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Username on a Finnish Online Marketplace for Illegal Drugs

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Abstract

Usernames play a major role in online communication by providing a vital first impression and including clues about the identities and personal characteristics of users. Usernames are extremely important in the online trade of illegal drugs, which carries several risks and therefore requires a high degree of trust between the transaction parties. This study examines how sellers and buyers of illegal drugs represent themselves in their usernames. Data on 1,654 usernames collected from a Finnish darknet marketplace, Torilauta (2017–2020) are analyzed both qualitatively and quantitatively. The usernames are mostly in Finnish and often feature slang and spoken language expressions. Many names include clues about a user's age, gender, and location. References to various illegal drugs in usernames were found to express a close relationship with the substances. In contrast, they only rarely utilize typical real-life marketing strategies, which suggests that the users do not seek publicity and do not wish to enhance their online reputation. Differences between drug sellers' and buyers' usernames are minimal, possibly because of group overlap. Overall, it appears that the users aim to blend in with the drug user community rather than stand out from it by building distinctive images of themselves.

Keywords: usernames, pseudonyms, computer-mediated communication, darknet, Tor network, narcotics, crime, Finland

1. Introduction

People are often known only by their usernames on various websites and online services. A username, also called a “nickname,” “pseudonym,” or “alias” in some other scholarly works (see Aleksiejuk 2014), is the name of a personal user account registered to a certain website or service and functioning as the user's identifier for that service. Usernames play a major role in computer-mediated communication. They are usually the first identity feature that the communicating parties will learn about each other. They therefore help to make the pivotal first impression about the person (Whitty & Buchanan 2010; Back et al. 2008). The contents of usernames may also express the users' identities and often include clues about their personal characteristics, such as age and gender (e.g., Raátz 2011; Stommel 2007; Bechar-Israeli 1995). Other users are frequently eager to utilize such clues to make assumptions about the personality of the user, even though empirical experiments have yielded mixed results regarding the accuracy of those assumptions (e.g., Back et al. 2008; Cornetto & Nowak 2006; Heisler & Crabill 2006).

One form of online interaction where usernames may have a particular significance is the trade of illegal drugs. Nowadays, many drug sellers and buyers use online services to find each other (Martin et al. 2019). Making deals with strangers is, however, not without problems. Drug markets include several juridical, financial, and health-related risks, like law enforcement interference, violence, robberies, or scams involving low-quality products. Online drug marketing therefore requires a high level of trust between the transaction parties. A username is usually one of the few identity features available to the parties before making a deal. Therefore, parties presumably use it to evaluate the trustworthiness of the other party.

This study examines how the sellers and buyers of illegal drugs represent themselves through their usernames on Torilauta ‘market board,’ a popular Finnish online marketplace for illegal drugs. More specifically, the study focuses on the choices of language, clues about a user's personality, references to drugs, and business- and crime-related images in usernames. Differences between the usernames of drug sellers and buyers are also analyzed. The article begins with background information about computer-mediated drug markets and Torilauta, followed by an introduction of the data and method used in the study. After presenting and discussing the results, the study concludes by discussing the outcomes of the findings, limitations of the study, and possible directions for future research.

2. Background

Even though the Internet has been exploited for drug-dealing purposes from its start (Power 2013), more systematic online drug businesses did not emerge until the 2010s, when the so-called “cryptomarkets” became widely used. Cryptomarkets are eBay-like marketplaces where independent vendors can advertise their products, customers can make purchases with virtual currencies like Bitcoin, and the products are then shipped through regular postal services. Cryptomarkets have lately been of great interest to drug policy scholars. Summaries of previous studies have been provided in the *World Drug Report* (United Nations Office on Drugs and Crime 2020), as well as by Shortis et al. (2020) and Martin et al. (2019). For the study

at hand, the most relevant data derives from a study on the usernames of drug vendors at AlphaBay (Hämäläinen 2019), which was the largest international cryptomarket between the years 2015 and 2017.

Cryptomarkets have certain advantages compared to traditional real-world drug markets. They are located on the darknet (also known as the Dark Web or Tor network), where encryption technologies are used to conceal the identities of the transaction parties, making it difficult for officials to interrupt activities (Munksgaard & Martin 2020). Moreover, the lack of face-to-face contact reduces violence and robberies, and open global markets give customers the opportunity to choose between several sellers and enable sellers to expand their business worldwide (Martin et al. 2020; Munksgaard & Martin 2020; Barratt et al. 2016). There are, however, disadvantages as well. Postal deliveries are relatively slow and uncertain, which can be especially problematic for drug users suffering from withdrawal symptoms. The use of Bitcoin for payments might also be troublesome for users with financial problems. Moreover, the digital traces left from the transactions might result in arrests even years later (Yle 2019).

Given the abovementioned disadvantages of cryptomarkets, drug sellers and buyers have begun using new kinds of services to reach each other. For example, recent studies have reported a growing use of social media to buy and sell drugs (Oksanen et al. 2020; Moyle et al. 2019). In Finland, the online Torilauta site served as an alternative marketplace for drugs in the last few years. Torilauta was a discussion forum located on the darknet, founded in November 2017 and shut down in November 2020. During its three years of operation, more than six million messages were posted to Torilauta, an average of over 5,000 messages daily (Malin 2020). Even though the website had sub-fora for various themes, such as hacking, dating, and casual chatting, most discussions involved drug dealing. Approximately 95% of all messages were sent to sub-fora dedicated to drug advertisements (Hämäläinen & Ruokolainen 2021).

On Torilauta, any user could open a new discussion thread to announce a desire to sell or buy products or services. Unlike on cryptomarkets, the items were delivered in face-to-face meetings and paid for with cash or other drugs. The details of the deals, like the meeting location, were not settled on Torilauta, but in private discussions using the encrypted mobile app Wickr. Since contacting other persons via Wickr requires knowing their usernames, the advertisements on Torilauta usually included the Wickr username of the advertiser. These Wickr usernames are the focus of our research.

The illegal drug sold most often on Torilauta was cannabis, followed by amphetamines, benzodiazepines, opioids, and ecstasy (Hämäläinen & Ruokolainen 2021). This distribution of substances corresponds rather well with the statistics on overall drug use in Finland (Karjalainen et al. 2020; Rönkä & Markkula 2020). Regular drug users comprised the majority of the Torilauta user pool, and they were often in socioeconomically disadvantaged positions (Harviainen et al. 2020). The language style used in the discussions was typically informal. It included a great deal of slang words and spoken language features, as well as deviations from the orthographic norms of standard language (Hämäläinen & Ruokolainen 2021).

3. Data and Method

Previous studies have typically employed two types of data to analyze the semantic content of usernames. Some scholars have conducted interviews or online surveys to ask username owners about the background and motivation for their name choices (e.g., Xu et al. 2020; Crenshaw & Nardi 2014; Hämäläinen 2013), whereas others have analyzed names without contacting their owners (e.g., Szymanski 2014; Ecker 2011; Stommel 2007). This study adopted the latter method. Since online drug traders are usually not willing to participate in surveys or interviews, studies using such data collection methods usually have relatively small sample sizes (e.g., Martin et al. 2020; Ormsby 2016; van Hout & Bingham 2014). For the same reason, Hämäläinen (2019) analyzed usernames on AlphaBay without contacting the owners of the names.

The problem when analyzing names without contacting the users is that scholars may have difficulty deciphering usernames. For example, the name *edguy*₁ could be understood as “guy called Ed” or as a reference to the German power metal band Edguy. Given that ambiguity obviously reduces the reliability and objectivity of the results, we endeavored to minimize its effect. By conducting a Google search, we ascertained the potential multiple meanings of the usernames, especially when encountering expressions unfamiliar to us. The context of drug dealing was also accounted for in the analysis. For example, we interpreted the username *mollyking* as a reference to 3, 4-methylenedioxymethamphetamine (MDMA), as *molly* is one of its slang names. In another community, though, *molly* might more likely be interpreted as a female name. To understand the slang expressions, we used scholarly studies on Finnish drug user slang (especially Hämäläinen & Ruokolainen 2021).

The data for the study was collected from Torilauta in January 2018, approximately two months after the website was established. Altogether, 9,300 messages were collected from all the sub-fora on the website. By carefully examining the messages, 1,853 different Wickr usernames were detected. Some of them were placed in a separate text field reserved for Wickr usernames, whereas others were included in the body text of the message, usually preceded by expressions such as “Wickr:” or “W//.” Some usernames appeared in

more than one message, but these duplicates were removed before the analysis. In addition to collecting usernames, it was also determined whether the users were selling or buying drugs; or whether they had some other objective (e.g., searching for a job, looking for a date, asking for advice). Of the 1,853 users, 199 (10.74%) were not involved with drug trading. Such users were filtered before the analysis, making the size of the final dataset 1,654 usernames. Of those users, 726 (43.89%) were sellers, 712 (43.05%) buyers, and 216 (13.06%) performed both roles. Consequently, drug buyers and sellers were almost equally represented in the data.

When using data retrieved from a marginalized online community, such as drug dealers and users, special attention should be paid to ethical questions. The ethical guidelines of our project were discussed thoroughly elsewhere (Harviainen et al. 2021), but we would like to highlight some key issues here. Although located on the darknet, Torilauta can be considered a rather public website given that it was widely used in Finland and was well-known to law enforcement officials as well (Malin 2020). To help ensure that this investigation would pose no harm to the users, care was taken to see that their real-life identities could not be reliably recognized based on their usernames or messages. Therefore, we considered it acceptable to utilize the data without the users' consent. Moreover, the usernames are not connected with users' messages and actions on the website, and only a limited number of sample names are provided in this article. We would also like to stress that we do not know whether the users analyzed in this study have committed crimes. The forum discussions only indicated the users' willingness to sell or buy drugs, not that such activities actually took place.

4. Results

4.1 Choice of Language

One of the key issues in selecting a username is the choice of language. On Torilauta, where practically all conversations were in Finnish, one might expect to see Finnish username elements as well. However, previous studies have shown that English, the lingua franca of the Internet, has a remarkable influence on usernames, even in non-English national online communities (e.g., Hämäläinen 2020; Xu et al. 2020; Bugheşiu 2012).

Based on the linguistic origin of the name elements, we divided the usernames in the data into six categories. In addition to Finnish, English, and other languages, we included categories called internationalisms, word-blends, and alphabetisms. Internationalisms are proper names or common nouns that are used similarly in several languages (e.g., *hypers*, *koala89*, *Union*), and therefore they cannot be classified as belonging to any specific language. Word-blends mix elements of different languages, like in the usernames *Kahvicup* 'coffee cup' and *Überallforyou* 'anywhere for you.' Alphabetisms are names that cannot be recognized as any known language (e.g., *av94*, *ldkbeu*, *ttxxx*).

Table 1: Distribution of Usernames Based on Language Choices

Language	Freq	%
Finnish	920	55.62
English	278	16.81
Other	50	3.02
Word-blend	58	3.51
Internationalism	38	2.30
Alphabetism	310	18.74

As Table 1 shows, over half of the usernames in the data were in Finnish. The other two categories with considerably high percentages were English and alphabetisms. By comparison, the other three categories remained low in frequency. It is also worth mentioning that slang words and spoken language features were frequent in the data and appeared in 368 usernames (22.25% of the data). Slang words for drugs and their use are further discussed in section 4.3. However, informal expressions were also widely used with non-drug-related name elements and in the advertisement texts on Torilauta (Hämäläinen & Ruokolainen 2021; Harviainen et al. 2020).

4.2 Age, Gender, and Location

Web users are often interested in the personal characteristics of the other users with whom they are involved. Among the most important characteristics of interest are users' age, gender, and location (Whitty & Gavin 2001). It is therefore not surprising that usernames often include clues to those attributes (e.g., Hämäläinen 2020; Hämäläinen & Haasio 2019; Raátz 2011; Cornetto & Nowak 2006). It should be emphasized, however, that such references do not necessarily correspond with a user's non-virtual personality.

Table 2: Self-References to Gender, Age, and Location

Reference	Freq	%
Gendered common noun	110	6.65
Personal name	98	5.93
Famous person or character	69	4.17
Gender references altogether	277	16.75
Year of birth	107	6.47
Age-related common noun	21	1.27
Age references altogether	128	7.74
Place name	44	2.66
City name abbreviation	16	0.97
Regional code	9	0.54
Location references altogether	69	4.17

Table 2 lists the frequencies of the references to user's gender, age, and location. As the table shows, the most frequent of the three personal attributes in the data were gender. According to our analysis, 277 usernames (16.75% of the data) included a potential reference to a user's gender, with 244 (88.09%) of them referring to males and only 33 (11.91%) to females. Gender references were divided into three subgroups. The first group consisted of common nouns for a male or female person, such as *mies* 'man,' *poika* 'boy,' *herra* 'mister, sir,' *prinssi* 'prince,' *jäbä* 'dude,' *tyttö* 'girl,' or *kuningatar* 'queen.' The nouns were usually combined with other words in usernames: *lähiökuningatar* 'suburb queen,' *spagettijäbä* 'spaghetti dude,' or *speedman1985*. The second group consisted of usernames that included a personal name, usually a given name (e.g., *jussi77*; *karrt*). Since not many unisex given names are used in Finland, and even then, only in low frequencies (Ainiala et al. 2012), given names usually reveal the gender of their bearer. The third group of gendered usernames included the names of well-known persons or fictitious characters, for example *paavonurmi* or *DonaldDuck123*. In such cases, however, it was less certain whether they corresponded with the user's gender, as they might have been based on merely liking or admiring the person or the character instead of identifying as him/her.

A potential reference to a user's age was included in 128 usernames (7.74% of the data). Table 2 shows that most such references were numbers indicating the user's year of birth (e.g., *hkiSuperman1984* or *tero87*). While other motivations might also have existed for choosing such numbers, the reference to year of birth is a common practice in usernames on various online communities (e.g., Hämäläinen 2020; Kokkinakis et al. 2016; Szymański 2014; Ecker 2011). From this category, we excluded those numbers that clearly have an alternative meaning (e.g., *dustyfoot* or *satana666ruoholahti*) or that could not refer to a living person's year of birth (e.g., *raven123* or *unicorn1124*). The use of age-related terms like *poika* 'boy,' *tyttö* 'girl,' *ukko* 'old man,' or *pappa* 'grandpa' in usernames could also provide some indication of the user's age, even though less precisely than a year of birth. In a community such as Torilauta, where most users were seemingly somewhat young, a 50-year-old man might have been regarded as an "old man" or "grandpa."

References to certain places were included in 69 usernames (4.17%). Table 2 shows that most of those references were place names, but city abbreviations and regional telephone codes (e.g., *hkiSuperman1984* or *vauhtihirmuo2*) were used as well. The places referenced included counties, cities, or neighborhoods located mainly in southern Finland. Six names included the element *Fin*, *Finland*, or *Suomi*, whereas seven names referred to locations outside Finland (e.g., *amsterdam*; *siperia* 'Siberia'; *vivaldasvegasi*).

4.3 Relationship to Drugs

In the data, 520 usernames (31.44%) used expressions that referred to psychoactive substances and their use. Table 3 shows that users referred to cannabis most often, followed by amphetamines, opioids, and psychedelics. General references to drugs and their use were also common in usernames: *highallday*; *humeihiha* ‘drug sleeve’; *kamaäää2* ‘junk head’; *narkkarioo* ‘narkomaniac’; *overdose5*; or *peräkujannisti* ‘rear alley junkie.’ In addition to illegal psychoactive drugs, usernames included infrequent references to alcohol, tobacco, snuff, and hormones, which were also occasionally sold on Torilauta.

Table 3: References to Psychoactive Substances and Their Use in the Data

Referred substance	Freq	%
Cannabis	177	10.70
Amphetamines	69	4.17
Opioids	42	2.54
Psychedelics	26	1.57
Alcohol	15	0.91
Benzodiazepines	14	0.85
MDMA	12	0.73
Tobacco and snuff	9	0.54
Hormones	5	0.30
Other drugs	13	0.79
Drugs in general	138	8.34
Altogether	520	31.44

Drugs were identified by various slang words in usernames. The data included 22 different slang words for cannabis, for example *dänkki* ‘dank,’ *budi* ‘bud,’ or *savu* ‘smoke.’ Moreover, 55 usernames included the number 420, a reference to the unofficial international cannabis day on April 20th (Vandoros & Kawachi 2019). The usernames also referred to certain cannabis strains like *Laughing Buddha*, *OG Kush*, or *Purple Haze*. Amphetamine was referred to via 12 different slang words, most often *vauhti* ‘speed’ or *piri*. The standard language words *cannabis*, *marijuana*, and *amphetamine*, instead, appeared very rarely in the data. The common use of drug-related slang constituted a notable difference from usernames on AlphaBay, where the substances were more often referred to using their official common nouns, even though slang words were used to some extent there as well (Hämäläinen 2019).

4.4 Business- and Crime-Related Images

With respect to the usernames of AlphaBay drug vendors, Hämäläinen (2019) recognized two opposite strategies for image creating. Some vendors presented themselves as reliable and legitimate business people by using real-world business vocabulary or borrowing famous real-world brand names. Meanwhile, other vendors even highlighted their criminality by using crime-related terminology and the names of infamous real or fictitious criminals.

In the Torilauta data, 115 usernames (6.95%) included references to business or trading. Table 4 shows that those names most often referred to shops and markets (e.g., *benzomarket*, *happokiska* ‘acid kiosk,’ or *rojukauppa* ‘junk shop’), pharmacy or chemistry stores (*apteekkari88* ‘pharmacist,’ *kemisti228* ‘chemist,’ or *medicine4all*), internationally or locally known real-world brand names (*Hilfiger09*, *Mountaindew1*, *Ruohonjuuri*, *turkuenergia*³), or the high quality of users’ products and services (*laatudoping* ‘quality doping,’ *pitäjänparasta* ‘best in the district,’ or *primedrugseller*). The data also included various other references to business, such as *easytrade*, *halvathinnat1* ‘low prices,’ *rehditkaupat* ‘fair trades,’ or *vendor* ‘vendor.’

Table 4: Business- and Crime-Related References in Torilauta Usernames

Reference	Freq	%
Shop, store, market, etc.	29	1.75
Pharmacy and chemistry	13	0.79
Real-world brand name	15	0.91
Quality of products and services	30	1.81
Other business references	28	1.69
Business references altogether	115	6.95
187*	9	0.54
Known criminal	10	0.60
Other crime references	18	1.09
Crime references altogether	37	2.24

* The number “187” (e.g., *vanki187* ‘prisoner’) originates from the California police code for murder and is used in the slang of crime-related subcultures.

Relations to crime were evident in 37 usernames (2.24%) in the data, in addition to those names that were connected to illegal drugs. Examples of references to infamous real-life or fictional criminals in the data were *escobarinc* (Pablo Escobar), *heisencrack* (Walter “Heisenberg” White), and *zäkthetripper* (Jack the Ripper). Other references to criminality included usernames like *OUTLAW99*, *rehtiroisto1* ‘honest crook,’ and *rosvo* ‘robber.’

4.5 Differences between Sellers’ and Buyers’ Usernames

Finally, we examined the differences between the usernames of drug sellers and buyers. These two roles are quite different from both marketing and juridical perspectives. Therefore, somewhat different behavior concerning username choices was hypothesized. Table 5 summarizes percentages for the three user groups in terms of the username attributes discussed in sections 4.1–4.4. The right-most column shows the p-value from the Pearson’s χ^2 test and indicates the statistical significance of the differences between the user groups.

Table 5: Differences in Sellers' and Buyers' Usernames

	Sellers		Both roles		Buyers		p-value
	Freq	%	Freq	%	Freq	%	
Reference to							
Gender	125	17.22	37	17.13	115	16.15	0.852
Age	58	7.99	10	4.63	60	8.43	0.177
Location	28	3.86	9	4.17	32	4.49	0.833
Language							
Finnish	402	55.37	114	52.78	404	56.74	0.580
English	137	18.87	43	19.91	98	13.76	0.015*
Alphabetism	117	16.12	41	18.98	152	21.35	0.039*
Slang	170	23.42	52	24.07	146	20.51	0.327
Related to drugs	262	36.09	69	31.94	187	26.26	0.00031**
Business images	74	10.19	11	5.09	32	4.49	0.000066**
Criminal images	19	2.62	8	3.70	10	1.40	0.088

* statistically significant ($p < 0.05$).

** statistically very significant ($p < 0.001$).

With respect to references to a user's age, gender, and location, there were no significant differences between the sellers' and buyers' usernames. Language choices, however, showed some moderate but statistically significant differences: sellers more often used English, whereas buyers favored alphabetisms in their usernames. As expected, usernames creating business images were distinctively more common among sellers in the data, as were references to drugs. Crime-related names were also slightly more common among sellers, even though the difference was not quite statistically significant.

5. Discussion

The amount of Finnish language in Torilauta usernames was considerably high, even in an exclusively Finnish community (cf. Hämäläinen 2020). Of several possible reasons for such an occurrence, the one especially worth discussing further is discriminatory attitudes within the community. Openly racist attitudes were common on Torilauta; many sellers and buyers stated in their advertisements that they make deals only with "ethnic Finns," or that they do not make deals with certain minorities, like Romani people (see also Harviainen et al. 2020). Adopting a username in Finnish might have been one way for users to highlight their native Finnish background and in this way present themselves as more attractive business partners for other users.

The frequent use of drug-related slang and spoken language in the data might be explained by the need to express belonging to the drug community, where the use of slang is common (Ghounane 2020). Knowing multiple words for drugs demonstrates expertise in the topic and might also express the importance of the substances for the users, in the spirit of the Finnish phrase *rakkaalla lapsella on monta nimeä* 'a dear child has many names.' It is also worth noting that despite referring basically to the same substance, not all slang words are completely synonymous: some words include references to the quality of the substance (Hämäläinen & Ruokolainen 2021). Slang words also appeared in AlphaBay usernames (Hämäläinen 2019) and even in the names of legal marijuana dispensaries (Nuessel 2017). Features of spoken language were common not only in usernames, but also in sales or buying advertisements on Torilauta. Using them expressed an informal, easygoing attitude, which was appreciated within the community (Harviainen et al. 2020).

Based on clues about the users' gender, age, and location in usernames, Torilauta users in our sample appeared mostly to be comparatively young Finnish males. The unequal representation of genders was not surprising, as the illegal drug trade has traditionally been dominated by males (e.g., United Nations Office on Drugs and Crime 2016; Denton & O'Malley 1999). However, it is possible that the usernames did not reliably represent the community's real gender distribution. Since women are often in a vulnerable position in drug communities (Arpa 2017), they might not want to highlight their gender in their usernames.

Overall, the number of usernames that provided clues about their users' personality was relatively low when compared to other types of online communities (e.g., Hämäläinen 2020). This might stem from the fact that most users wanted to protect their identity from possible law enforcement investigations. Somewhat surprising was the low number of geographic references in the data, considering that the location of the parties involved is relevant information for face-to-face drug dealing. However, as Torilauta was divided in regional sub-fora, it was perhaps unnecessary for users to highlight their location in their usernames.

The percentage of drug-related usernames on Torilauta was higher than on the AlphaBay market, where 24% of drug vendors' names were related to their products and desired product effects (Hämäläinen 2019). This might well reveal the extent to which drugs were a central part of Torilauta users' identity and lifestyle (see also Harviainen et al. 2020), rather than merely an instrument of business. The number of references to particular substances corresponded rather well with the prevalence of their sales on Torilauta and use in Finland overall (Hämäläinen & Ruokolainen 2021; Karjalainen et al. 2020; Rönkä & Markkula 2020). General references to drugs in this investigation often expressed uncontrolled, dependent, or reckless use of the substances. This might seem surprising at first glance because words like *nisti* 'junkie' and *narkkari* 'narkomaniac' carry strong negative connotations and can be considered offensive in public discourses (Hämäläinen & Lahti 2021). Within the Torilauta community, however, even excessive and problematic drug use were not judged—instead, they represented a central part of the website's culture and many of the users' identities.

The percentages of business- and crime-related images in the Torilauta usernames were relatively low when compared to AlphaBay, where 13% of usernames included business images and 7% criminal images (Hämäläinen 2019). Since such images can be regarded as effective strategies of image-building for online drug vendors, their absence in the data might therefore indicate that the Torilauta users did not run their businesses very professionally or systematically. Previous studies on Finnish drug-related criminality (e.g., Perälä 2011) support this conclusion. However, users might have also intentionally avoided creating powerful images of themselves, as high-profile sellers more likely end up as targets of law enforcement operations.

Business- and crime-related images were significantly more common in the usernames of sellers than buyers, indicating that some sellers sought to build a distinctive image for themselves. The frequent use of English in sellers' usernames might also have been motivated by business aims, as English plays a remarkable role in the commercial world and its nomenclature in Finland (Ainiala et al. 2012). Overall, however, the differences between sellers' and buyers' usernames were rather minimal in the data. This result might indicate that the groups were not distinctively different, but overlapping, as demonstrated by the noteworthy number of users who had both roles in the data.

6. Conclusion

This study examined how drug sellers and buyers on the Finnish darknet marketplace Torilauta represented themselves via their usernames. As a general conclusion, it appears that the users tried to blend in with the drug user community rather than stand out in the crowd. Meanwhile, they told relatively little about themselves in their usernames. These results differed considerably from the previous study on usernames on the large international cryptomarket AlphaBay (Hämäläinen 2019). Therefore, one should avoid generalizing the results of this study to other types of online drug markets. Instead, usernames should also be studied in other such contexts.

Even though analyzing a large collection of usernames may provide important information about the user pool and the culture of the online community, the identities of individual users are not reliably revealed by their usernames alone. The information on a user's real-life gender, age, or location might be genuine, but it might just as well be false. Whichever may be the case, even the combination of given name and year of birth—a common structure for usernames (Hämäläinen 2020)—is usually not enough to identify a certain person, at least in the Finnish context. This fact should ease possible ethical concerns as to whether the study will cause juridical or other problems for the research subjects. Nevertheless, ethical issues should always be carefully considered when studying online drug markets. It is essential to pay close attention to the special features of the study design and the studied context to minimize harm.

One alternative to the current study design would be to use data collected through interviews or online surveys. The sample sizes would probably remain smaller, but the results could give new insights that remain hidden with the method used in this study. Another alternative approach to the topic would be to analyze big

data acquired from darknet marketplaces using corpus linguistic methods (Motschenbacher 2020; Kokkinakis et al. 2016; Drachen et al. 2014).

Though Torilauta has now been shut down, online drug trading continues. Past experience shows that any services and sites that have been shut down are usually quickly replaced by similar ones (van Buskirk et al. 2017). Therefore, research on darknet drug markets should also continue. An extensive body of literature already exists on cryptomarkets, but online services that bring face-to-face drug sellers and buyers together have been studied much less. Recent studies have suggested that the online drug markets are becoming more decentralized, as more users turn to local websites or social media groups like Torilauta (United Nations Office on Drugs and Crime 2020; Martin et al. 2019). Consequently, more research should target these new service forms. As this study has shown, onomastic theories and methods can be utilized to contribute to scientific discussion about online drug markets.

Notes

¹ In the names *dustyfoot* and *satana666ruoholahti*, the number 6 replaces the similar-looking letter O, and 666 is the mark of the devil in Christianity.

² In the names *hkisuperman1984* and *vauhtihirmuo2*, “hki” is the abbreviation for Helsinki and “02” is the regional code for Southwest Finland. For more on the use of Finnish regional telephone codes as indicators of a person’s location, see Hämäläinen & Haasio (2019).

³ *Ruohonjuuri* is the name of a Finnish store chain that sells organic products. *Ruoho* ‘grass’ is also a common slang word for cannabis (Hämäläinen & Ruokolainen 2021). Turku Energia is an electricity company located in Turku, Finland.

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