

“Chasing the High” – Experiences of Ethylphenidate as Described on International Internet Forums

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ABSTRACT: Ethylphenidate is a novel psychoactive substance with undocumented effects, risks, and motivation for use. In this study, we investigated the experience of ethylphenidate by analyzing self-reports published on Internet forums, which revealed seven overarching themes: (1) compulsive redosing and addiction; (2) impacts on the mental state; (3) bodily agitation; (4) increased sociableness; (5) administration; (6) diverse evaluations based on intention; and (7) safety and precaution. Ethylphenidate appeared as a potent psychostimulant with an imminent abuse potential. It was mainly used for recreational purposes. The effects included not only pleasurable stimulation, euphoria, and cognitive enhancement but also indecisiveness, anxiety, and cognitive fragmentation. The users reported an increase in body temperature, heart rate, and blood pressure, but they also experienced profuse sweating and muscle tension. Ethylphenidate acted as a social lubricant, enhancing intimacy, communication, and social skills. Two opposing user mentalities were uncovered: (1) pleasure seeking and risk neglecting, and (2) safety-first orientation. This information could be of importance to legislators, public health personnel, and prevention strategists.

KEYWORDS: ethylphenidate, novel psychoactive substance, legal high, research chemical, Internet drug, drug use

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Background

Ethylphenidate, also known as *nopaine*, is one of several novel psychoactive substances (NPS) that has made the journey from being a biomedical research chemical to a contemporary and commercially available drug on the Internet.^{1,2} Ethylphenidate was one of 49 novel substances officially notified for the first time in the European Union in 2011.³ Since then, an additional 154 NPS – 73 in 2012 and 81 in 2013 – have been notified through the early warning system on new drugs. More than one novel substance is added to the market every week, and nothing indicates that this trend will come to a halt. The progressively increasing number of online vendors and NPS is believed to reflect an expanding and changing market for drugs.⁴ Data on the prevalence of NPS use is, however, limited, and the few available studies show varying results across populations and substances. A Eurobarometer survey⁵ estimated that, on average, 5% of youth in Europe had experience of NPS use, while an investigation of a targeted population of nightclub visitors in the United Kingdom reported a lifetime use of 65.8%.⁶

NPS, also referred to as *legal highs*, *designer drugs*, or *research chemicals*, are often produced to circumvent existing drug laws by altering the molecular structure of classified drugs while preserving the psychoactive effects.⁷ Regulatory action is, to some extent, impeded since clandestine chemists

continuously adapt to current legislations and provide a stream of alternative and unclassified NPS with unknown effects.⁸ The speed at which the market for drugs evolves is a challenge not only for legislators but also for public health agencies and researchers alike. Despite being notified in 2011, there is a lack of scientific knowledge about ethylphenidate. A search on *ethylphenidate* in PubMed (Oct 5, 2014) yielded only 19 hits, which mainly covered analysis techniques, mice models, or its counterpart drug methylphenidate.

Ethylphenidate is an amphetamine-like psychostimulant, which acts as a dopamine and norepinephrine reuptake inhibitor.¹ It is also a legally ambiguous derivative of its parent drug methylphenidate, which is a registered medicine used to treat attention deficit/hyperactivity disorder (ADHD) and narcolepsy. The fact that ethylphenidate is formed *in vivo* and likely contributes to the overall drug effect when methylphenidate is ingested in combination with ethanol reflects their close relationship.⁹ The pharmacological profile of ethylphenidate differs from that of methylphenidate in that the former is more selective to dopaminergic than to noradrenergic action. This quality has been argued to be of value when developing personalized and improved pharmaceuticals for ADHD patients.² In addition to its medicinal use, methylphenidate and similar psychostimulants have attracted an increasing number of nonmedical users from the general population in pursuit of



cognitive enhancers.^{10–12} Although undocumented in the literature, the legal ambiguity and online availability of ethylphenidate make it a presumable candidate for such purposes.

Evaluating the specific effects and harm potential of NPS, and ethylphenidate in particular, is difficult since primary literature about the chemistry, pharmacology, and toxicology of these substances is deficient.¹ One study¹³ has concluded that cardiovascular side effects related to the use of ethylphenidate might have contributed to one fatality in Germany. Besides this, little knowledge exists. However, reviewing ethylphenidate from the broader perspective of psychostimulants reveals a range of likely effects, which include “euphoria, increased energy/decreased fatigue, reduced need for sleep, decreased appetite, decreased distractibility, increased self-confidence and alertness, increased libido, and prolonged orgasm”.¹⁴ (p.151) These effects indicate that psychostimulants are used not only for medication or cognitive enhancement but also for pleasurable purposes. Other physical and possibly more disagreeable effects may include “tremor, diaphoresis, increased muscle tension, tachypnea, hyperreflexia, and hyperpyrexia”.¹⁴ (p.151) Psychostimulants are also characterized by their high abuse potential,^{1,15} which is known to increase further if the drug is injected or administered nasally instead of orally.¹² Beyond the broad theoretical generalizations of ethylphenidate as a psychostimulant and derivative of methylphenidate, there is, to our knowledge, very limited published information. Therefore, triangulation of data from alternative sources of information, such as the Internet, has been suggested and successfully utilized as a way to overcome the lack of knowledge about NPS.^{1,16} The Internet is not only a market place for NPS, but it is also the home of drug discussion forums where users exchange knowledge anonymously and publicly. The discussions also function as a social support system where users assist each other in uncovering substance facts and administration techniques. Several studies have highlighted the focus on harm reduction in these communities.^{17–19} Another prominent forum feature involves the sharing of drug experiences in a connoisseur-like manner.¹⁹ These types of self-reported data from the Internet have previously been used by us to analyze experiences following the use of synthetic cannabinoids, 4-HO-MET and methoxetamine.^{20–22} Although anecdotal and easily available online, the data revealed nuanced and substance-specific effects and experiences that were considered free from exaggerated drug romanticizing or distorting bias. For example, the results from our investigation of self-reported side effects of synthetic cannabinoids were not only congruent with the findings of clinical case studies but also revealed poorly documented residual and long-term symptoms. Using online and self-reported data is a time-efficient way of contributing to knowledge in a rapidly evolving field of research, especially when information is scarce, as in the case of ethylphenidate. Furthermore, the Internet remains an undeniable reality and primary source of information for youth with sensitive or health- and drug-related concerns,^{5,23,24}

which provides further reasons to investigate the experiences posted online.

The aim of this study was to investigate and characterize the experience following the use of ethylphenidate by analyzing self-reports published anonymously on international Internet forums.

Methods

Data collection. The raw data for the present study were user generated, and consisted of anonymous experience reports published in the public domain of the Internet. Earlier research of ours¹⁹ has shown that the publication and sharing of self-reported drug experiences is a characteristic ascribed to online drug communities. Therefore, the first step of the data collection process was aimed at finding the principal Web sites in which experience reports are contained. Deluca et al.²⁵ have undertaken a comprehensive investigation of the Internet’s “leading edge” communities, which resulted in the identification of the “key online resources” for accurate and timely information about NPS. The top international Web sites with open access were *bluelight.org*, *drugs-forum.com*, *erowid.org*, and *legalhighsforum.com*. A Google search was conducted to confirm the status of these Web sites as “leading edge”, but also to explore the search results for any newly added resources. The keywords *ethylphenidate*, *experience*, *trip*, and *report* were used interchangeably in seven different Google searches. The Web sites returned within the first 10 hits of each of the 7 searches (of a total of 70) were further investigated. Besides the previously identified key resources, an additional four Web sites were identified as potential sources of data since they also contained collections of drug reports.

In the second step, the local search engines of the eight identified Web sites were used to find experience reports involving ethylphenidate use specifically. In one case, where a local search was unfeasible, the 500 most recent reports of any drug were scoured manually to find experiences of ethylphenidate in particular. A total of 100 ethylphenidate reports were found and collected. In the third step, the collected reports were screened to sort out duplicates posted on more than one Web site. Experiences that included a combination of drugs were also removed. In total, 44 reports were collected for the analysis. See Table 1 for an overview of the Web sites and number of remaining reports after the screening. The status of the “key online resources” as “leading edge” was further confirmed by the fact that 41 of the 44 reports were collected from them. A retrospective Google search was undertaken to rule out the chance of overlooked reports. The first 100 hits returned by the keywords “ethylphenidate trip report” did not reveal any reports that had not been already included or screened. This indicates that the majority of ethylphenidate reports available online were collected and included in the study. The gathering of data took place in August 2014. The earliest report included

**Table 1.** Sources of data and the number of experience reports after screening.

STEP 1: POTENTIAL WEB SITES RETURNED BY THE GOOGLE SEARCH ENGINE	STEP 2: NUMBER OF EXPERIENCE REPORTS AFTER LOCAL SEARCH	STEP 3: NUMBER OF EXPERIENCE REPORTS AFTER SCREENING
www.drugs-forum.com	53	29
www.erowid.org	26	10
www.bluelight.org	9	2
www.chemsrus.com	4	1
www.legalhighsforum.com	3	0
www.the-tripreport.com	3	0
www.reddit.com	1	1
www.neurosoup.info	1	1
Total	100	44

in this study was posted in March 2011 and the latest in March 2014.

Participants. The experience reports were written and posted by 44 anonymous user accounts online. Thirteen users stated their gender, 11 males and two females. Seven users stated their age, which ranged from 19 to 42 with a median age of 23.

Analysis. The raw data were analyzed qualitatively using inductive thematic analysis,^{26,27} which seeks to identify recurrent patterns of experience. The inductive analysis was data-driven, and undertaken with as much openness and a bias-free attitude as possible. The first step of the analysis procedure meant reading and re-reading the experience reports with as little distorting preconceptions as possible in order to get familiar with the content. Second, the whole dataset was systematically divided into meaningful items of data, which were transferred into a separate document. Next, all data items were coded into more basic elements of information. For example, the data item *As the intense feeling faded I felt rather hollow and very much wanted to reclaim the original rush* was coded for *Feeling empty when the effects subsided* and *Strong urge to re-experience the effects*. The coding was done manually in a word document, and resulted in 755 coded elements. Eventually, recurring patterns were identified by relating and combining coded elements with the same meaning into broader categories, which were given names and provisional definitions. A coded element could be included in more than one category. The analysis resulted in 45 categories, which in turn were related and subordinated into seven overarching themes that characterized the ethylphenidate experience. During the analysis, each theme was systematically reviewed and refined by repeatedly returning to the original dataset for verification and support of the abstracted themes. Also, each theme was checked for internal coherence and distinction between themes. See Table 2 for a summary of the definitive categories and overarching themes.

Ethical Considerations

The raw data analyzed in the present study consisted of information posted anonymously and publicly online. No terms of

access restricted the experience reports from public access. The collection and analysis of data were considered to be observations of public behavior online, in compliance with the ethical guidelines and recommendations of SACHRP (Secretary's Advisory Committee for Human Research Protections).²⁸ We approached the data in a discrete and observational manner, entirely without interaction or intervention with human subjects. Also, no information that could lead to indirect or direct identification of persons was either found or handled. Even though the data were public, anonymity was further preserved by not collecting user aliases or report URLs. In addition, quotations illustrating the findings in the Results section have carefully been assessed to prevent the possibility of back-tracking URLs through search engines. Some quotation details have been altered to prevent user alias identification.

Results

The analysis of 44 self-reports involving the use of ethylphenidate generated 755 coded elements of meaningful information, which were arranged into 45 categories of recurring characteristics. These categories were sorted based on their relation to each other at a higher level of abstraction, which resulted in seven overarching themes that characterized the experience of ethylphenidate: 1) compulsive redosing and addiction; 2) impacts on the mental state; 3) bodily agitation; 4) increased sociableness; 5) administration; 6) diverse evaluations based on intention; and 7) safety and precaution. The themes and illustrative quotations from the dataset are presented below.

Compulsive redosing and addiction. The use of ethylphenidate appeared to be associated with a persistent impulse to redose. Thirty-one of the 44 users stated that they redosed at least once or more. Most users experienced a strong urge for prolonged effects and an inability to control the cravings for more drugs. Many described how they initially attempted to restrain and limit their use but repeatedly failed to maintain discipline: *I chased the high although I promised myself not to/ Every time I convinced myself it was the last line, which was a lie.* The general consensus among users was that ethylphenidate



Table 2. Analysis resulting in 44 categories and seven overarching themes.

THEME	CATEGORY	NUMBER OF CODED ELEMENTS
Compulsive redosing and addiction	Urge to redose	22
	Tolerance	13
	Redosed	31
	Addictive	15
Diverse evaluations based on intention	Comparisons	24
	Looking for replacement	20
	Negative judgments	19
	Positive judgments	21
	Intentions	30
Impacts on the mental state	Stimulation	30
	Euphoria	26
	Buzzed	16
	Restless and anxious	21
	Focus and concentration	18
	Paranoia	8
	Hallucinations	7
	Lethargy	5
	Motivation	11
Bodily agitation	Heart rate and blood pressure	26
	Itching	4
	Gurning	4
	Heat and sweat	13
	Hangover	5
	Numbness	5
	Breathing difficulties	6
	Dry mouth and dehydration	4
	Muscle tension	9
	Appetite	11
	Sleep deprivation	11
	Cold	10
	Shakiness	7
Increased sociableness	Sexual	16
	Sociable	12
	Talkative	13
	Empathy	11
	Appreciation of music	7
Administration	Route of administration	53
	Insufflation reactions	32
	Appearance	19
	Duration	15
	Come down	10
	Onset	20
	Dosage	44
Safety and precaution	Advice	28
	Safety	23

could entail a high potential for misuse and addiction. Repeated exposures to the drug meant a quick buildup of tolerance and progressively reduced intensity and duration of the effects: *After the fourth line, the pleasurable effects were gone.* Nevertheless, users tried to reclaim the initial high from sober by redosing. Many users also felt empty and unsatisfied as the effects diminished, which further contributed to the urge for more drugs. Successive doses were increased in attempts to overcome tolerance and produce the desired effects, which was rarely achieved. On the contrary, it was common that users experienced less and less satisfaction with each redose.

Impacts on the mental state. The experience of ethylphenidate was characterized by multiple impacts on the user's mental state, some of which were unwanted. The same cognitive faculty, such as the ability to concentrate, could be affected in diametrically different ways, which meant that it could either improve or degrade. As regards the unwanted effects, users experienced an undesirable restlessness and anxiety. They also described how their mindset had a jittery disposition, and how the ability to focus and concentrate was significantly lowered. Normal and coherent thought patterns were broken and fragmented, leaving the users aimless and indecisive: *It was a haphazard trip and I was scatty as hell.* This state affected the short-term memory in a negative way. A few users also felt listless and lethargic. Other less frequently experienced side effects included paranoia and hallucinations.

The sought-after and positively experienced impacts on the user's mental state can be summarized as a dramatic increase in the levels of excitement/arousal. Users described an immediate and intense rush of pleasurable stimulation, which was characterized by alertness and a general mood lift: *An indescribable rise in energy!!/Orgasmic!* Another apparent aspect of the arousing effects was feelings of euphoria and optimism. This state typically astounded the users, who expressed it as being refreshing and fulfilling. The intensity of the euphoric effects varied among users. In contrast to the unwanted effects of degraded focus, it was common that the ability to focus and concentrate was greatly improved. Users depicted it as being very awake with a clear and silent mind: *I was lucid and mentally sharp as a laser beam.* Performing complex or simultaneous tasks was easy, since no distractions or distortions diverted attention. The users' motivations were affected so that resistance to routines and normally tedious tasks lessened. The users' also felt impelled to be active and do things. In addition, an increase in self-confidence was commonly described. In some cases, the effects were more calming than exciting/arousing. Some depicted a state free from suffering and worrying where there was no need to do anything: *I lied down and relaxed as the nervousness for tomorrow's exams evaporated.*

Bodily agitation. There were numerous bodily reactions ascribed to the use of ethylphenidate, most of which incorporated some form of unpleasant agitation. Users described a pronounced increase in heart rate and blood pressure. This was occasionally experienced as annoying, worrying, or even



freighting: *I freaked out when my resting pulse passed 120 bpm.* Heavy dosing or extended and frequent use of ethylphenidate was reported to induce an even stronger rise in heart rate and blood pressure. A few users also experienced breathing difficulties and chest pressure, which forced them to breathe consciously and with effort. Other common reactions accompanying the above were heightened body temperature and profuse sweating: *I felt pressure near my nasal passages, a burning face and floods of sweat.* Conversely, it was not uncommon for users to experience coldness, especially in the extremities of their bodies. In addition, users reported general muscle tension, jaw-clenching, and involuntary grinding of their teeth. There were also descriptions of unconscious gurning, bodily tremors, and shakiness. It also appeared that the use of ethylphenidate could entail a reduced or suppressed appetite and sleep deprivation: *It killed my appetite/I'm still wide awake.* A limited number of users stated that they felt numb and dehydrated and their mouths were extremely dry.

Increased sociableness. The ethylphenidate experience involved the facilitation of social situations, improved social skills, and an increased need for social interaction. According to the users' descriptions, a yearning for the company of others emerged with the drug effects. On the whole, ethylphenidate appeared to act as a social lubricant, enabling a natural urge to communicate with people in real life or online: *It gave me a social push and I obsessively chatted on MSN all night.* Many expressed a greater than normal appreciation for friends and family. They also experienced being so caught up in the social sphere that they lost track of time and space. Furthermore, the users mentioned that they became very talkative in a relaxed and unforced manner. The flow of conversation appeared to be improved. In some cases, the drug was taken among peers, which was characterized by bonding, mutual understanding, and sharing. This was also portrayed as the emergence of a strong sense of empathy, compassion, and love for others: *Felt an overwhelming empathy for my brother in law.* Users stated that they hugged each other and showed respect for each other in previously unfamiliar ways. Sexual feelings and intimacy were also affected. A number of users experienced a heavy increase in sexual arousal, resulting in compulsive sex and masturbation: *Blessed my wife with sex all day long.* Some males expressed being sexually aroused while having erectile difficulties, and others, both men and women, could not reach orgasm.

Administration. Many descriptions concerned the method of drug administration and conditions surrounding it. The most common method was insufflation, but several other ways were described as well. Insufflating ethylphenidate was reportedly associated with intense nose burn, gagging, tears, and dripping nose, which remained for some time. Insufflation was sometimes so corrosive that users bled from the nose, and the sense of smell was affected for days: *I got the most horrible burn from the depths of hell and a bleeding nose/A caustic feeling that damaged my mucous membranes and affected my smell.* Other means of administration included putting the

drug in a gel capsule that was ingested orally or anally. The drug was also consumed by placing it on tin foil and heating from underneath while inhaling the evaporating fumes, which was described as an unpleasant white smoke with a harsh taste and a chemical-like odor. In some cases, a special vaporizer device intended for drug administration was used. Some users administered the drug by smoking it in a rolled cigarette. A few users injected the drug intramuscularly or intravenously: *Absorption was better when cooked up and injected.* It appeared that users occasionally switched between different methods of administration when redosing. The stated reasons were either to experience differences in effects, or to find the least disagreeable method of administration.

The substance was described as a coarse white, off-white, or yellowish crystalline powder. According to the users, there was no noticeable odor, and it had a bitter taste. In a few cases, the powder was reported to be transparent, chunky, and a little bit sticky. The average insufflation dose appeared to be 40 mg, although doses in between 10 and 100 mg were reported. Not all users stated their dose, partly because they were careless with their measurements: *I eyeballed a clumsy average line for maximum effect.* The onset, duration, and decay of the effects varied significantly between users and the method of administration. Some experienced an instantaneous onset, while others reported that it could take up to one hour for full effect. User consensus was that the effects subsided quickly. Vaporizing and injecting it allegedly decreased the time of onset and reduced the duration. Once redosing was terminated, the comedown was experienced with ease for some, while others had residual and hangover-like symptoms: *A rather sudden end followed by an obnoxious comedown with headache.*

Diverse evaluations based on intention. General retrospective evaluations of ethylphenidate were diverse and widespread throughout the reports. The number of negative judgments was almost equal to the number of positive judgments. Some users were fascinated and impressed by the effects, and enjoyed them to a degree that they wanted to repeat the experience: *A lot of bang for the buck and I will do it again in the future.* A few users also rated ethylphenidate as a substance with recreational potential. Others were discouraged and stated that it was an unpleasant experience, and that they would not use it again: *The negative effects greatly overshadowed the few positives/Waste of time and money, I flushed it down the toilet.* It was evident that the users of ethylphenidate were motivated by a pursuit of an equivalent alternative to both traditional drugs and recently classified NPS: *The search for a descent Mephedrone substitute is over!!/Due to legal status, I've been investigating an alternative to Ritalin.* Counterpart drugs were also used as a point of reference when determining the experienced overall usefulness of ethylphenidate. All aspects of ethylphenidate were taken into account when comparing it with other drugs. For example, the low price and legality in certain regions were commended. The short duration experienced and the urge to redose were considered less attractive. The pros and



cons were thoroughly and retrospectively examined, resulting in two-sided evaluations where some users were content and others not. Individual and preliminary effect expectations also affected the users' reviews. All in all, ethylphenidate was given highly diverse evaluations biased by personal preferences and intentions: *I wanted a study aid and I found one/A mediocre high which did not produce the desired motivation or focus.* Although some used ethylphenidate as a tool for studying or concentration, it was more commonly used as a means of recreation: *I wanted everything to be entertaining and it was.* A few intentions involved escapism or coping with emotional or physical pain, while others mentioned increased sociableness as motive for use.

Safety and precaution. Although depictions of drug abuse were common, there were also users who advocated and practiced a drug use guided by precaution and safety. First-time users commonly started with a preliminary micro dose to check for allergic reactions, bad drug batches, or general intolerance: *I always play safe and experimented with a 1 mg allergy test.* Gradual and cautious dosing was also a way to achieve a controlled onset and understanding of the effects. Users described how they prepared themselves by hydrating the body with water and scheduled their food intake after the upcoming drug use. In addition, they avoided certain types of food or beverages that could increase blood pressure or heart rate and dehydrate the body: *For safety reasons I didn't drink alcohol or coffee at the party.* Dietary supplements like vitamin pills were also mentioned as a way to optimize safe drug use and reduce residual effects.

The reports contained a great deal of advice and safety recommendations based on self-experience, which were directed to other users on the forum. There were warnings of the addictive qualities of ethylphenidate, and potential users were urged to be cautious. In many cases, others were recommended to stay away from the drug altogether: *Responsible use of ethylphenidate is impossible, so stay away!* It was also common to alert others of the experienced side effects and other pitfalls that users had experienced. Recommendations of safe settings were also mentioned.

Discussion

This study investigated the experience following the use of ethylphenidate, as described by anonymous users on the Internet. Forty-four public self-reports were systematically analyzed to reveal recurrent characteristics of the ethylphenidate experience, which resulted in 45 categories and seven overarching themes: (1) compulsive redosing and addiction; (2) impacts on the mental state; (3) bodily agitation; (4) increased sociableness; (5) administration; (6) diverse evaluations based on intention; and (7) safety and precaution. The results suggest that ethylphenidate may be an insidious substance associated with an imminent risk of drug abuse and addiction. Many users redosed compulsively, and often in vain, to overcome drug tolerance and subsiding effects. The frequent experience of *chasing*

the high reflects both the harm potential of ethylphenidate as well as its consistency with structurally similar substances such as amphetamine and methylphenidate, which are well known for their psychostimulant effects and high abuse potential.^{1,15} The redose rate of 70% was remarkably high in comparison with the total absence of addiction tendencies documented during our analysis of experiences involving the use of the NPS 4-HO-MET.²¹ Studies of methoxetamine²⁰ and synthetic cannabinoids²² revealed experiences of redosing and dependency, though less excessive and immediate compared with ethylphenidate. The effects and risks reported by users of the psychostimulant NPS mephedrone were highly congruent with the experiences of ethylphenidate, including both compulsive redosing and dependence.^{29,30} Hence, an exceptional abuse liability may pertain to the use of NPS with psychostimulant qualities. The varying harm characteristics displayed by different drugs imply a greater need for research into NPS-specific risks and motivations for use. Providing substance profiles based on user-generated and accessible data online could make prevention efforts more effective and resource-efficient.

The analysis revealed several reasons for using ethylphenidate. The most commonly stated reason for use was recreation, which is quite alarming in light of the evident abuse potential. Going beyond the explicitly stated, it appeared that the users found the pleasurable effects highly appealing, which was reflected in the astonishing and fulfilling response to the arousing effects and the positive evaluations of ethylphenidate. The stimulating energy boost, euphoria, and increased self-confidence reported by the users were concordant with the characteristics of other potent psychostimulants such as amphetamine or cocaine.¹⁴ Furthermore, the users stated that they were motivated by an increase in sociableness. Ethylphenidate acted as a social lubricant, enhancing intimacy, empathy, and communication. The instant gratification offered by ethylphenidate could explain why users exposed themselves to the experience regardless of it being relatively short-lasting and potentially harmful. It could also explain the dissatisfaction users felt as the effects diminished, which in turn would account for the subsequent urge to redose. The risk-taking displayed by the users is, however, puzzling, considering that recreation was the main stated reason for use. Escaping from problems or suffering was a motivational factor for just a few users. To seek out novel and intense drug experiences regardless of apparent risks is, according to Andrucci et al.³¹, closely linked to high levels of personal sensation-seeking qualities, which can predict and explain the indulgent use of ethylphenidate and other insufficiently researched NPS.

Another motivation included the desire for a state of heightened attentiveness and improved capacity to concentrate. The experience of an undistracted and clear mind appeared to evoke a spontaneous lust to be active and undertake normally tedious tasks, which was utilized for cognitive enhancement and studying in particular. These findings

suggest that the already increasing use of pharmaceuticals (eg, methylphenidate and modafinil) for such purposes^{10–12} has been extended to include the novel substance ethylphenidate. Interestingly enough, the analysis confirmed that users intentionally searched for a legal and accessible alternative to a number of classified counterpart drugs. This highlights the previously described dilemma of regulatory action,⁸ as it may propel the emergence and usage of yet more new and unpredictable NPS.

The sought-after impacts on the mental state came at the expense of bodily reactions that put a heavy strain on the body. The increased heart rate, blood pressure, and body temperature were occasionally accompanied with breathing difficulties, profuse sweating, and muscle tension. These effects, along with classic psychostimulant symptoms such as sleep deprivation and suppressed appetite,¹⁴ give further support to the notion of ethylphenidate as a highly potent NPS. Another ordeal type of experience appeared to be the administration of the drug. The most common method was insufflation, which caused intensive and corrosive nose burn and occasional bleeding. Nasal, as opposed to oral, administration significantly enhances the risk of drug abuse,¹² and that is perhaps why many users experienced a strong urge to redose. Other less common routes of administration were vaporizing, oral or anal ingestion, and intramuscular or intravenous injections. Some users were very careful and meticulous with their dosing and administration, while others were sloppy and careless. Some performed a small allergy test for safety, while others recklessly went for immediate and maximum dosing.

The differences in user mentality and the plurality of motivations and experiences on the whole testify to a diverse community of users. Walsh³² has argued that the investigation of online data can reveal *hidden populations* of drug users. This is perhaps why the ethylphenidate experience was characterized by several contradictory discourses dividing the user community. Besides the administration differences, the experience of ethylphenidate was not always gratifying or retrospectively evaluated as positive, as mentioned above. On the contrary, an oppositional discourse consisting of negative evaluations and unwanted experiences emerged. Instead of the ecstatic, enhancing, and pleasurable impacts on the mental state, users experienced cognitive degradation, anxiety, restlessness, and a fragmented and indecisive mindset. Interestingly enough, there were also numerous negative evaluations of ethylphenidate. We also found, in contrast to the experiences of sensation-seeking and risk-negligence, that users were guided by the principle of harm reduction. The frequently occurring accounts of social support, precautions, and advice testify to a counterbalancing safety-first-oriented mentality, which is supported by the findings in earlier studies of online drug discussion characteristic.^{17–19} Barratt, Allen, and Lenton³³ have argued that adherents of the harm-reductive discourse represent the middle ground that bridges the gap between the official drug prohibition stance and risk-neglecting individuals looking for

pleasure. The high level of sensation-seeking displayed by the users in diametrical position to the public health discourse is known to correlate with experimental and varied poly-drug use,³¹ which is particularly troublesome since the smorgasbord of unfamiliar NPS is steadily increasing. Furthermore, official health interventions and prevention targeting users who neglect risks despite being informed of them are likely to be ineffective at best.³⁴ In the worst case, official restrictions and health promotion attempts can paradoxically become counterproductive, serving as the key incentive for engagement in risky behavior.³⁵ It has been demonstrated that the engagement in harmful activities can be fueled by the wish to rebel against the oppositional and dominant societal discourse. The risk of *boomerang effects* emphasizes the importance of acknowledging harm reduction as an overlooked and complementary tool for effective prevention in order to reduce the overall harm of potent NPS such as ethylphenidate.

Conclusion

Ethylphenidate appeared as a two-sided drug. Although novel, legally ambiguous, and easily available online, it emerged as a highly potent recreational drug with psychostimulant properties and imminent harm potential. The nuanced and occasionally two-sided experiences revealed in the present study contribute to a narrowing of the knowledge gap pertaining to ethylphenidate as a recreational drug among the general population. This study might have been limited by the use of data from a sample of Internet users that could be unrepresentative of a wider population. The use of Internet data also entails some validity concerns, such as the inability to confirm substance identity or purity. However, the trustworthiness of the findings was affirmed by 1) the congruence between the experienced effects and the psychostimulant characteristics documented in the literature, 2) the absence of one-sided, drug-glorifying experiences, 3) the presence of several contrasting discourses, and 4) previous NPS research suggesting that Internet data are relatively trustworthy. This also implies that the public and self-reported accounts of experiences facing youth in search of drug-related information on the Internet are realistically portrayed. The exclusion of reports based on poly-drug use may have limited the results in the sense that it does not represent the whole community of users. However, the information derived from ethylphenidate use exclusively, especially the effects, motivations, and differences in user mentality, could be of importance to legislators, public health personnel, and prevention strategists alike. Therefore, further research should seek to standardize the investigation of self-reported and online data in order to more quickly be able to publish NPS-specific knowledge reports.

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Author Contributions

Conceived and designed the experiments: CS, AK. Analyzed the data: CS, AK. Wrote the first draft of the manuscript: CS. Contributed to the writing of the manuscript: CS, AK. Agree with manuscript results and conclusions: CS, AK. Jointly developed the structure and arguments for the paper: CS, AK. Made critical revisions and approved final version: CS, AK. Both authors reviewed and approved of the final manuscript.

REFERENCES

- Gibbons S. 'Legal highs' – novel and emerging psychoactive drugs: a chemical overview for the toxicologist. *Clin Toxicol*. 2012;50(1):15–24.
- Patrick KS, Corbin TR, Murphy CE. Ethylphenidate as a selective dopaminergic agonist and methylphenidate – ethanol transesterification biomarker. *J Pharm Sci*. 2014;103(12):3834–42.
- European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Europol 2011 annual report on the implementation of council decision 2005/387/JHA. 2012. Available at: <http://www.emcdda.europa.eu/publications/implementation-reports/2011>. Accessed October 16, 2014.
- European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). *The State of the Drugs Problem in Europe*. 2012. Available at: <http://www.emcdda.europa.eu/publications/annual-report/2012>. Accessed October 16, 2014.
- The Gallup Organization. Youth attitudes on drugs. Flash eurobarometer 330 analytical report. 2011. Luxembourg: European Commission.
- Wood DM, Hunter L, Measham F, Dargan PI. Limited use of novel psychoactive substances in South London nightclubs. *QJM*. 2012;105(10):959–64.
- Johnson LA, Johnson RL, Portier R. Current "legal highs". *J Emerg Med*. 2013;44(6):1108–15.
- King LA. Legal controls on cannabimimetics: an international dilemma? *Drug Test Anal*. 2013;6(1–2):80–7.
- Markowitz JS, DeVane CL, Boulton DW, et al. Ethylphenidate formation in human subjects after the administration of a single dose of methylphenidate and ethanol. *Drug Metab Dispos*. 2000;28(6):620–4.
- Dresler M, Sandberg A, Ohla K, et al. Non-pharmacological cognitive enhancement. *Neuropharmacology*. 2013;64:529–43.
- Farah MJ, Smith ME, Ilieva I, Hamilton RH. Cognitive enhancement. *WIREs Cognit Sci*. 2014;5(1):95–103.
- Ragan CI, Bard I, Singh I. What should we do about student use of cognitive enhancers? An analysis of current evidence. *Neuropharmacology*. 2013;64:588–95.
- Krueger J, Sachs H, Musshoff F, et al. First detection of ethylphenidate in human fatalities after ethylphenidate intake. *Forensic Sci Int*. 2014;243:126–9.
- Phillips KA, Epstein DH, Preston KL. Psychostimulant addiction treatment. *Neuropharmacology*. 2014;87:150–60.
- Markowitz JS, Logan BK, Diamond F, Patrick KS. Detection of the novel metabolite ethylphenidate after methylphenidate overdose with alcohol coingestion. *J Clin Psychopharmacol*. 1999;19(4):362–6.
- Wood DM, Dargan PI. Understanding how data triangulation identifies acute toxicity of novel psychoactive drugs. *J Med Toxicol*. 2012;8(3):300–3.
- Chiauzzi E, DasMahapatra P, Lobo K, Barratt MJ. Participatory research with an online drug forum: a survey of user characteristics, information sharing, and harm reduction views. *Subst Use Misuse*. 2013;48(8):661–70.
- Móro L, Rácz J. Online drug user-led harm reduction in Hungary: a review of "Daath". *Harm Reduct J*. 2013;10:18.
- Soussan C, Kjellgren A. Harm reduction and knowledge exchange – a qualitative analysis of drug-related internet discussion forums. *Harm Reduct J*. 2014;11:25.
- Kjellgren A, Jonsson K. Methoxetamine (MXE) – a phenomenological study of experiences induced by a "legal high" from the internet. *J Psychoactive Drugs*. 2013;45(3):276–86.
- Kjellgren A, Soussan C. Heaven and hell – a phenomenological study of recreational use of 4-HO-MET in Sweden. *J Psychoactive Drugs*. 2011;45(3):276–86.
- Soussan C, Kjellgren A. The flip side of "spice": the adverse effects of synthetic cannabinoids as discussed on a Swedish internet forum. *Nord Stud Alcohol Drugs*. 2014;31:207–20.
- Borzekowski DL, Rickert VI. Adolescent cybersurfing for health information: a new resource that crosses barriers. *JAMA Pediatr*. 2001;155(7):813–7.
- Gray NJ, Klein JD, Noyce PR, Sesselberg TS, Cantrill JA. Health information-seeking behavior in adolescence: the place of the internet. *Soc Sci Med*. 2005;60(7):1467–78.
- Deluca P, Davey Z, Corazza O, et al. Identifying emerging trends in recreational drug use; outcomes from the Psychonaut Web Mapping Project. *Prog Neuropsychopharmacol Biol Psychiatry*. 2012;39:221–6.
- Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77–101.
- Hayes N. *Doing Psychological Research*. Buckingham: Open University Press; 2000.
- Secretary's Advisory Committee on Human Research Protections (SACHRP). *Considerations and Recommendations Concerning Internet Research and Human Subjects Research Regulations*. Washington, D.C: U.S. Department of Health and Human Services; 2013.
- Freeman TP, Morgan CJ, Vaughn-Jones J, Hussain N, Karimi K, Curran HV. Cognitive and subjective effects of mephedrone and factors influencing use of a 'new legal high'. *Addiction*. 2012;107(4):792–800.
- Winstock A, Mitcheson L, Ramsey J, Davies S, Puchanewicz M, Marsden J. Mephedrone: use, subjective effects and health risks. *Addiction*. 2011;106(11):1991–6.
- Andruci GL, Archer RP, Pancoast DL, Gordon RA. The relationship of MMPI and sensation seeking scales to adolescent drug use. *J Pers Assess*. 1989;53(2):253–66.
- Walsh C. Drugs, the internet and change. *J Psychoactive Drugs*. 2011;43(1):55–63.
- Barratt MJ, Allen M, Lenton S. "PMA sounds fun": negotiating drug discourses online. *Subst Use Misuse*. 2014;49:987–98.
- Hornik R, Jacobsohn L, Orwin R, Piesse A, Kalton G. Effects of the national youth anti-DRUG media campaign on youths. *Am J Public Health*. 2008;98(12):2229–36.
- Crossley ML. Introduction to the symposium 'health resistance': the limits of contemporary health promotion. *Health Educ J*. 2002;61(2):101–12.