



The interest in eight new psychoactive substances before and after scheduling



Anders Ledberg*

Centre for Social Research on Alcohol and Drugs, SoRAD, Stockholms universitet, SE-106 91 Stockholm, Sweden

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ABSTRACT

Background: In recent years the recreational use of new psychoactive substances (NPS) has increased. NPS are considered a threat to public health and the main response to this threat is to make the selling and buying of these substances illegal. In Sweden, during the last 5 years, 62 new substances have been classified as narcotics but little is known of the effects of making a particular substance illegal. The aim of this work is to study how legal status influences the interest in NPS in Sweden.

Methods: Forty-five thousand posts made in a Swedish Internet discussion forum (Flashback Forum) related to eight NPS (MDPV, Methylone, 4-MEC, 4-HO-MET, MXE, 6-APB, AH-7921, and 3-MMC) were used to derive time-dependent measures of interest in these substances. Intervention analyses were used to investigate the effects of legal status on the forum interest.

Results: For all eight substances the activity on the forum (measured as number of posts per day) showed a drastic decrease around the time of classification. The statistical analysis showed that in seven of eight cases, the drop in activity could be accounted for by the legal status of the substances.

Conclusions: The legal status of the substances was shown to have a substantial effect on the interest in the substances. The novel measure used to trace the interest in particular NPS could be a useful tool to follow trends in substance use in almost real-time.

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1. Introduction

The number of new psychoactive substances (NPS) available on the drug markets has increased substantially during the last years (e.g. UNODC, 2013). NPS are substances that are often not controlled by national or international law and which have putative psychoactive properties. They constitute a heterogeneous group, are often synthesized in labs (Collins, 2011), and often sold openly through websites on the Internet (Schifano et al., 2006; EMCDDA, 2009; Schmidt et al., 2011; Bruno et al., 2013).

The scientific knowledge of pharmaceutical and medical effects of NPS is limited. Consequently users of NPS often have to rely on other users to learn about dosage, ways of administration, and possible interactions with other substances (e.g. Schmidt et al., 2011; Corazza et al., 2012). Moreover, the labeling on purchased NPS might not always agree with the content (Brandt et al., 2010), further increasing the difficulty of safe usage. Indeed, there is a growing fear that the usage of NPS might constitute a serious concern to public health (EMCDDA, 2011; UNODC, 2013) and there are

several case-reports where use of NPS are claimed to be causally involved in fatal intoxications (Wikström et al., 2010; Kronstrand et al., 2011).

When introduced on the drug markets, NPS are typically not controlled by international treaties and are often legal to sell and buy according to national legislations. New substances are regularly evaluated by the WHO Expert Committee on Drug Dependence (e.g. WHO, 2012) and might be appended to the list of controlled substances according to the Convention on Psychotropic Substances of 1971 (United Nations, 1971). In many countries the national regulation of psychoactive substances follows the same route: individual substances are identified, evaluated, and classified as illegal. This implies that relatively minor changes of the chemical structure might, from a legal point of view, turn an illegal substance into an unregulated one, legal to sell and buy. Given the large number of NPS detected every year (73 new substances reported within the European Union (EU) in the year 2012 (EMCDDA, 2013)) this route presents a substantial challenge. Indeed, when a substance becomes illegal, new unscheduled substances might be introduced as a replacement (Shanks et al., 2012; Jebadurai et al., 2013). An investigation of the effects of making a certain substance illegal should therefore include an analysis of interest and use of other related substances.

* Tel.: +46 8163250.

E-mail address: anders.ledberg@sorad.su.se

Which are the effects of making a psychoactive substance illegal to sell and possess? For the more “traditional” psychoactive drugs it is clear that punitive legislation does not necessarily quench the supply. Indeed, even if controlled by international treaties since a long time (United Nations, 1961, 1971) cannabis, amphetamines, cocaine and opiates are still used extensively throughout the world (UNODC, 2010). In the case of NPS much less is known about the effects of scheduling, but it is possible that the “legal” marketing of these substances (i.e. that they are sold openly on the web) will make classification have a more direct effect on the supply. There are some indications that this is indeed so (Anderson et al., 2010; Advisory, 2011; Carhart-Harris et al., 2011; Stogner et al., 2012; Loeffler and Craig, 2013) but there are also reports of users whose use seem to be relatively unaffected by the legal status (Winstock et al., 2010; Wood et al., 2012). Interestingly, a few reports support the notion that scheduling removes the substance from the web, at least from websites on the ‘surface web’, but might remain available via more ‘traditional’ routes such as street dealers (Winstock et al., 2010; Advisory, 2011) and possibly from “dark net” websites as well.

To accurately follow trends in NPS usage it is important to analyze information available on the Internet (Schifano et al., 2006). Indeed, in the 2010 report from the International Narcotics Control Board (INCB) it is recommended that

Governments should monitor Internet forums to identify the substances that might replace mephedrone as a result of that substance being placed under national control in a growing number of countries (INCB, 2011, p. 44)

Internet fora focusing on drug use have been used in previous research: to detect new NPS entering the market (Deluca et al., 2012); to recruit subjects for web-based surveys and interviews (Baggott et al., 2010; Carhart-Harris et al., 2011; Van Hout and Bingham, 2013); and to describe users’ experiences with NPS (Kjellgren and Jonsson, 2013). In the work presented here, a novel measure of the activity on a Swedish Internet forum is used to follow the interest in eight NPS before and after they were made illegal.

As a measure of NPS-related activity the number of posts related to a particular substance was followed as a function of time. This study used Flashback Forum (FB), which is the largest Swedish Internet discussion forum, and eight NPS were followed for a time period that included the scheduling of the substances. More than 45,000 posts made by approximately 3700 users were used to derive time-dependent activity profiles for the substances. A detailed analysis of the content of the posts of 200 users showed that approximately half of the users explicitly claim to have tried the substance under discussion. The main question addressed is if the interest in a particular substance (on FB) depends on its legal status.

2. Methods

In this section the Internet forum is described, the selection of the substances investigated is motivated, and the extraction and analysis of data is explained. First, however, a brief description of the Swedish legal regulations of NPS is given.

2.1. The Swedish legal regulation of psychoactive substances

In Sweden substances of misuse are controlled according to three different laws. Substances classified as narcotics are regulated by two laws SFS 1968:64 (1968), and SFS 1992:860 (1992), and the controlled substances are listed in the Narcotic Drug Control Ordinance (SFS 1992:1554, 1992). Narcotic substances are illegal to

trade, possess, and use. Substances can also be classified under the law Prohibition of Certain Goods Dangerous to Health (SFS 1999:42, 1999). This makes it illegal to sell and possess the substance but not to use it.

There is also a recent law according to which police and customs can destroy substances of misuse that are likely to be scheduled in the future (SFS 2011:111, 2011).

2.2. Flashback Forum

Flashback Forum (<http://www.flashback.org>, henceforth FB) is an online discussion forum that covers a wide range of topics (most not related to drugs). The site is hierarchically organized around “topics”, for example a particular substance. Only members can post messages and membership is anonymous and free of charge. The website is open for anyone to read. Each post has a time-stamp and may refer to other posts. The posts belonging to a particular topic will be referred to as a “thread”. There are strict rules that forbid posts aiming at trading (selling, buying, changing, providing information of where to buy, etc.) narcotics. Flashback Forum is by far the biggest internet forum in Swedish and has more than 850,000 members (March 2014). It is perhaps important to notice that a member does not necessarily correspond to a unique physical person, but that misuse of multiple memberships is prohibited.

2.3. The substances

The intended focus of the study was on substances that changed status from legal to illegal during the last 5 years in Sweden. Of the more than 60 such substances a further selection was made to include only those that were discussed with some frequency in a dedicated thread on FB (else the measure used here is not applicable). Many of the NPS that have been scheduled are so-called synthetic cannabinoids and these seem to be marketed and used in combination with smokable herbal mixtures. The particular cannabinoids in the mix are often not declared, e.g. products labeled ‘Spice’ has been found to contain a number of different synthetic cannabinoids (EMCDDA, 2009). Consequently, few synthetic cannabinoids were discussed in dedicated FB-threads and synthetic cannabinoids were therefore not included in this work. This should not be taken as an indication that these substances are not discussed or used in Sweden. For example, the main thread on FB discussing ‘Spice’ had more than 11,000 posts made by 1710 unique members and a recent study of hospital emergency admission indicate that synthetic cannabinoids are among the more used NPS in Sweden (Helander et al., 2013). These considerations lead to the following selection of NPS to be included in the study: MDPV, Methylone, 4-MEC, 4-HO-MET, MXE, 6-APB, AH-7921, and 3-MMC (see Table 1).

2.4. Data analysis

For each of the eight substances the major thread on FB was identified and the corresponding pages were downloaded. These downloaded html files were parsed using the Beautiful Soup module (<http://www.crummy.com/software/>) for the programming language Python (<http://www.python.org>). For each thread the number of unique members were identified and the dates of each post was used to form a time series of number of posts per day.

2.4.1. Statistical analysis. To test if there was a change in mean activity in a particular thread around the date a substance became illegal the following procedure was used. Data from $N=180$ days preceding and following the scheduling date were extracted and the square root of the counts on each day was used as the dependent measure (except for 3-MMC, where data from 90 days before

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