suggest that both vendors and customers view samples as means to increase business and produce market stability and want to avoid a tragedy of the commons. The market norm is that heavily discounted items are not to be exploited by customers, and vendors do not seek out addicts for future profits, but actively shun them. Searches

for “sample hunter” and related keywords in the full corpus of Agora forum threads yield several complaints about similar opportunism.

Repeated Games: You can easily kill yourself with this stuff. Or you can be smart and have a good time!

Market actors play “repeated games” to mitigate the intrinsic insecurities of drug markets. For example, buyers who are unable to assess the quality of a product before it’s purchased might make several purchases until they have established a reliable source (Reuter & Caulkins, 2004). In cryptomarkets, actors play repeated games both individually and collectively. That is, they try out each other, and they learn from exchanges that are documented in reviews and forum discussions. Samples are low-cost introductions or invitations to such games. In the edited thread below, vendor Phat_Pharma introduced himself/herself by offering free samples of the highly potent drug fentanyl. Like many others, he or she would only send samples to “people with experience and good [market] stats,” that is, people who have purchased drugs in the same marketplace. In this case, actors noted that a different kind of experience is warranted to try Phat_Pharma’s products.

Customer_1: What is fentnayl?

Phat_Pharma: It’s an opioid.

Customer_2: What are some ROAs [routes of management] for this?

Customer_3: It looks like oral is way to go with this (although I’m sure snorting would work too).

Phat_Pharma: If you guys do not know what it is or how to use it please do not try it! It is dangerous stuff and it’s pure.

Customer_4: I grabbed up a sample. I will start a review thread once I receive and try it out!

Phat_Pharma: Good to see you buying again Customer_4.

Phat_Pharma: I sold out early this morning.

Cusstomer_5: I received my order 6 days after being marked shipped and that included the weekend . . . Stealth needs improvement in 1 specific area and I think Pharma knows what that is. If you don’t please send me a PM [personal message] and I’ll be happy to share the info . . . Product is fucking amazing. I insufflated a tiny quantity (1.5mg) and got a VERY nice buzz . . . Fucking LEGIT DUDE!!! 10/10 . . . My clocks are not precise enough to have measured whether the sample as advertised was on point (they only go to mg). But—it certainly looked like .01g (Scales were reading .01g) . . . From what I’ve seen from you I hope you stick around.

Customer_4: OMG dude you just eyeballed a tiny little line of pure fent? Lol do you know dangerous that is? The difference between 200ug’s and 1 mg is negligible to the naked eye but it’s also the difference between life and death! The best thing to do with Fent HCL is to make a solution you can make one for spraying in your nose . . . ANYONE HAS ANY QUESTIONS REGARDING FENT HCL AND DOSING OR ANYTHING AT ALL message me please. You can easily kill yourself with this stuff. Or you can be smart and have a good time!

Cryptomarket actors learn from the milieus they operate within, much like how people learn drug consumption (Becker, 2008), practical skills (Anderson, 1999), and attitudes toward the law (Sutherland, Cressey, & Luckenbill, 1992). In the previous section, we saw that the vendor Ghost had learned how to encrypt information from a customer, and in the excerpts above, Phat_Pharma and Customer_4 educated market actors on the dangers of fentanyl. The high risks involved in playing “repeated games” with potent and lethal drugs are sobering. Actors might be “experienced”

market users and still obtain nearly free or low-cost samples of drugs that they are unfamiliar with, and thus they might be seriously harmed from the first round of a game. The inadequate knowledge of users and absence of safety regulations arguably make fentanyl much more dangerous than it would be if administered under controlled circumstances.

Regression Results: Pharmacy-Grade Quality?

Sellers of opioid-based painkillers and other prescription pills were like all others in that they offered samples in exchange of reviews to gain market share. But unlike in other categories, sample distribution actually increased sales.

One possible explanation is that prescription pills are either pharmaceutically produced, that is, of near-perfect quality, or they are manufactured by an amateur, for example, the dealer or her wholesale dealer. That is, prescription pills in cryptomarkets are of highly variable quality. Assessing product quality is a problem in all drug markets, for all product categories, but the difference between Food and Drug Administration-approved, professionally manufactured drugs and the alternative is particularly salient. Cocaine sellers, meanwhile, might sell samples of high-purity cocaine and “cut” or adulterate the rest to profit from the increased quantity. It is difficult for vendors of prescription pills to do this in the same way. Studies have found that drug adulteration is much less common than what buyers and sellers think (Coomber, 1997), but it is the subjective risk of receiving a low-quality product that affects purchasing behavior. With samples, vendors can confirm that they have access to “pharmacy-grade” drugs. Pills are also perfectly dosed, so a consumer of one sample pill will have a relatively good idea of what she’s ordering. Moreover, the market value of a single user dose of prescription drugs is on average lower than one dose of more expensive drugs such as cocaine, and the opportunity cost of giving away, say 30 one-pill samples of xanax, is lower than the opportunity cost of giving away 30 0.25g doses of cocaine. Pills are also easy to pack and ship.

ThreeKings is one of many dealers who offered “pharmacy-grade” samples:

ThreeKings: We'd like to generate new happy customers and get quality feedback therefore this offer: Valium 4 × 5MG [or] 4 × 10MG Oxycodon . . . EU/UK 6 dollars . . . 1 order per customer.

Customer_3: Hi because the oxy have no markings whatsoever I am wondering where they are from? Do they have apap or acetaminophen? I am a little hesitant because of this. Do you have the original packaging maybe?

Customer_4: The oxycodon pills arrived fast domestic stealth was ok.

ThreeKings: They are Dutch Pharmacy grade no import. We have decided to ship without blister package to lower any issues since every blister is numbered . . . Dutch non import pharmacy products are usually non-branded.

Customer_4: I've taken three of these white unmarked pills over an hour and a half ago and absolutely nothing has happened.

Customer_2: Did you crush up the pills? One thing I'd like to hear from the vendor is whether or not they're controlled release tablets.

Customer_4: So I am now definitely experiencing effects although I am not quite sure how I would describe them. There is no real euphoria . . . Vendor is it possible these are 5mg and XR [extended release]? Reassure all of us and just snap a quick picture of the blisters all we'd need is the substance name and strength.

ThreeKings: The Oxycodon is TIMERELEASE and 10mg! If you want a full effect crush them . . . and take them on an empty stomach. I would really want some to review that takes them properly there is no way to get a good review if someone expect such a high from 10mg time releases on a full stomach.

Customer_3: ThreeKings have been so friendly to send me a picture of the packaging. It's from Sandoz and Lannacher and definitely TIME-RELEASED. So crush that shit up . . . I took two which I completely ground up with a mortar and ingested them with some water on an empty stomach. After about 30 minutes effects set in and they were not disappointing. The whole world became covered in a slight haze of joy . . . Falling asleep was an amazing experience filled with what I would dub "conscious dreams" the type not unlike those you get after a night of XTC . . . I do apologize for doubting the quality of the product.

Customers were interested in the samples of oxycodone and valium, but unsure of the product quality. They asked the vendor to verify that the pills were manufactured by a pharmaceutical company. One customer reported underwhelming effects after taking "three of these white unmarked pills" and cordially expressed dissatisfaction. The vendor replied that the cause of milder-than-expected effects were due to mismanagement: The pills, he or she wrote, will only produce "a high" if they are "crushed" and taken on an "empty stomach." The vendor also shared pictures of the original wrapping of the pills with one customer, who reported back that the oxycodone sample was manufactured by German and Austrian pharmaceutical companies.

Discussion

Journalists, law enforcement, and social media users spread anecdotal evidence and unconfirmed reports of drug dealers offering free drugs to nonusers. This strategy arguably makes sense from a pure business perspective, as samples are distributed for such purposes in legal markets (Bawa & Shoemaker, 2004). Tobacco companies, for example, give away free cigarettes to instill smoking habits in potential customers (Altman, 1996). However, interviews with drug users and sellers show that drug dealers very rarely give out samples, and if they do, only to known customers (Coomber, 2003). When I started to work on this article, it was not known if this was also true for digital drug markets. I found that in Agora, low-cost and nearly free samples of drugs were common. In the period November 4, 2014 to September 9, 2015, vendors sold thousands of low-cost and nearly free samples.

Dealers announced low-cost and nearly free samples in the market forum to introduce themselves and their businesses. In some cases, vendors were new to the digital underworld and sought to cultivate a customer base. In other cases, vendors were well-versed in cryptomarket trade, but had recently immigrated from markets that were no longer available, for example, due to law enforcement operations. The low-cost and nearly free samples were typically offered in limited quantities, and in exchange of reviews. Customers with a documented history of forum participation and review-writing were prioritized over new, unknown customers, and "sample hunters" and "junkies" were eschewed by vendors and customers alike, for their disrespect of market norms of cordial and reciprocal relations. Many vendors preferred to distribute samples to established reviewers, who make up a role that is not found in other drug markets: the drug critic. Through critics, dealers can demonstrate product quality, adequate packing methods, shipping speed, and customer service, all of which are markers of a good dealer (Van Hout & Bingham, 2014).

Vendors and customers who sold and bought low-cost and nearly free samples partook in repeated games at reduced risk. Vendors, who are likely to make mistakes at the early stages of their market endeavors, interacted with customers who presumably had lower expectations than in cases where they pay full prices. Vendors also learned to align their operations with market norms. Customers, who would reasonably be wary of new vendors who had yet to prove their trustworthiness, got to play a low-cost round of what might be a repeated game.

Possible explanations of the positive and statistically significant relationship between sample distribution and increased sales of prescription drugs and opioid-based painkillers include that pills are easy to pack, professionally dosed, and that the drugs are either of top “pharmacy-grade” quality or of subpar manufacturing. Besides the case of cannabis, where medical marihuana is available, the quality gaps are arguably narrower in other categories, or at least harder to measure. In the case of prescription drugs, the pills are either pharmacy-grade or they are not. If a vendor is able to demonstrate that he or she has access to the former, customers might decide that future purchases will be of the same quality.

The prevalence of opioid samples is an important finding as opioid addiction is producing undeniable social harm in the United States and other parts of the world (Birnbaum et al., 2011; Rudd et al., 2016). Customers have likened the discovery of cryptomarkets to feeling like a “kid in the candy store” (Barratt, Lenton, et al., 2016), which suggests that users not only buy their preferred drugs but are also willing to try unfamiliar products, and it is possible that some of them come back for more. However, because customer identities were anonymized by the Agora market, it is not possible to estimate individual purchasing patterns over time, for example, to illuminate whether people get addicted through the availability of free opioid samples in markets like Agora. In the absence of such evidence, we don’t know to what degree opioid customers use Agora to supplement or replace other sources of supply, or “discover” opioids through cryptomarkets. In surveys, cryptomarket users report having other sources (Barratt, Ferris, & Winstock, 2016), and studies suggest that many opioid users formed their addiction by legal means, for example, as medical professionals moved from underprescribing opioids in the 1980 to overprescribing them since the 2000s (Atkinson, Schatman, & Fudin, 2014; Bicket, Long, Pronovost, Alexander, & Wu, 2017). I note this to avoid falling in the same trap as the media reports referenced in the beginning of the article. Nonetheless, the previously undocumented availability of nearly free drugs warrants further attention.

Conclusion

Samples are rare in conventional drug markets (Coomber, 2003), but were common in the large cryptomarket Agora, where sophisticated security software and reputation systems fostered anonymous e-commerce. Dealers distributed thousands of low-cost and nearly free samples, in all major product categories, and they were notably transparent about their intentions to rake up reviews, cultivate customers, and increase trade. This businesslike approach to drug trade is contrary to the relational economics that are characteristic of trade in closed in-person markets (Beckert & Wehinger, 2012), but conversations about samples were earnest, friendly, and respectful in tone, and buyers who failed to reciprocate low-cost or nearly free samples with reviews were shunned for “ruin[ing]” the market “for everyone.” One interpretation of this is that actors seek to establish friendly ties with future-exchange partners because they prefer to trade with people they trust, as in other lemon markets (Akerlof, 1970; DiMaggio & Louch, 1998). Another interpretation is that actors partake in a community of commerce: Customers and vendors have clear, instrumental goals, but they also want to support and strengthen the fragile structure of their preferred market. Sample sales are low-risk exchanges that foster social and economic relations, educational game-playing, and reproduce market roles.

Acknowledgments

I would like to thank Wen Fan, Xiaorui Huang, Michael Tempone, and William Attwood-Charles.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Science Foundation [#1702919].

ORCID iD

Isak Ladegaard  <https://orcid.org/0000-0001-9480-551X>

References

Akerlof, G. A. (1970). The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 488-500.

Aldridge, J., & Décaray-Hétu, D. (2014). *Not an "Ebay for drugs": The cryptomarket "Silk Road" as a paradigm shifting criminal innovation* (SSRN Scholarly Paper No. ID 2436643). Rochester, NY: Social Science Research Network.

Altman, D. G., Levine, D. W., Coeytaux, R., Slade, J., & Jaffe, R. (1996). Tobacco promotion and susceptibility to tobacco use among adolescents aged 12 through 17 years in a nationally representative sample. *American Journal of Public Health*, 86(11), 1590-1593.

Andersen, R. (2008). *Modern methods for robust regression*. Los Angeles, CA: SAGE.

Anderson, E. (1999). *Code of the street*. New York, NY: W.W. Norton.

Andrade, X., Sifaneck, S. J., & Neagis, A. (1999). Dope sniffers in New York City: An ethnography of heroin markets and patterns of use. *Journal of Drug Issues*, 29, 271-298.

Apuzzo, M. (2016, April 13). F.B.I. used hacking software decade before iPhone fight. *The New York Times*. Retrieved from <https://web.archive.org/web/20171204183903/https://www.nytimes.com/2016/04/14/technology/fbi-tried-to-defeat-encryption-10-years-ago-files-show.html>

Arlacchi, P. (1998). Some observations on illegal markets. In Ruggiero, V., Taylor, I., & South, N. (Eds.), *The new European criminology: Crime and social order in Europe* (pp. 203-215). London, UK: Routledge.

Atkinson, T. J., Schatman, M. E., & Fudin, J. (2014). The damage done by the war on opioids: The pendulum has swung too far. *Journal of Pain Research*, 7, 265-268.

Bagwell, T. C. (2015). Facebook. Retrieved from https://web.archive.org/save/_embed/https://www.facebook.com/photo.php?fbid=1041543009235683&set=a.182254338497892.46618.100001399822877&type=3

Bancroft, A., & Reid, P. S. (2016). Concepts of illicit drug quality among darknet market users: Purity, embodied experience, craft and chemical knowledge. *International Journal of Drug Policy*, 35, 42-49.

Barratt, M. J. (2012). Silk Road: Ebay for drugs. *Addiction*, 107, 683-683.

Barratt, M. J., Ferris, J. A., & Winstock, A. R. (2016). Safer scoring? Cryptomarkets, social supply and drug market violence. *International Journal of Drug Policy*, 35, 24-31.

Barratt, M. J., Lenton, S., Maddox, A., & Allen, M. (2016). "What if you live on top of a bakery and you like cakes?"—Drug use and harm trajectories before, during and after the emergence of Silk Road. *International Journal of Drug Policy*, 35, 50-57.

Bawa, K., & Shoemaker, R. (2004). The effects of free sample promotions on incremental brand sales. *Marketing Science*, 23, 345-363.

Becker, H. S. (2008). *Outsiders*. New York City, NY: Simon & Schuster.

Beckert, J., & Wehinger, F. (2012). In the shadow: Illegal markets and economic sociology. *Socio-Economic Review*, 11, 5-30.

Benoit, K. (2011). *Linear regression models with logarithmic transformations*. London, UK: London School of Economics.

Bicket, M. C., Long, J. J., Pronovost, P. J., Alexander, G. C., & Wu, C. L. (2017). Prescription Opioid Analgesics Commonly Unused After Surgery: A Systematic Review. *JAMA Surgery*, 152, 1066-1071.

Birkenshaw, S. (2016). *Drug dealers' winning strategy: Free samples*. Retrieved from <https://web.archive.org/web/20170904142515/http://narcononjajournal.org/drug-dealers-giving-free-samples/>

Birnbaum, H. G., White, A. G., Schiller, M., Waldman, T., Cleveland, J. M., & Roland, C. L. (2011). Societal costs of prescription opioid abuse, dependence, and misuse in the United States. *Pain Medicine*, 12, 657-667.

Branwen, G. (2015, July). *Dark Net Market archives, 2011-2015*. Retrieved from <https://www.gwern.net/DNM-archives>

Bright, D. A., & Sutherland, R. (2017). "Just doing a favor for a friend": The social supply of ecstasy through friendship networks. *Journal of Drug Issues*, 47, 492-504. doi:10.1177/0022042617704004

Butler, S. F., Cassidy, T. A., Chilcoat, H., Black, R. A., Landau, C., Budman, S. H., & Coplan, P. M. (2013). Abuse rates and routes of administration of reformulated extended-release oxycodone: Initial findings from a sentinel surveillance sample of individuals assessed for substance abuse treatment. *The Journal of Pain*, 14, 351-358.

Christin, N. (2013,). Traveling the Silk Road: A measurement analysis of a large anonymous online market-place. In *Proceedings of the 22nd International Conference on World Wide Web* (pp. 213-224). New York, NY: Association for Computing Machinery.

Christin, N. (2014). Commentary on Barratt et al.(2014): Steps towards characterizing online anonymous drug marketplace customers. *Addiction*, 109(5), 784-785.

Coomber, R. (1997). The adulteration of drugs: What dealers do to illicit drugs, and what they think is done to them. *Addiction Research*, 5, 297-306.

Coomber, R. (2003). There's no such thing as a free lunch: How "freebies" and "credit" operate as part of rational drug market activity. *Journal of Drug Issues*, 33, 939-962.

Coomber, R., & Turnbull, P. (2007). Arenas of drug transactions: Adolescent cannabis transactions in England—social supply. *Journal of Drug Issues*, 37(4), 845-865.

Coomber, R., & Moyle, L. (2014). Beyond drug dealing: Developing and extending the concept of "social supply" of illicit drugs to "minimally commercial supply." *Drugs: Education, Prevention, and Policy*, 21, 157-164.

Coomber, R., & Sutton, C. (2006). How quick to heroin dependence? *Drug and Alcohol Review*, 25, 463-471.

Coomber, R., & Turnbull, P. (2007). Arenas of drug transactions: Adolescent cannabis transactions in England—social supply. *Journal of Drug Issues*, 37, 845-865.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. London, UK: SAGE.

Curtis, R., & Wendel, T. (2000). Toward the development of a typology of illegal drug markets. *Crime Prevention Studies*, 11, 121-152.

Davey, Z., Schifano, F., Corazza, O., Deluca, P., & Psychonaut Web Mapping Group. (2012). e-Psychonauts: Conducting research in online drug forum communities. *Journal of Mental Health*, 21, 386-394.

Décaire-Hétu, D., & Giommoni, L. (2017). Do police crackdowns disrupt drug cryptomarkets? A longitudinal analysis of the effects of operation onymous. *Crime, Law and Social Change*, 67, 55-75.

Décaire-Hétu, D., Paquet-Clouston, M., & Aldridge, J. (2016). Going international? Risk taking by crypto-market drug vendors. *International Journal of Drug Policy*, 35, 69-76.

Demant, J., Munksgaard, R., & Houborg, E. (2016). Personal use, social supply or redistribution? Cryptomarket demand on Silk Road 2 and Agora. *Trends in Organized Crime*, 1-20.

DiMaggio, P., & Louch, H. (1998). Socially embedded consumer transactions: For what kinds of purchases do people most often use networks? *American Sociological Review*, 63, 619-637.

Dorn, N., Murji, K., & South, N. (1992). *Traffickers: Drug markets and law enforcement*. Hove, UK: Psychology Press.

Duck, W., & Rawls, A. W. (2012). Interaction orders of drug dealing spaces: Local orders of sensemaking in a poor black American place. *Crime, Law and Social Change*, 57, 33-75.

Eck, J. E. (1995). A general model of the geography of illicit retail marketplaces. *Crime and Place*, 4, 67-93.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing ethnographic fieldnotes*. Chicago, IL: University of Chicago Press.

Farr, S. (2017, May 29). Cops: Dealer gave free heroin samples to undercover officers. *The Inquirer*. Retrieved from <https://web.archive.org/web/20170904144937/http://www.philly.com/philly/health/addiction/Cops-Dealer-gave-free-heroin-samples-to-undercover-officers.html>

Fox 13 News. (2015, October). *Police warn of drug that resembles Halloween candy*. Retrieved from <https://web.archive.org/save/www.fox13news.com/trending/police-warn-of-drug-that-resembles-halloween-candy>

Gambetta, D. (2009). *Codes of the underworld: How criminals communicate*. Princeton, NJ: Princeton University Press.

Guerette, R. T., & Bowers, K. J. (2009). Assessing the extent of crime displacement and diffusion of benefits: A review of situational crime prevention evaluations. *Criminology*, 47, 1331-1368.

Halpern, J. H., & Pope, H. G., Jr. (2001). Hallucinogens on the Internet: A vast new source of underground drug information. *American Journal of Psychiatry*, 158, 481-483.

Hardy, R. A., & Norgaard, J. R. (2016). Reputation in the Internet black market: An empirical and theoretical analysis of the Deep Web. *Journal of Institutional Economics*, 12, 515-539.

Jacobs, B. A. (1999). *Dealing crack: The social world of streetcorner selling*. Lebanon, NH: University Press of New England.

Kaplan, J. (1983). *The hardest drug: Heroin and public policy*. Chicago, IL: University of Chicago Press.

Kertesz, S. G. (2017). Turning the tide or riptide? The changing opioid epidemic. *Substance Abuse*, 38, 3-8.

Ladegaard, I. (2017a). We know where you are, what you are doing and we will catch you: Testing deterrence theory in digital drug markets. *British Journal of Criminology*. Advance online publication. doi:10.1093/bjc/azx021

Ladegaard, I. (2017b). "I pray that we will find a way to carry on this dream": How a law enforcement crackdown United an online community. *Critical Sociology*, 0896920517735670.

Lake, E. (2017, March). CHILD PILL ALERT Four schoolgirls aged 13 taken to hospital after "taking teddy bear ecstasy pills." *The Sun*. Retrieved from <https://web.archive.org/web/20171104171357/https://web.archive.org/save/https://www.thesun.co.uk/news/3029788/four-schoolgirls-aged-13-taken-to-hospital-after-taking-teddy-bear-ecstasy-pills/>

Lindesmith, A. R. (1940). Dope fiend mythology. *Journal of Criminal Law and Criminology*, 31(2), 199.

Martin, J. (2014). Lost on the Silk Road: Online drug distribution and the 'cryptomarket'. *Criminology & Criminal Justice*, 14(3), 351-367.

May, T., Harocopos, A., Turnbull, P. J., & Hough, M. (2000). *Serving up: The impact of low-level police enforcement on drug markets*. London, England: Great Britain Home Office, Policing and Reducing Crime Unit.

May, T., & Hough, M. (2004). Drug markets and distribution systems. *Addiction Research & Theory*, 12(6), 549-563.

McSweeney, T., Turnbull, P., & Hough, M. (2008). *Tackling drug markets and distribution networks in the UK: A review of the recent literature*. London, England: UK Drug Policy Commission.

Meiklejohn, S., Pomarole, M., Jordan, G., Levchenko, K., McCoy, D., Voelker, G. M., . . . Savage, S. (2013, October). A fistful of bitcoins: Characterizing payments among men with no names. In *Proceedings of the 2013 Conference on Internet Measurement* (pp. 127-140). New York, NY: Association for Computing Machinery.

NSA (2017). "Tor Stinks" presentation. Retrieved from <https://web.archive.org/web/20171204195252/https://edwardsnowden.com/docs/doc/tor-stinks-presentation.pdf>

New York Times (1924, November 9). *One million Americans victim of drug habit*. Retrieved August 29, 2017, from <https://web.archive.org/web/20171204172949/http://www.druglibrary.org/SCHAFFER/History/e1920/nyt110924.htm>

Nordseth, P. (2017). Retrieved from <https://web.archive.org/web/20171104172225/http://filtrernyheter.no/nei-narkodealere-prover-neppe-a-lure-barna-dine-til-a-spise-ecstacy-som-likner-godteri/>

Paoli, L. (2004). The illegal drugs market. *Journal of Modern Italian Studies*, 9, 186-207.

Parker, H. J., Aldridge, J., & Measham, F. (1998). *Illegal leisure: The normalization of adolescent recreational drug use*. London, England: Psychology Press.

Parker, H. J., Williams, L., & Aldridge, J. (2002). The normalization of "sensible" recreational drug use: Further evidence from the North West England longitudinal study. *Sociology*, 36, 941-964.

Pierce, J. P., Choi, W. S., Gilpin, E. A., Farkas, A. J., & Berry, C. C. (1998). Tobacco industry promotion of cigarettes and adolescent smoking. *Journal of the American Medical Association*, 279, 511-515.

Pradel, V., Frauger, E., Thirion, X., Ronfle, E., Lapierre, V., Masut, A., . . . Micallef, J. (2009). Impact of a prescription monitoring program on doctor-shopping for high dosage buprenorphine. *Pharmacoepidemiology & Drug Safety*, 18, 36-43.

Reuter, P., & Caulkins, J. P. (2004). Illegal "lemons": Price dispersion in cocaine and heroin markets. *Bulletin on Narcotics*, 56, 141-165.

Reuters. (2017, July). *India Fumes as Philip Morris Pushes Marlboro on Young People*. Retrieved from, <https://web.archive.org/web/20171204192431/https://www.reuters.com/investigates/special-report/pmi-india/>.

Richardson, L. (2007). Beautiful soup documentation.

Rudd, R. A., Seth, P., David, F., & Scholl, L. (2010–2015). Increases in Drug and Opioid-Involved Overdose Deaths — United States, MMWR Morb Mortal Wkly Report 2016; 65, 1445–1452. DOI: <http://dx.doi.org/10.15585/mmwr.mm655051e1>.

Sandberg, S. (2012). The importance of culture for cannabis markets: Towards an economic sociology of illegal drug markets. *British Journal of Criminology*, 52, 1133-1151.

Schor, J. (2016). Debating the sharing economy. *Journal of Self-governance and Management Economics*, 4(3), 7-22.

Serra, G. (2015, October). Cops have never heard of “new drug.” *IOL*. Retrieved from <https://web.archive.org/web/20170904134645/https://www.iol.co.za/news/south-africa/western-cape/cops-have-never-heard-of-new-drug-1926532>

Soska, K., & Christin, N. (2015, August). Measuring the longitudinal evolution of the online anonymous marketplace ecosystem. In *Proceedings of the 24th USENIX Security Symposium* (Vol. 15, pp. 33-48). Washington, DC: USENIX Association.

Sundararajan, A. (2016). *The sharing economy: The end of employment and the rise of crowd-based capitalism*. Cambridge, MA: MIT Press.

Sutherland, E. H., Cressey, D. R., & Luckenbill, D. F. (1992). *Principles of criminology*. Lanham, MD: Rowman & Littlefield.

Tadelis, S. (2016). Reputation and feedback systems in online platform markets. *Annual Review of Economics*, 8, 321-340.

Terry, C., & Pellens, M. (1928). *The opium problem* (Patterson Smith reprint series in criminology, law enforcement, and social problems. Publication no. 115). Montclair, NJ: Patterson Smith.

Thump. (2015, October). *This trending story about ecstasy-spiked Halloween candy is probably a sham*. Retrieved from https://web.archive.org/web/20171204192712/https://thump.vice.com/en_us/article/gvnqn9/this-trending-story-about-ecstasy-spiked-halloween-candy-is-probably-a-sham

Tor Project. (2017). Retrieved from <https://www.torproject.org/about/overview.html.en>

Tzanetakis, M., Kamphausen, G., Werse, B., & von Laufenberg, R. (2016). The transparency paradox. Building trust, resolving disputes and optimising logistics on conventional and online drugs markets. *International Journal of Drug Policy*, 35, 58-68.

Van Buskirk, J., Naicker, S., Roxburgh, A., Bruno, R., & Burns, L. (2016). Who sells what? Country specific differences in substance availability on the Agora cryptomarket. *International Journal of Drug Policy*, 35, 16-23.

Van Buskirk, J., Roxburgh, A., Bruno, R., Naicker, S., Lenton, S., Sutherland, R., . . . Burns, L. (2016). Characterising dark net marketplace purchasers in a sample of regular psychostimulant users. *International Journal of Drug Policy*, 35, 32-37.

Van Hout, M. C., & Bingham, T. (2013). “Surfing the Silk Road”: A study of users’ experiences. *International Journal of Drug Policy*, 24, 524-529.

Van Hout, M. C., & Bingham, T. (2014). Responsible vendors, intelligent consumers: Silk Road, the online revolution in drug trading. *International Journal of Drug Policy*, 25, 183-189.

Author Biography

Isak Ladegaard is a PhD student in Sociology at Boston College, MA, United States. His research interests include crime and deviance, social control, economic sociology, and information and communication technology. His work also appears in the *British Journal of Criminology*, *Critical Sociology*, and in forthcoming issues of the *Sociological Review and Socio-Economic Review*. His dissertation research is funded by the National Science Foundation.