



Novel Psychoactive Substances

Experienced effects, attitudes, and motivations
among online drug community users

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Faculty of Arts and Social Sciences

Psychology

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Abstract

Background

The availability of legally ambivalent Novel Psychoactive Substances (NPS) with mostly undocumented effects and risks has progressively increased during the last decade. The knowledge gap pertaining to the field of NPS and its community of online users constitutes a challenge for legislators, prevention strategists, and researchers. Little knowledge exists about the users and their experienced effects, attitudes, and motivations for use, which is troublesome from a public health perspective. Therefore, the aim of the present research is to contribute to the bridging of the knowledge gap pertaining to the field of NPS by 1) investigating the “leading edge” online communities and their users, 2) characterizing the experienced effects of a novel stimulant, 3a and 3b) surveying the users’ attitudes and motivations for use, and 4) exploring their self-reported reasons for NPS use inductively.

Methods

Online user generated data were collected and analyzed systematically through the protocol of thematic analysis. A comprehensive user survey was promoted at the “leading edge” communities in order to gather data on the user characteristics, including their motivations for use, which were analyzed statistically.

Results

The findings demonstrate that the studied NPS community was characterized by robust group cohesiveness and social identity. A strong counter attitude to and mistrust in public institutions were detected. The forum discussions functioned as an extensive and cumulative exchange of peer to peer generated knowledge and a social support system in service of the shared purpose appearing as harm reduction. A sense of drug community belongingness and relatedness was a sought after experience and prominent motivation for NPS use. The users were highly experienced drug users and appeared to be driven by a desire for recreation, pleasure, novelty, and a range of instrumental values. They were also knowledgeable and presented good degree of emotional well-being. Three user orientations are outlined; 1) the risk-negligent sensation seeker with interest in stimulating drugs and enhancement, 2) the self-medicating pursuer of

coping with mistrust in public health and proneness for sedative drugs, and 3) the well-informed self-explorer advocating harm reduction and hallucinogenic drugs. In addition, a diverse set of effects and motivations for use were identified. For instance, the novel stimulant ethylphenidate appeared as a two-sided, insidious, and potent novel stimulant with imminent harm potential and effects in line with traditional counterpart stimulants like amphetamine. The survey data revealed a similar pattern where the stimulants, opioids and GABA activating substances were perceived as having significantly greater abuse potential than the hallucinogens. The reason for NPS use in general was pleasure and enjoyment although several distinct motivation profiles were found at the level of drug groups. For example, the hallucinogens were used mainly for self-exploration and spiritual attainment while the stimulants to a larger degree were used for enhancement of performance, and opioids used primarily for coping. The use of synthetic cannabinoids was mainly motivated by external circumstances such as price, availability and legality, and they appeared as less valued substitutes to herbal cannabis. A study into the users' own and self-reported reasons for NPS use resulted in a multitude of richer and more comprehensively described reasons than previous accounts. Some of the more conspicuous incentives included the seeking of novel and exciting adventures, and the use of NPS for safer drug use circumstances compared with established street drugs, which is noteworthy considering the public's growing concern of NPS as harmful endeavors. Also, it emerged that the use of NPS was driven by a guinea-pig-like service to the community and harm reduction.

Conclusions

The results provide more nuanced knowledge about NPS and its community of users which could be of importance to all parties involved in the prevention of NPS related harm. On the whole, we need to approach the diverse field of NPS with more sophistication than the broad brush approach of drugs in general in order to minimize the potential for drug related harm and drug user alienation and stigmatization. A one-fits-all preventive solution to such a diverse area of drug groups, user types, effects, and motivations for use is likely to be ineffective at best and counterproductive at worst. The findings highlight the much debated issue of whether prevention should focus on a reduction in overall use or a reduction in overall harm. The risk-oriented and dominantly prohibitive prevention strategy may benefit from recognizing most drug use as an adaptive

function with instrumental value. Otherwise, the existing pathologising views of drug users will run the risk of fueling potentially harmful behaviors like novel sensation seeking, self-medicating and avoidance of public health and emergency care. Moreover, prohibition appears not only to drive the development of and displacement to substituted NPS with yet more harmful effects, but also serves as the key incentive for engagement in risky behavior by users with sensation seeking qualities. Exaggerated amounts of external control could also lead to a worsening of the already occurring alienation and stigmatization of drug users with rejected social values. The results of the current investigations could be a starting point for science based benefit-risk evaluations and the development of more appropriate prevention messages, including not only the risks but also the benefits in order to better resonate with the users. Furthermore, identifying not only the explicit reasons for NPS use but also the types of motivation could improve prevention efforts. Finally, the users' perspectives should be acknowledged and worked with instead of against.

Keywords

Novel psychoactive substances, drugs, legal highs, Internet, forum, ethylphenidate, discussions, motivation, substance displacement, harm reduction

Sammanfattning

Bakgrund

Tillgången på legalt tvetydiga Nya Psychoaktiva Substanser (NPS) med mestadels odokumenterade effekter och risker har ökat kraftigt under det senaste decenniet. Bristen på kunskap om NPS och den internetbaserade brukarkulturen utgör en utmaning för lagstiftare, preventionsstrateger och forskare. Ur ett hälso-perspektiv är det bekymmersamt att kunskapen om brukarna och deras upplevda effekter, attityder och motivation är bristfällig. Syftet med föreliggande forskningen var att bidra till ökad kunskap inom NPS-fältet genom att 1) undersöka de mest inflytelserika drogforumen och deras användare, 2) karaktärisera de upplevda effekterna av en ny stimulerande drog, 3a och 3b) kartlägga användarnas attityder och motivation för bruk, samt att 4) induktivt analysera deras självrapporterade anledningar för att konsumera NPS.

Metod

Användargenererad data från Internet samlades in och bearbetades systematiskt genom tematisk analys. Statistiskt analyserad data om brukarnas karaktärsdrag, så som deras motivation, samlades in med en omfattande enkät som marknadsfördes på de mest inflytelserika drogforumen på Internet.

Resultat

Resultaten visar att den internetbaserade brukarkulturen kännetecknas av en stark grupptillhörighet och social identitet. Brukarna uppvisade även påtaglig misstro till och missaktning mot institutioner och den allmänna drogdiskursen. Forumdiskussionerna karaktäriserades av ett omfattande och kumulativt utbyte av peer-to-peer-genererad kunskap, samt av att fungera som ett socialt stödssystem i syfte att främja den övergripande avsikten att minimera drogrelaterade skadeverkningar. Tillhörighet och gemenskap var eftertraktade upplevelser och framstående drivkrafter för användandet av NPS. Brukarna var till stor del erfarna droganvändare som drevs av ett behov för rekreation, nöje, nya upplevelser och en rad andra instrumentella avsikter. Trots detta framstod brukarna som påtagligt kunniga, och uppvisade även en hög grad av emotionellt välbefinnande. Tre brukarmentaliteter beskrevs; 1) den riskförsummande sensationssökaren med intresse för stimulerande droger och förstärkning av egna förmågor, 2) den självmedicinerande coping-strategen med misstro mot vården och en

benägenhet för dämpande droger, och 3) den välinformerade självutforskaren som förespråkar skademinimering och hallucinogena preparat. En mängd olika effekter och motivationer identifierades. Den nya drogen etylfenidat framstod exempelvis som en motstridig, förrädisk och kraftfullt stimulerande substans med överhängande skadepotential och effekter i linje med traditionella stimulanter som amfetamin. Med hjälp av en enkätstudie synliggjordes ett liknande mönster där stimulanter, opioider och GABA-aktiverande substanser uppfattades ha signifikant större missbrukspotential än hallucinogenerna. Den vanligast förekommande anledningen för att använda NPS (generellt sett) var nöje och njutning. På substansgruppsnivå hittades dock flera specifika motivationsprofiler. Till exempel användes nya hallucinogener huvudsakligen till självutforskning och andligt sökande medan stimulanter i högre utsträckning användes för prestationshöjande ändamål, och opioider användes främst för coping. Bruket av syntetiska cannabinoider var företrädesvis motiverat av yttre omständigheter så som pris, tillgänglighet och laglighet, och de framstod som mindre önskvärda och mer hälsovådliga substitut till växtbaserad cannabis. En studie av användarnas egna och självrapporterade anledningar till bruket av NPS resulterade i en mängd detaljrika och mer omfattat beskrivna anledningar än vad som förekommit i litteraturen. Ett av de mer iögonfallande incitamenten inbegrep sökandet efter nya och spännande äventyr. NPS användes också för att möjliggöra mer fördelaktiga och tryggare drogomständigheter jämfört med etablerade gatudroger, vilket är anmärkningsvärt med tanke på den mediala och allmänna diskursens växande oro inför NPS. Det framkom även att bruket av NPS drivs av en ”försökskanins-liknande” service till drogforumen och det skademinimerande ändamålet.

Slutsatser

Föreliggande resultat kan förhoppningsvis bidra till mer nyanserad kunskap om NPS och dess brukarkultur som kan vara till nytta för alla parter involverade i förebyggandet av NPS-relaterade skadeverkningar. I syfte att minimera drogrelaterade skadeverkningar och alienering av brukare behöver vi närma oss NPS fältet på ett mer sofistikerat sätt än enbart med svepande och övergripande perspektiv på droger och droganvändare i största allmänhet. Tillämpning av endast en preventiv strategi på ett så mångfacetterat område med substansgrupper, brukartyper, effekter och motivationer kommer sannolikt vara ineffektiv som bäst och kontraproduktiv som värst. Resultaten lyfter även den omdebatterade

frågan huruvida prevention bör fokusera på nolltolerans mot droger eller nolltolerans mot drogrelaterade skadeverkningar. Dagens riskfokuserade och övervägande förbudsinriktade preventionsstrategi skulle kunna dra nytta av vetenskapen om att en stor del av droganvändande har en adaptiv funktion med instrumentalt värde. Utan en sådan ansats riskerar patologiserandet av droganvändare att resultera i riskfyllda beteenden såsom sensationssökande, självmedicinering och undvikande av vård och akutsjukvård. Vidare förefaller förbud och kontroll bidra till utvecklandet och konsumtionen av ytterligare nya droger med okända risker och effekter. Dessutom utgör förbud i sig självt ett incitament för riskfyllda beteenden hos droganvändare med sensationssökande karaktärsdrag. Överdriven extern kontroll kan också leda till en ökning av den redan förekommande alieneringen och stigmatiseringen av droganvändare. Föreliggande forskning kan utgöra en utgångspunkt för evidensbaserade risk-vinst-evalueringar och mer ändamålsenlig prevention som inkluderar både risker och fördelar i syfte att göras mer trovärdig för brukarna. Vidare kan identifieringen av både explicita anledningar för bruk av NPS samt fastställandet av typ av motivation effektivisera preventionssinsatser. Slutligen bör brukarnas perspektiv erkännas, beaktas och arbetas med istället för emot.

Nyckelord

Nya psykoaktiva substanser, droger, internetdroger, Internet, forum, etylfenidat, diskussioner, motivation, drogsubstitution, skademinimering

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Karlstad, December 26, 2017

Christophe Soussan

List of studies

- Study 1** Soussan, C., & Kjellgren, A. (2014). Harm reduction and knowledge exchange – a qualitative analysis of drug-related Internet discussion forums. *Harm Reduction Journal*, 11(25). <https://doi.org/10.1186/1477-7517-11-25>
- Study 2** Soussan, C., & Kjellgren, A. (2015). “Chasing the High” – Experiences of Ethylphenidate as Described on International Internet Forums. *Substance Abuse: Research and Treatment*, 9, 9–16. <https://doi.org/10.4137/SART.S22495>
- Study 3a** Soussan, C., & Kjellgren, A. (2016). The users of Novel Psychoactive Substances: Online survey about their characteristics, attitudes and motivations. *International Journal of Drug Policy*, 32, 77–84. <https://doi.org/10.1016/j.drugpo.2016.03.007>
- Study 3b** Unpublished additional analysis of the data in **Study 3a**
- Study 4** Soussan, C., Andersson, M., & Kjellgren, A. (2017). The diverse reasons for using Novel Psychoactive Substances – A qualitative study of the users’ own perspectives. *International Journal of Drug Policy*, 52, 71–78. <https://doi.org/10.1016/j.drugpo.2017.11.003>

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Introduction

Overview

A profound shift in the market for drugs has occurred during the last decade. A multitude of progressively increasing and easily available Novel Psychoactive Substances (NPS), presented as legally ambiguous alternatives to established drugs (such as amphetamine, heroin, LSD and cannabis), have flooded the market. In 2014 and 2015, the European Monitoring Centre for Drugs and Drug Addiction identified a total of 199 novel substances, which is the equivalent to at least two new drugs per week (EMCDDA, 2016). In 2016, the number of newly detected substances decreased to 66, which is the equivalent to the levels in 2012 and 2013. The total number of detected and monitored substances in Europe is currently 620, of which 426 were identified during the past five years (EMCDDA, 2017a). The simultaneous and continuous increase of online drug vendors on the Internet is believed to reflect not only improved monitoring capacities but an expanding and constantly changing drug market that is difficult to have a complete overview of. Moreover, the availability of unregulated NPS is not limited to the European market but also constitutes a global dilemma of concern; a worldwide survey showed that at least 94 countries reported a recent emergence of NPS (INCB, 2013; UNODC, 2014).

NPS are often intentionally produced to circumvent current drug laws by altering the molecular structure of already classified drugs while preserving and mimicking their psychoactive effect (Johnson, Johnson, & Portier, 2013). Other NPS, such as ethylphenidate and JWH-018 (“Spice”), are abandoned biomedical research chemicals or previous pharmaceutical candidates, and derivatives of such, that reemerge as commercially available drugs on the Internet (EMCDDA, 2017b; Gibbons, 2012; Patrick, Corbin, & Murphy, 2014). According to Corazza, Demetrovics, van den Brink, and Schifano (2013), “novel” does not necessarily mean new but also includes long-existing compounds “*which have recently become popular in the drug market*”. Consequently, regional differences and rapid changes in legal status sometimes make it difficult to determine if a drug is considered novel or not. Furthermore, NPS are occasionally referred to as “legal highs”, “designer drugs”, or “research chemicals”. The different labels indicate how a substance is packaged, marketed and sold, and to what type of user it is aimed at (EMCDDA, 2015, 2017a). For instance, the term “legal high” denotes an attractively packaged product offered online and in smart shops to

recreational users. Many of the “legal highs” are branded with imaginative names like “Gogain” or “Snow blow”, which indicate what drug effect the product is intended to mimic while the actual psychoactive component most often is concealed for the consumer (Soussan & Kjellgren, 2014a). “Research chemicals”, on the other hand, are specified chemical compounds sold online under the impression of being used for scientific purposes but are actually intended for users who seek to explore themselves and the psychoactive effects. In addition, NPS are sometimes sold surreptitiously as, for example, “bath salt”, “incense” or “plant food”, and are labeled “not for human consumption” in attempts to evade legislative attention (Gibbons, 2012). In recent years, other types of NPS have appeared on the market; body and mind enhancers, so called “nootropics”, are commonly available and offered as “food supplements” in fitness shops or online. Also, counterfeit medicines containing novel substances are on the rise (EMCDDA, 2015, 2016). In short, a clearly demarcated definition of NPS is difficult to formulate, especially since some novel drugs establish themselves as part of the overall drug repertoire over time, as in the case of mephedrone in the UK (Moore, Dargan, Wood, & Measham, 2013).

The steady increase of easily accessible NPS and online vendors does not appear to be subsiding, on the contrary, the market for NPS is assumed to keep developing. This upsurge has partly been attributed to a decreased purity of established drugs. The rapid growth and change of drug market characteristics is also believed to be fueled by globalization and enabling factors of the Internet and new technology such as anonymous money transactions and encrypted communications (EMCDDA, 2015). The manufacture of NPS in bulk quantities is known to take place in China and India for further shipment by air to the European market via middlemen who process and sell it to the end users. Lately, it has also been uncovered that some NPS are produced in Europe (EMCDDA, 2016).

The dilemma of legal control

The legal control of continuously emerging NPS is a lengthy process in most countries. Moreover, regulatory action is to some extent impeded since clandestine chemists continuously adapt to and exploit new legislations by altering the chemical structure of previously prohibited drugs or by introducing abandoned medical research chemicals in order to provide a stream of alternative and unclassified NPS with yet again unknown effects and risks (Johnson et al., 2013;

King, 2014; van Amsterdam, Nutt, & van den Brink, 2013). Further attempts to evade legal control include the use of Internet as an arena for the open sale of surreptitiously labeled NPS. Besides the inherent harm potential, the speed at which this cat and mouse game advances constitutes a challenge for public health agencies and researchers worldwide (EMCDDA, 2015). The consequences of legal control have varied between regions and substances (Winstock & Ramsey, 2010). In some cases the associated harm, reflected by the number of emergency room visits, has diminished while other cases entailed a significant rise in use of counterpart drugs with even more adverse effects than the initial drug. It has been reasoned that prohibition and supply reduction of established drugs is the key driver for displacement to substituted NPS with unknown or greater harm potential, as demonstrated in the case of mephedrone in the UK (Measham, Moore, Newcombe, & Welch, 2010) and anticipated in the case of synthetic cannabinoids in New Zealand (Rolles & Kushlick, 2014). Different approaches to the dilemma of NPS and drug enforcement have been discussed and evaluated. Some countries, like the UK, apply a generic classification system while other countries, like Sweden, use a specific listing system. According to King (2014) as well as van Amsterdam et al. (2013) there are pros and cons with both methods. They especially highlight the problematic nature of generic classification as it could potentially fuel the emergence of unknown NPS and black markets while increasing the harm it was intended to decrease. They conclude by declaring a need for science based benefit-risk evaluations in order to limit the adverse effects of NPS. Hence, more research into the effects and properties of specific NPS is needed.

Availability, prevalence and trends

Data on NPS availability, prevalence and trends are often scarce, contradictory or uncertain. For example, the statistics presented by the EMCDDA (2016) are considered minimum estimates and most often build upon non-systematic national seizure reports and notifications through the EU Early Warning System, which is influenced by regional changes in legal status, reporting practices and so forth. However, as stated earlier, the number of available NPS and online vendors are progressively increasing although it is uncertain to what extent that reflects the improved monitoring capacities. The largest group of monitored NPS is currently synthetic cannabinoids followed by novel stimulants (EMCDDA, 2016), which is further indicated by the unprecedented increase of

calls regarding these types of substances to poison control centers in the US between 2009 and 2011 (Johnson et al., 2013). Furthermore, snapshot surveys of the NPS situation on the Internet have revealed that novel stimulants are cheap and widely available to consumers online (Nizar, Dargan, & Wood, 2015; Vermette-Marcotte, Dargan, Archer, Gosselin, & Wood, 2014). Recent findings also suggest that novel synthetic opioids and counterfeit medicines containing novel benzodiazepines are on the rise, which is alarming since they imply a greater harm potential and target a more problematic group of users (EMCDDA, 2016).

The overall prevalence-of-use rates are uncertain since scientific studies are limited and based on different populations or substances. A former Eurobarometer (2011) survey showed that the lifetime experience of NPS among youth in Europe was on average 5% (with considerable variations between countries) while the most recent Eurobarometer survey (2014) revealed that the same number had increased to 8%. Although the increase should not be taken lightly, these numbers differed considerably from the lifetime experience of NPS, and mephedrone use in particular, revealed by three different studies of distinctly targeted populations in the UK; 65.8% among nightclub visitors (Wood, Hunter, Measham, & Dargan, 2012), 40% among dance music consumers (Winstock, Mitcheson, Deluca, et al., 2011), and 31.4% among students across the UK (Corazza, Simonato, Corkery, Trincas, & Schifano, 2014). A comparable investigation of the nightlife scene in the US showed that the experience of NPS was relatively low; synthetic cannabinoid and mephedrone use was admitted by 8.2% and 1.1% respectively (Kelly et al., 2013), which again points to the variations between regions, populations, and studies as well as the difficulty to define NPS users as a coherent group.

Types of NPS and their general effects

The vast array of available NPS are plant-based, fungal, semisynthetic or synthetic compounds which belong to different chemical families and induce a variety of diverse effects (EMCDDA, 2015; Hohmann, Mikus, & Czock, 2014; Zawilska, 2015). Psychoactive compounds are defined as drugs that influence subjective experience and behavior by acting on the nervous system (Julien, Advocat, & Comaty, 2011). More specifically, the psychoactive properties of drugs in general derive from their temporary interaction with the endogenous neurotransmitter systems of the central nervous system in the brain (Perrine,

1996). The multiple ways in which different drugs interact with different neurotransmitter systems greatly influence the specific psychoactive effect. The mood-, consciousness-, perception-, and behavior-altering effects of drugs are mainly produced by facilitating or inhibiting the synthesis, storage, release, binding, or deactivation of neurotransmitters. An agonist drug is said to stimulate, mimic or increase the activity of a neurotransmitter while an antagonist drug blocks or decreases the normal functioning of a neurotransmitter. The arousing effects of many stimulants are, for example, caused by a release and inhibited reuptake of dopamine and norepinephrine (Julien et al., 2011).

Besides the above mentioned theory on pharmacological action inherent to each psychoactive substance, other psychological, environmental and cultural variables influence the overall experience of a drug's effects (Julien et al., 2011). In addition, genetic factors are proven to affect the sensitivity and tolerance to the effects of drugs (Boehm, Reed, McKinnon, & Phillips, 2002). The theory of drugs, set and setting (Zinberg, 1986) contends that there are at least two additional determinants which need to be taken into consideration in order to understand how a drug affects a person; 1) *set* includes the drug user's expectations, intentions, beliefs, attitudes and personality structure at the time of consumption, and 2) *setting* constitutes the environment, circumstances, and social context in which the drug use takes place. The inherent pharmacological drug effects combined with the set and setting are crucial elements in determining the outcome of a drug experience (Dalgarno & Shewan, 2005; Eisner, 1997; Metzner, 1998; Zinberg, 1986). A fourth determinant, "the matrix", is referred to as the *"environment from which the subject comes: the environment surrounding the subject before and after the session, and the larger environment to which the subject returns"* (Eisner, 1997). Several researchers have argued that careful consideration to these determinants can reduce the risks of side-effects to a minimum. In other words, if a drug user is thoughtful, knowledgeable, well-prepared, and mindful of the environment in which the consumption takes place, the effects can be non-obtrusive, self-controlled, and potential harm can be reduced significantly while the positive effects maximized (Dalgarno & Shewan, 2005; Zinberg, 1986). The extent to which each determinant (drug, set, and setting) affect the overall experience is believed to vary between drug types; the hallucinogenic experience, for example, is known to be determined primarily by set and setting while the outcome of stimulants and opioids is more reliant on the inherent pharmacological action (Metzner, 1998).

Another key theoretical concept in relation to drug effects relates to the phenomena of altered states of consciousness (ASC), which is somewhat difficult to define, perhaps because of the elusiveness and subjectivity of consciousness itself (Tassi & Muzet, 2001). In any case, ASC most often refers to the non-ordinary states and experiences characterized by distinct deviations from the normal waking state, which can be induced not only by psychoactive drugs but also by techniques such as hypnosis, meditation, music, sensory overload, sleep deprivation and so forth (Blackmore, 2010). Besides being defined by the method of induction, ASC is associated with objective physiological patterns and behavioral measurements such as heart rate, emotional expression, and neural activity correlates. More commonly though, ASC is defined by subjective measures: *“a qualitative alteration in the overall pattern of mental functioning, such that the experiencer feels his consciousness is radically different from the way it functions ordinarily”* (Tart, 1972). Another definition states that ASC is *“a change in thinking, feeling and perception, in relation to one’s ordinary baseline consciousness, that has a beginning, duration, and ending”* (Metzner, 1992). Most subjectively oriented definitions place importance on the distinct deviations from the normal patterns of subjective experience in the waking state of consciousness (Blackmore, 2010). The following is a comprehensive list of potentially altered functions affected in a drug induced ASC: attention, perception, imagery and fantasy, inner speech, memory, higher-level thought processes, meaning and significance, time perception, emotional feeling and expression, arousal, self-control, suggestibility, body image, and sense of personal identity (Farthing, 1992). For instance, a drug can alter attention so that it becomes outwardly or inwardly oriented as well as narrowly or broadly focused. Some drugs are known to induce an altered state in which short-term memory is reduced and a liberating “here-and-now” state occurs, which is believed to entail changes in the perception of time (Blackmore, 2010). Levels of arousal are also known to vary considerably during altered states; stimulant induced activation is drastically different from deep relaxation in some forms of meditation (Blackmore, 2010). Some have argued that intentional use of ASC goes back long in history, and that humans and animals have an inherent and natural drive for the alteration of consciousness, analogous with e.g. hunger or sex (Weil, 1998).

Two other relevant theoretical constructs in the discussion of drug effects are tolerance and sensitization. Repeated use of a particular drug may lead to decreased sensitivity to some or all of the effects of that drug as a result of expo-

sure to it, which is called tolerance. In other words, the potency of effects from use of a specific dosage level of a drug decreases over time, and more of the drug is required to induce the same strength of physiological and psychological effects (Julien et al., 2011; Miller, Dackis, & Gold, 1987). In technical terms, drug tolerance represents a negative change in the dose-response curve. The concept of cross-tolerance refers to the notion that a drug can cause tolerance to other drugs with the same type of pharmacological action. The underlying mechanism of drug tolerance is homeostasis; the nervous system's efforts to adapt to the continued presence of a drug and maintain a state of optimal balance by changes in neural functioning (Poulos & Cappell, 1991; Wagner, 2003). For example, exposure to an agonist type of drug and the over-activation of receptors for a particular neurotransmitter may decrease the number of receptors or reduce their efficiency. Conversely, the use of an antagonist drug may result in an increase of receptor and improved responsivity for a particular neurotransmitter, which is referred to as sensitization. In either case, the restoration of disrupted homeostasis leads to compensatory responses which most often are diametrical to the initial drug effects. Sudden elimination of a drug after sustained use can therefore manifest as severe abstinence or withdrawal, which may consist of strong, adverse and oppositional reactions. The severity of withdrawal depends on several factors such as the number of repeated exposures, dose, and the rapidity of drug elimination from the system (Poulos & Cappell, 1991; Siegel, 1983; Wagner, 2003).

Just as in the case of set and setting outlined above, the role of learning and experience also plays an important role in drug tolerance. Contingent drug tolerance, for example, denotes that the particular effects an individual is tolerant towards need to be actually experienced; only receiving the drug is at least in some cases not enough for the development of tolerance. Furthermore, conditioned tolerance refers to a person's experience with the drug administration environment and adaptation to specific situational cues (Siegel, 1983; Wagner, 2003). In other words, the consumption of a particular drug outside the context in which the drug is normally consumed may lead to more intense effects even if the dose level is the same. This theory also states that each drug administration is equivalent to a Pavlovian conditioning response where the situational cues constitute conditioned stimuli and the drug effects are unconditioned stimuli. The situational cues (conditioned stimuli) associated with drug use are believed to evoke progressively stronger and stronger compensatory condi-

tioned responses opposite to the unconditioned drug effects, which counteract the drug effects and produce situational tolerance (Siegel, 1983). Importantly, conditioned tolerance not only incorporates cues external to the self but also internal stimuli, which means that thinking about a drug can elicit compensatory conditioned responses and entailing abstinence (Siegel, 2008).

NPS can be classified by their chemical structure and by their type of effect. The degree of subtlety in any classification of drugs varies, most likely depending on the purpose of the classification and who it is supposed to be useful for. A coherent and established classification system and terminology does not appear to exist (Tracy, Wood, & Baumeister, 2017) although several attempts to overview NPS have been made. For example, a highly comprehensive and refined approach to NPS classification directed towards health professionals lists twelve substance groups based on their molecular structure (Schifano, 2015) while an investigation of online drug forum data and other resources revealed no more than four main classes of NPS including psychostimulants, dissociative anesthetics, hallucinogens, and benzodiazepines (Beharry & Gibbons, 2016). Another article reviewed the available literature on the most common NPS which were divided into synthetic cannabinoids (“Spice”), *Salvia divinorum*, and cathinone derivatives (Johnson et al., 2013). A PubMed literature review (Hohmann et al., 2014) and seizure data published by the EMCDDA (2015) confirms that synthetic cannabinoids and cathinones derivatives with stimulating effects are the most common groups of NPS. Zawilska (2015) agrees that synthetic cannabinoids and stimulants are the most popular among users in most countries and underlines that specific NPS may induce a combination of effects from several effect classes. Drawing upon the possible approaches to NPS classification, and this paper’s emphasis on the users’ experienced effects and motivation for use, the following mixed version of effect- and chemical structure classification has been extracted from the literature and used for the purpose of this paper; hallucinogens, stimulants, dissociatives, GABA activating substances (henceforth GABA), synthetic cannabinoids, and opioids.

Hallucinogens

The hallucinogens, comprised of psychedelic phenethylamines and tryptamines, induce effects similar to LSD or psilocybin (“magic mushrooms”), which include euphoria, well-being, sensory enhancement, insight, new perspectives, and strong alterations in perception and awareness (Beharry & Gibbons, 2016;

Gibbons, 2012; Schifano, 2015). They are also considered “entactogens” because of their ability to increase empathy and social bonding. The side-effects mainly include fearful reactions like paranoia and anxiety (Kjellgren & Soussan, 2011). Some novel phenethylamines are in rare cases known to cause serious health implications such as tissue necrosis, seizures and even death (Hohmann et al., 2014; Thorlacius, Cedercrantz-Borna, & Personne, 2008).

Stimulants

Novel stimulants often mimic the effects of established stimulants like cocaine and amphetamine, and are associated with increased alertness, euphoria, disinhibition, increased locomotor activity and impulsivity, palpitations and increased blood pressure (Baumeister, Tojo, & Tracy, 2015; Schifano, 2015; Zawilska, 2015). Higher doses can entail psychotic symptoms such as derealization, depersonalization, and paranoia. The side effects can also include a range of cardiovascular, cognitive, psychiatric, and neurological symptoms such as hypertension, anxiety, hyperthermia, or possibly death, as suspected in a case related to the use of ethylphenidate in Germany (Krueger et al., 2014; Zawilska, 2015). Moreover, a range of likely effects have been linked to the use of stimulants in general: *“euphoria, increased energy/decreased fatigue, reduced need for sleep, decreased appetite, decreased distractibility, increased self-confidence and alertness, increased libido, and prolonged orgasm”* (Phillips, Epstein, & Preston, 2014). Other physical and possibly more disagreeable effects may include *“tremor, diaphoresis, increased muscle tension, tachypnea, hyperreflexia, and hyperpyrexia”* (Phillips et al., 2014). In addition, use of stimulants has been linked to increased sociability and talkativeness. In general, psychostimulants are also characterized by their high abuse potential, reward sensitization, and fierce withdrawal symptoms, which is argued to be true for at least some of the novel stimulants as well (Baumeister et al., 2015; Gibbons, 2012; Markowitz et al., 2000; Zawilska, 2015).

Dissociatives

The novel dissociatives induce effects which are similar to established counter-part drugs such as ketamine and PCP, which induce a dissociated state characterized by weightlessness, absence of time, and disconnection from the physical body (Tracy et al., 2017). The effects, which are known to be dose dependent, can be both stimulating and hallucinogenic. In addition, the effects include altered sensory perception, dissociation from the environment, loss of inhibition and spiritual or out of body experiences. The possible side effects range from

high blood pressure, tachycardia, anxiety and high abuse potential to derealization, motor incoordination and psychotic experiences (Beharry & Gibbons, 2016; Kjellgren & Jonsson, 2013; Schifano, 2015).

GABA activating substances (benzodiazepines)

GABA activating substances usually have muscle relaxant, anxiolytic, hypnotic and sedative properties. They are also used for their euphoric and anesthetic qualities, and are associated with rapid development of tolerance, withdrawal and abuse potential (Andersson & Kjellgren, 2017; Beharry & Gibbons, 2016; Schifano, 2015).

Synthetic cannabinoids

Synthetic cannabinoids, so called “Spice”-products, are alternatives to established herbal cannabis, which produce a highly potent and cannabis-like effect characterized by alterations in cognitive function, mood, and perception. More specifically, the effects include euphoria, increased empathy and better social interactions. Other documented properties include hallucinations, increased appetite, elevated heart rate and blood pressure levels, mydriasis, and dry mouth. More severe and long-term side effects incorporated dependency, withdrawal, psychosis-like states, seizures, vomiting, depression and emotional numbness (Johnson et al., 2013; Schifano, 2015; Soussan & Kjellgren, 2014b; Zawilska, 2015).

Opioids

The effects of novel opioids are similar to heroin and morphine although in many cases several times more potent (EMCDDA, 2015; Katselou, Papoutsis, Nikolaou, Spiliopoulou, & Athanaselis, 2015). They are known for their analgesic, sedative and euphoric effects. Some of the possible side effects include ototoxicity (hearing disorders), hypothermia (reduced body temperature), respiratory depression, and high dependency potential. Moreover, multiple cases with fatal outcome have been reported throughout Europe (Schifano, Orsolini, Duccio Papanti, & Corkery, 2015).

NPS user characteristics

The typical NPS user has primarily been depicted as a young male (Corazza et al., 2014; Maxwell, 2014; Vardakou, Pistos, & Spiliopoulou, 2011; Werse &

Morgenstern, 2012) although a study of patterns of synthetic cannabinoid use in Australia reported that middle-aged adults constituted a quarter of the overall sample which had a median age of 27 (Barratt, Cakic, & Lenton, 2013). Moreover, an investigation of a self-selected sample of novel stimulant users in Slovenia showed that males and females were evenly distributed (Sande, 2016). The studies above also reported diverse differences in the users' educational level and employment status. Accordingly, some NPS users are known to be well-informed, knowledgeable, and experienced with drugs in general (Davey, Schifano, Corazza, & Deluca, 2012; Soussan & Kjellgren, 2014a; Werse & Morgenstern, 2012) while others appeared to be less informed, more prone to risks, and showed low levels of literacy (Corazza et al., 2014; Kaló, Móró, Demetrovics, & Felvinczi, 2017; Maxwell, 2014). Another study revealed that some of the so called "psychonauts" who populate drug discussion forums view themselves as "psychedelic researchers", "new shamans", "philosophers", or "alchemists", and that they displayed above average employment conditions, high introspection capacities, verbal fluency, and high levels of drug knowledge (Orsolini, Papanti, Francesconi, & Schifano, 2015). The variations in NPS user characteristics across studies most likely reflect the methodological and regional differences as well as a difficulty to regard the users of NPS as a coherent and easily defined group. Walsh (2011) has argued that hidden populations, such as healthy and normally functioning adults, exist among drug users. In addition, Werse and Morgenstern (2012) have outlined several NPS user types which differ in terms of previous drug experience, substances of interest, and intentions for use. Also, contradictory user discourses, such as risk-neglectors and harm reduction advocates, have been observed among peers in online NPS communities (Barratt, Allen, & Lenton, 2014; Soussan & Kjellgren, 2014a). The research into these communities also revealed a strong counter public attitude and distrust of social institutions (Duxbury, 2015).

Motivation

Little knowledge exists about the reasons for NPS use and further research is needed to explore these reasons (Moore et al., 2013). A better understanding of the motivations for drug use is believed to improve prevention efforts and reduce drug-related harm (Adams et al., 2003; Boys, Marsden, & Strang, 2001). For example, determining if drug use is driven by rewards (positive reinforcement) or escape (negative reinforcement) is claimed to be essential for effective

prevention. Moreover, prevention campaigns that neglect to acknowledge the pleasure incentive may be resisted and could paradoxically serve as motivation for engagement in drug use (Barratt et al., 2014). A more nuanced understanding of the specific reasons for drug use is also believed to increase the ability to tailor messages relevant to the appropriate target groups (Boys et al., 2001; Sutherland et al., 2017).

The field of motivation is, however, a vast and complex area of research including a range of human motivation models in general and drug use theories in particular. There is also a branch of research concentrated solely on describing the explicit reasons rather than explaining drug use with a general theory. Moreover, the literature on drug use is divided into those who focus only on problematic and non-beneficial drug abuse (e.g. West, 2006) and those who recognize but differentiate this behavior from recreational, instrumental or otherwise beneficial use (e.g. Müller & Schumann, 2011; Nicholson, Duncan, & White, 2002). Making a distinction between problematic and non-problematic drug use is important since epidemiological and clinical data demonstrate that the majority of drug users are not and will never become addicts (Müller & Schumann, 2011; Nicholson et al., 2002). To complicate the matter further, drug use theories are rooted either in the biological, psychological or social domains of life. Some researchers have also emphasized genetics and personality rather than motivational models in explaining why people consume drugs (Andrucci, Archer, Pancoast, & Gordon, 1989; Goode, 2012; Wills, Vaccaro, & McNamara, 1994). In most cases, the multitude of theories and perspectives on drug use and abuse are complementary rather than contradictory in nature. No comprehensive and all-encompassing theory that fits with all individuals, situations and domains has fully been accepted by the scientific community (Goode, 2012). Although the present investigations are primarily data-driven, and use the participants' experiences rather than guiding theory as point of departure, a selection of influential theory on motivation is presented below for the sake of later discussion and framing of the findings.

Abuse and addiction

The complexity of drug use motivation is reflected by the sheer number of theories presented in a review by West (2006). Although the paper was psychologically oriented and concerned only problematic use, the number of theories explaining addiction amounted to 30. Defining addiction is somewhat difficult; it

can either be defined by related diagnostic criteria or as a concept, and it also changes over time. Addiction has traditionally been defined as “*a state of physiological adaptation to presence of a drug in the body so that absence of the drug leads to physiological dysfunction which is manifest to the sufferer as unpleasant or even life-threatening withdrawal symptoms*” (West, 2006). Newer conceptualizations of addiction emphasize the engagement in harmful behaviors rather than the physiological withdrawal symptoms since these in themselves pose little threat and can be treated while compulsive behaviors constitute serious long-term threats to the well-being of drug users and others. Hence, addiction is defined as “*a syndrome in which a reward-seeking behavior has become out of control*” (West, 2006). It is also meaningful to distinguish between habitual drug use and addiction since not all habitual drug users are addicts while most if not all addicts are habitual drug users who continue to take drugs even though adverse effects on well-being of self and others exist, and repeated efforts to stop using have failed.

The self-medication model of addiction is one of the more influential theories. It states that there is a link between psychological mood disorders and drug use, and that the addict takes drugs in order to cope with challenging life experiences (West, 2006). In other words, individuals with poor emotional regulation skills are likely to use drugs to manage negative affective states. The theory includes the concept of cost-benefit analysis, which means that the perceived benefits have somewhat mistakenly been calculated to outweigh the risks. The theory holds that in the end the drug will be both the cause and solution to the initial problem. Choice of drug is known to vary with the sought-after drug effect, which include, for example, the alleviation of anxiety and management of psychiatric disorders (West, 2006). Central to this idea is that drugs enable short term relief of symptoms which in the long term will perpetuate and increase with use, and that the addict is unable to gain insight into his or her own distress due to the addiction.

Another historically predominant psychological theory of addiction, related to the self-medication model, is the mechanism of reinforcement. According to these types of theories, people use drugs to maximize reward and minimize punishment, often via hedonic effects (Goode, 2012; Sullivan, Hagen, & Hammerstein, 2008; West, 2006). In essence, addicts continue to abuse a drug because they have previous experience of being rewarded for it. This turns into a non-active associative learning mechanism in which drugs reward behaviors

that result in use of more of the same drug. This idea rests on the notion that the underlying process of reinforcement engages primary evolved and instinctual parts of the brain. Reinforcement can be either positive (reward) or negative (escape), and every repetition of drug use leads to stronger cue-response-reward associations just like in a maladaptive feedback loop. Abstinence or withdrawal derives from the compensatory effects of physiological adaptation and tolerance to the continued presence of a drug that is no longer in the system. A vicious abusive circle is created when increasingly larger doses are needed to alleviate the aversive symptoms of abstinence, which often are diametrically different from the initial drug effects (Goode, 2012; West, 2006). The negative spiral of continued self-administration in order to escape abstinence (negative reinforcement) is at the foundation of various physical-dependence theories of addiction. Although appealing in its simplicity, these theories do not explain why detoxified addicts relapse. Hence, complementing theories based on the premise that addiction is driven by craving for the pleasurable effects, so called positive-incentive theories, have emerged (Berridge & Robinson, 1998; Higgins, Heil, & Lussier, 2004). Experiments with rats and the pleasure centers in the brain showed that the release of dopamine plays a crucial role in the rewarding and habit forming effects. These theories of addiction have been extended with a recognition of the importance of drug-associated cues and their role in creating Pavlovian-like conditioned compensatory responses responsible for craving and relapse (Skinner & Aubin, 2010). Furthermore, many addicts have reported a compulsory drive towards wanting the drug even though the actual experience of the effects are not as pleasurable as previously. Therefore, recent theory of addiction, the so called incentive sensitization theory, makes a clear distinction between wanting (positive-incentive value) and liking (hedonic value). The theory states that the key driver of addiction is the positive-incentive value or the anticipated pleasure, which increases over time and with repeated administrations in people predisposed to addiction (Berridge, Robinson, & Aldridge, 2009; West, 2006). According to the same theory, wanting and liking is closely related in the initial phase of drug abuse, but as tolerance to the pleasurable effects (liking) develops and the craving (wanting) gets sensitized the two fall out of proportion, leaving the addict desperately wanting something that never fully satisfies the anticipated pleasure. It has been demonstrated that liking and wanting are related to different psychological processes and neural circuitries (Berridge et al., 2009; West, 2006).

Instrumental drug use

Abuse and addiction theories seldom acknowledge recreational, instrumental or otherwise beneficial use of drugs, and if they do it is regarded as an intermediary step towards addiction (Müller & Schumann, 2011). Epidemiological and clinical data, however, suggest that the majority of people who try drugs will never become addicts (Nicholson et al., 2002). In addition, there is growing awareness of addiction as a specific expression of a more general behavioral problem including e.g. poor decision making and bad impulse control, which lead to compulsory behaviors per se among a certain number of people (Baler & Volkow, 2006; Yücel & Lubman, 2007). In contrast to the predominant reinforcement model of addiction and its view of human nature as passive, inherently vulnerable and susceptible to problematic drug use, evidence demonstrates that drug use in many cases incorporates a rational appraisal process (Boys et al., 2001). Reducing the initiation and maintenance of drug use entirely to the mechanisms of rewarding feedback loops and the “hijacking” of the brains reward circuits are therefore unsatisfactory as a theory. The reinforcement paradigm of addiction has also been criticized for 1) over-generalizing the results of mouse-model studies under experimental conditions to humans, and 2) not distinguishing between the differences in addiction potential among drug types. Studies have namely showed that improved and enriched environments with non-drug alternative choices significantly reduce drug self-administration, and that established dopamine related reinforcement concerns primarily stimulant type of drugs (Ahmed, Lenoir, & Guillem, 2013; Badiani, Belin, Epstein, Calu, & Shaham, 2011; Solinas, Thiriet, Chauvet, & Jaber, 2010). The need to acknowledge non-problematic and instrumental use of drugs has been highlighted by several researchers in order to avoid possible counter intuitive effects of the more pathologising views of that type of behavior (Ellis et al., 2012; Müller & Schumann, 2011; Nicholson et al., 2002).

The concept of drug instrumentalization is an alternative theoretical framework for non-problematic drug use, which is seen as “*a stable and widespread behavior in its own right*” (Müller & Schumann, 2011). According to this framework, drugs are consumed for the effects on mental states and the entailing support of personal goal-achievement. The idea is that individuals can learn that mental states can be altered intentionally through drugs and that a particular effect of a substance is recognized and remembered for subsequent facilitation of non-drug-related improvement of personally beneficial behaviors. For example, the ef-

fects of caffeine (the instrument) will after a tiring day induce a more attentive state of mind which could enable improved studying abilities. Other research has also emphasized the importance of an instrumental drug use model, and argues that the intentional utilization of drugs for certain functions and attainment of personal goals predicts the likelihood of future consumption (Boys et al., 2001). This is also in line with the evolutionary model of risky adolescent behavior, which posits that drug use and similar activities should be understood as evolutionary adaptive functions rather than maladaptive or dysfunctional behavior (Ellis et al., 2012). In sum, these theories emphasize that humans have the ability to learn and use psychoactive substances and altered mental states for fitness-relevant outcomes rather than their immediate rewarding effects. The concept of cost-benefit analysis is present in these theories as well but denotes a conscious rational process rather than miscalculation (Ellis et al., 2012; Pennay, 2015).

Sensation seeking

The relationship between substance use and personality has been thoroughly investigated over the last decades. Studies demonstrate that drug consumption behaviors can be predicted by personality measures (Andrucci et al., 1989; Yanovitzky, 2005). In particular, high levels of the sensation seeking personality trait are associated with increased adolescent drug use as well as chronic drug abuse. Sensation seeking is defined by *“the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences.”* (Zuckerman, 2015). It is theorized that sensation seeking individuals find not only the illegal risk taking exciting but also experience the neurological stimulation of the actual substance use rewarding (Yanovitzky, 2005). Also, the act of using drugs is appealing in the sense that it is unconventional and constitutes a new kind of experience (Zuckerman, 2015). Furthermore, there seems to be a correlation between sensation seeking and the number of experienced drugs. Also, the perception of risk differs considerably between the high and low sensation seekers in that the persons with high sensation seeking qualities are less likely to consider drug use risky (Zuckerman, 2015). Other similar personality dimensions such as novelty seeking, harm avoidance and reward dependence have been correlated with initial drug consumption among adolescents, and those dimensions are *“assumed to reflect brain systems involved in adaptation to novel, aversive, and appetitive stimuli in general”* (Wills et al., 1994).

Self-determination theory

Going beyond drug use theories in particular reveals a multitude of general human motivation theories. One of the more influential and well supported theories is Self-Determination Theory (SDT), which is especially suitable as a framework for the current investigations because it 1) has an affinity with successful substance abuse programs (Deci & Ryan, 2008), 2) applies to diverse populations in several health promotion contexts such as drug use, tobacco cessation, weight loss, medication adherence and diabetes management (Ryan & Deci, 2000b; Smith, 2011), 3) is increasingly used for explaining and understanding health related behaviors (Fortier, Williams, Sweet, & Patrick, 2009), 4) focuses not only on the amount or intensity of motivation but rather its type or orientation (Deci & Ryan, 2012), and 5) commonly utilizes self-reports as a motivation measurement (Ryan & Deci, 2000a). SDT assumes that humans have a natural and inherent tendency for self-motivation, growth, personality integration, and well-being. Substantial empirical evidence supports the fact that satisfaction of three fundamental psychological needs (competence, autonomy, and relatedness) is vital for a person to be internally motivated, which in turn facilitates optimal functioning, energization of behavior, life-satisfaction, well-being, and social and personal development (Deci & Ryan, 2012; Fortier et al., 2009; Ryan & Deci, 2000b). The sense of autonomy and competence is seen as crucial for the integration and internalization of behaviors and thus moving an individual towards a more self-determined orientation. SDT emphasizes the importance of identifying the extent to which a behavior emanates from the self, or whether it is externally regulated. According to SDT, the style of behavior regulation falls along a locus-of-causality spectrum ranging from amotivation to different forms of extrinsic motivation to intrinsic motivation (Deci & Ryan, 2012; Ryan & Deci, 2000b). In other words, the driving force behind a behavior can vary in regards to its relative autonomy. For instance, people can be moved to do something because they inherently value that activity or because they feel strong external pressure, demand or seduction. In essence, the distinct types of motivation outlined in SDT have consequences for well-being and performance, among other things. For instance, intrinsic motivation, found at the self-determined end of the spectrum of motivation types, is characterized by an *“inherent tendency to seek out novelty, challenges, to extend one’s capacities, to explore and to learn”* and describes the *“natural inclination toward assimilation, mastery, spontaneous interest, and exploration”* (Ryan & Deci, 2000b). Taken together, intrinsic motiva-

tion refers to the engagement in an activity for the rewards inherent in the activity itself. Social environments can facilitate or forestall intrinsic motivation in people by the way they support the three innate psychological needs. Extrinsic motivation, found at the controlled end of the spectrum of motivation types, is characterized by the extent to which the value and regulation of a behavior have been internalized, which range from amotivation and lack of control, to passive compliance, to self-control, to active personal commitment and congruence (Ryan & Deci, 2000a, 2000b). Externally regulated behaviors vary in their relative autonomy but are performed to attain a separable outcome, to satisfy a demand, or for rewards or to avoid punishment. The importance of greater internalization for well-being and life-satisfaction has already been mentioned, but how does one move a person towards self-motivation? Relatedness is of key concern since individuals are more likely to adopt behaviors valued by significant others (Ryan & Deci, 2000b). Moreover, social environments which facilitate competence and adopt an autonomy supportive attitude rather than exerting excessive amounts of external control are more likely to engender intrinsic motivation and thus well-being, life-satisfaction, and better performance.

Promotion and prevention orientation

Yet another perspective on human motivation comes from Self-Regulatory Focus theory (SRF), which highlights the importance of extending the dominant and appealingly simple principle that people are motivated by a hedonic approach of pleasure and avoidance of pain with further underlying principles of its functioning (Higgins, 1997). Another such important principle concerns people's self-regulatory orientation and the strategically different ways in which they reduce the discrepancies between current states and desired end-states. According to SRF, this can be accomplished by means of two coexisting motivational systems called promotion and prevention. These systems differ in regards to what essentially drives behavior (nurturance vs security), and what regulatory style (eagerness vs vigilance) is favored when monitoring the self in pursuing goals and directing behavior to reach certain ideals (Higgins, 1997; Scholer & Higgins, 2012). Promotion-focused regulation is guided by wants, ideals, and advancements. This orientation is also concerned with accomplishments and the pursuit of goals through eager approach strategies. What matters to a promotion-focused individual are positive deviations from the neutral state – the difference between “0” and “+1”. In other words, they are much more

sensitive to gains vs non-gains in relation to their ideals than they are concerned with negative deviations from status quo. Prevention-focused individuals, on the other hand, are duty oriented and disposed towards the prevention of negative outcomes through the use of vigilant avoidance strategies. Greater significance is therefore placed on not losing anything – the difference between “0” and “-1” (Scholer & Higgins, 2012). Prevention-oriented self-regulation is focused on avoiding risks and not making mistakes while promotion-oriented self-regulation involves a focus on hits and not missing opportunities. It is assumed that people need both systems although one is likely to dominate over the other in any given moment due either to persistent personality preferences or situational factors (Higgins & Spiegel, 2004). In essence, *“Individuals can increase the likelihood that they will attain a desired end-state (reduce discrepancies) by either approaching matches or avoiding mismatches to that end-state”* (Higgins, 1997), and *“within the promotion system, the price of happiness is vulnerability to depression. Within the prevention system, the cost of calm is vulnerability to anxiety”* (Scholer & Higgins, 2012).

Relevant to the discussion about drug use, prevention-focused individuals in an unsatisfactory state of “-1” are known to take substantial risks in order to return to the neutral state (Scholer & Higgins, 2012). The promotion-focused individuals are to a greater extent eagerly motivated to seek out opportunities for the ultimate experience, which makes them vulnerable to extreme lows. They will, however, choose the enriched over the impoverished alternative, even if that comes at a cost (Zhang & Mittal, 2007). Furthermore, promotion-focused individuals have to a greater extent been linked to chronic thrill seeking and health-detrimental behaviors like use of stimulants to overcome illness (Uskul, Keller, & Oyserman, 2008). Furthermore, the match or fit between a person’s self-regulatory orientation and the strategic means used to attain a desired end-state is known to be variably congruent. A good regulatory fit affects the degree of engagement in an activity positively, and creates a sense of “rightness” in the individual (Lee & Aaker, 2004; Scholer & Higgins, 2012).

Explicit reasons

An alternative and common way of approaching the motivation for drug use is to list the explicit and specific reasons rather than explaining drug use through a theoretical model, which seems to be the case in all the NPS-specific studies available. The present investigations are mainly oriented towards this approach. In this regard, many sources have emphasized that the motivation for using

NPS revolves around external circumstances such as price, legal status, purity, availability or non-detectability in screening tests (Sutherland et al., 2017). Other findings suggest that users are driven mainly by curiosity, enhancement of social situations, the enjoyable effects, and a desire to “get high” (Corazza et al., 2014; Johnson et al., 2013; Measham et al., 2010; Sande, 2016; Werse & Morgenstern, 2012; Winstock, Lawn, Deluca, & Borschmann, 2016). It is also likely that the motivations for using NPS overlap with the motivations for using established drugs. A review of the literature on motivations for drug use in general exposed several other recurring incentives such as pleasure, enhancement, coping, self-assertion, habit and addiction, and self-exploration (e.g. Boys et al., 2001; Nicholson et al., 2002; Novacek, Raskin, & Hogan, 1991). Some of these motives have been documented in reviews about different NPS. For example, the use of novel stimulants has been associated with salient addiction potential and sought-after effects such as the facilitation of social situations, euphoria, cognitive enhancement, and increased energy and motivation (Beharry & Gibbons, 2016; Hohmann et al., 2014; Johnson et al., 2013; Ragan, Bard, & Singh, 2013; Zawilska, 2015). On the contrary, an investigation into the experiences induced by the novel hallucinogen 4-HO-MET (Kjellgren & Soussan, 2011) showed that the main reason for use was curiosity and self-exploration while, however, bingeing tendencies or experiences of addiction were absent. The use of benzodiazepines has been linked to sedative and anxiolytic effects with high addiction potential and related incentives such as self-medication, coping and as an aid to temper the “come down” effects of stimulants or hallucinogens (Andersson & Kjellgren, 2017; Beharry & Gibbons, 2016). The different motives for NPS use not only overlap with the established drug use motives but also indicate that the motivations might vary between substances from different effect-classes. The assumption of NPS specific motivations is further substantiated by the fact that legal status constituted a major incentive for the use of synthetic cannabinoids (Werse & Morgenstern, 2012) while the appeal of the novel stimulant mephedrone was found to be uninfluenced by legal status (Moore et al., 2013). Furthermore, use of novel stimulants and synthetic cannabinoids is to a greater extent motivated by opportunistic reasons (legality and availability) than other types of drugs (Sutherland et al., 2017). Hence, approaching the motivations from a broad and all-encompassing perspective of NPS in general will occasionally be unrefined, especially considering that a more nuanced understanding of the different pathways to drug use is assumed to be essential in enabling ef-

fective treatment, prevention and consequently a reduction in harm (Adams et al., 2003; Boys et al., 2001). Therefore it is important not only to study the motivations for NPS use in general but also to examine more fully if and how the motivational characteristics of each group of NPS differentiate.

Harms, risks and the lack of knowledge

Van Amsterdam et al. (2013) have argued that NPS, for several reasons, are undesirable. Compared to established drugs, there is a lack of knowledge about the risks and effects, their legal status can give the impression that they are safe to use, and no safe use practices have been established. Gibbons (2012) has also emphasized the imminent harm potential associated with NPS and states that users might play “Chemical Russian Roulette”, which is exemplified by the 70 cases with fatal outcome in the UK which were related to the use of the novel stimulant mephedrone. Furthermore, some NPS are known to be much more potent than the established counterpart drugs they intend to mimic, which easily can lead to overdosing or severe adverse effects (Beharry & Gibbons, 2016; van Amsterdam et al., 2013). Particularly harmful synthetic opioids or novel stimulants, with stronger potency than their established counterparts, have increasingly appeared on the drug market which targets the more vulnerable and problematic users (EMCDDA, 2016). This constitutes a great risk of fatal overdoses, especially if surreptitiously sold as heroin or amphetamine. For example, the potent novel stimulant alpha-PVP was associated with nearly 200 cases of acute intoxications and 100 cases with fatal outcome across Europe (EMCDDA, 2016). Furthermore, synthetic cannabinoids are full agonist in cannabinoid receptors, which in comparison to the partial agonist effects of their counterpart tetrahydrocannabinol (THC) in herbal cannabis is believed to result in stronger potency and several adverse effects (Atwood, Huffman, Straiker, & MacKie, 2010; Soussan & Kjellgren, 2014b).

There are very limited information and published data on specific NPS available to either users or health-care personnel (Gibbons, 2012; Pirona et al., 2017; Wood & Dargan, 2012). These substances have rarely or never been subjected to studies on humans or animals, which make them highly unpredictable. Long-term effects, dependency potential, toxicological risks, or possible contraindications are largely unknown. In addition, content declaration or warnings about side effects or hazardous substance interactions are mostly lacking (Schmidt, Sharma, Schifano, & Feinmann, 2011). In short, *“NPS have rarely been studied for*

the purposes they are being used for and therefore pose a considerable and significant threat to the health of society” (Beharry & Gibbons, 2016). Moreover, studies indicate that knowledge about NPS among health care professionals and prevention practitioners is not only lacking but the information they do know tends to be inaccurate (Simonato et al., 2013; Stogner, Khey, Agnich, & Miller, 2016). Another study identified a knowledge gap pertaining to NPS; timely and accurate information about NPS is unavailable for users and health care professionals (Pirona et al., 2017). Furthermore, an investigation into the use and risk awareness among students in the UK concluded that there is a growing need for reliable and scientific based information about NPS (Johnson et al., 2013).

The lack of knowledge is particularly visible in the case of the novel stimulant ethylphenidate. Despite being notified by the EU Early Warning System in 2011, a PubMed literature search on Oct 5 2014 yielded only 19 hits, which mainly covered analysis techniques, mice models, or its counterpart drug methylphenidate. Ethylphenidate has been described as an amphetamine-like psychostimulant, which acts as a dopamine and norepinephrine reuptake inhibitor (Gibbons, 2012). 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 (Markowitz et al., 2000). 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 (Patrick et al., 2014). 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 (Dresler et al., 2013; Farah, Smith, Ilieva, & Hamilton, 2014; Ragan et al., 2013). Although undocumented in the literature, the legal ambiguity and online availability of ethylphenidate make it a presumable candidate for such purposes, which add to the importance of studying its characteristics. Moreover, a study (Krueger et al., 2014) has concluded that cardiovascular side effects related to the use of ethylphenidate might have contributed to one fatality in Germany. Besides this and the broad general characteristics of stimulants

outlined above, very little specific knowledge about ethylphenidate exists, which highlights the need for further research.

The role of the Internet and social identity

The Internet has not only played a part in enabling the rapid and global diffusion of NPS. Several researchers have suggested and utilized the Internet as data source in order to bridge the knowledge gap pertaining to NPS and their patterns of human use (Beharry & Gibbons, 2016; Bruno, Poesiat, & Matthews, 2013; Winstock & Ramsey, 2010; Wood & Dargan, 2012). Besides being a key market place for NPS, the Internet is also the home of increasingly popular discussion forums and other resources in which communities of users voluntarily contribute and exchange drug related information. An online community is defined as *“an Internet-connected collective of people who interact over time around a shared purpose, interest, or need”* (Yuqing Ren, Kraut, & Kiesler, 2007). Previous studies theorize that the goal of online communities may be functional or hedonic, the former meaning a *“symbiotic exchange of useful information”* and the later referring to the *“creation and consumption of a positive, confluent experience through interaction”* (Bagozzi & Dholakia, 2002). This is in line with recent investigations demonstrating that activities in online drug communities function as a social support system where users assist each other in uncovering all sorts of substance facts and administration techniques based on both scientific knowledge and the users’ own experiences. In addition, the community members display salient experiences of social togetherness and peer cohesiveness (Kjellgren, Henningsson, & Soussan, 2013). Another prominent forum feature involves the connoisseur-like sharing of drug experiences and best practices to optimize drug use and avoid adverse side-effects. It has been speculated that the users’ willingness to contribute to the online drug communities comes from mistrust in public institutions and an entailing desire for – in their eyes – unbiased drug information. Some researchers have hypothesized that the social ritual and moral practice involved in the knowledge exchange, called *“marginal citizen science”*, constitutes an incentive for drug experimentation per se (Duxbury, 2015). Several studies have highlighted the user guided focus on harm reduction in these communities (Chiauzzi, DasMahapatra, Lobo, & Barratt, 2013; Duxbury, 2015; Móró & Rácz, 2013; Rönkä & Katainen, 2017; Soussan & Kjellgren, 2014a) although one recent account proposed that the participants possessed inadequate resources for peer based harm reduction (Kaló et al., 2017). Moreover, another

study speculated that the shared peer to peer knowledge in these communities might contribute to a competence fallacy; an overestimation of one's abilities and an exaggerated sense of superiority possibly responsible for excessive risk taking (Rönkä & Katainen, 2017). Many of the users who populate the forums are believed to belong to a group of under-researched recreational drug users with a view of themselves as non-problematic drug users, and who are not interested in discontinuing their drug use (Stetina, Jagsch, Schramel, Maman, & Kryspin-Exner, 2008). A contended reason for the attractiveness of online forum discussions is the potential for anonymous interaction (Pendry & Salvatore, 2015). A closer investigation of the community characteristics and the discussions about NPS would therefore be beneficial for the development of knowledge about the NPS situation.

Several researchers suggest that social identity theory could be a useful framework to help explain the volitional and committed participation and contribution of information in online communities (Bagozzi & Dholakia, 2002; Shen, Yu, & Khalifa, 2010; Yuqing Ren et al., 2007). Discussion forums and social networking sites constitute an important medium through which social identity develops during adolescence, which in turn informs the perception of self and influences downstream behaviors and actions (Pegg, O'Donnell, Lala, & Barber, 2017). The concept of social identity would therefore be an especially suitable model for explaining why the participation in online drug community practices hypothetically constitutes an incentive for drug use (Duxbury, 2015). Furthermore, the identification with and engagement in online discussion forums evidently, and perhaps counterintuitively, promotes offline individual well-being and societal commitment (Pendry & Salvatore, 2015). This is in line with sociological theories on offline settings, which suggest that group identification, peer interaction, and close supportive relationships are strongly related to well-being, psychological health, and more effective coping strategies (Pendry & Salvatore, 2015). Interestingly, the positive effect of online interaction on offline behaviors seemed to take place only when the forum discussions concerned stigmatizing topics. Somewhat contradictory, another study showed that higher levels of exposure to alcohol related content on social networking sites (in this case Facebook) correlated with higher levels of alcohol use, which increased when the time spent participating on the site was low (Pegg et al., 2017).

In either case, the social identity theory (SIT), in essence, seeks to explain why and how people think, feel and behave in social terms. The central claim of SIT is that an individual's sense of self to different extents derives from the dynamic relationships of groups to which they belong and the emotional significance associated with that membership (Tajfel & Turner, 1986). According to SIT, there is not only one personal selfhood but rather multiple group affiliated identities which may be informed and activated by shared social identities in an ebb and flow manner, which in turn influence thoughts, emotions and behavior. Two relevant concepts are in-groups and out-groups; the former refer to a group to which an individual perceives membership (feelings of similarity and engagement) and the latter a group an individual does not identify with (Pegg et al., 2017; Tajfel & Turner, 1986). Forum members may, for example, differ in degree of forum identity inclusion in their self-concept. The online group membership is, however, a vital and valid informant of identity, and as such a significant determinant of outcome measures such as well-being and behavior (Pendry & Salvatore, 2015). It has also been argued that online forum users trade the "richness" of established face to face meetings with a possibility to satisfy other needs, such as social support not being met by any offline communities (Pendry & Salvatore, 2015). The importance of social identity in explaining the volitional knowledge contribution and exchange of information in online communities has been highlighted elsewhere (Bagozzi & Dholakia, 2002; Shen et al., 2010). Three processes by which the in-group and out-group mentality manifests exist; 1) social categorization means that individuals categorize other people in order to make sense of them-selves and distinguish appropriate from inappropriate behavior accordingly, 2) social identification refers to the process of becoming a member of groups with perceivably endorsed characteristics, which result in emotional relevance and a group dependent sense of self, and 3) social comparison denotes the process following categorization and identification in which in-group and out-group comparisons take place in order to sustain a view of the in-group as favorable and the out-group as the opposite (Tajfel & Turner, 1986; Yuqing Ren et al., 2007).

The use of data from the Internet

Anecdotal data from the Internet have previously been suspected to be biased or unreliable because of the difficulty to confirm, among other things, substance identity or purity (Davey et al., 2012; Wood & Dargan, 2012). However,

the Internet and the content of drug discussion forums has also been concluded to provide a wealth of information which could be useful for investigating NPS effects and trends (Beharry & Gibbons, 2016; Stetina et al., 2008). Recent research concluded that online drug forums are a valid and reliable source of information for identifying temporal trends and demographics (Paul, Chisolm, Johnson, Vandrey, & Dredze, 2016). Also, triangulation of data from sources like self-reported experiences and sub-population user surveys online has been advised in situations where other sources are unavailable (Wood & Dargan, 2012). In fact, self-reported experiences published online have successfully been used to analyze and document the characteristics of different NPS such as mephedrone, 4-HO-MET, methoxetamine, and “Spice” (Kjellgren & Jonsson, 2013; Kjellgren & Soussan, 2011; Soussan & Kjellgren, 2014b; Wood & Dargan, 2012). These studies revealed nuanced and NPS-specific effects and patterns of acute toxicity that were considered free from exaggerated drug romanticizing or distorting bias. For example, the results from an 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 (Kjellgren & Soussan, 2011). Using online and self-reported data have proved to be a time-efficient way of contributing to knowledge in a rapidly evolving field of research, especially when scientific information is scarce and unavailable to users, legislators, and health care practitioners (Simonato et al., 2013), as in the case of ethylphenidate.

Disregarding the validity concern, the Internet remains an undeniable reality and primary source of information for youth with sensitive or health- and drug-related issues of concern (Borzekowski & Rickert, 2001; Eurobarometer, 2011; Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005). In addition, the use of an online drug survey revealed an otherwise hidden population of recreational users who appeared to rely primarily on the Internet as trusted source of information about drugs (Stetina et al., 2008). The authors concluded, in line with Walsh (2011), that the use of Internet in research can enable access to a population of users who are inconspicuous in society and unreachable by established research methods. This provides further reasons to investigate the experiences posted online in order to understand the users of NPS and the reality facing young people on the Internet, and also to examine the possibilities for future research and prevention strategies.

Rationale for the investigations

The speed at which the market for drugs evolves is a challenge for public health professionals, prevention strategists, and researchers alike. The lack of scientific knowledge about NPS and its community of online users is impeding. Therefore, the aim of the present investigations was to contribute to the bridging of the knowledge gap pertaining to the field of NPS by 1) identifying and describing the NPS related discussions on the “leading edge” international drug discussion forums online, 2) documenting and characterizing the experiences following the use of NPS (in this case the novel stimulant ethylphenidate) by analyzing self-reports published anonymously on international Internet forums, 3a) surveying the characteristics, including differences in attitudes and motivations across drug types, among a self-selected sample of international NPS users online, 3b) investigating any underlying relationships between the motivation items in Study 3a, and check for correlations between the potential outcome components, drug types, and well-being, and 4) exploring and thematizing the self-reported reasons for NPS use among a sample of international NPS users online.

The present investigations

Study 1: Harm reduction and knowledge exchange—a qualitative analysis of drug-related Internet discussion forums

Aim

The aim of this study was to explore, define, and characterize the implicit and explicit features of the discussions about NPS on the “leading edge” international drug discussion forums.

Data Collection

The data were retrieved from the “leading edge” online drug discussion forums: bluelight.org, drugs-forum.com, and legalhighsforum.com. The 20 most recent threads of discussion in each subcategory of each forum were collected into a list (one for each forum), containing thread title and number of posts. Threads unrelated to NPS were removed. Each list was sorted by number of posts to find the threads most frequently discussed in each forum. The top 20 threads from each forum (a total of 60) were selected for further investigation and analysis. The total number of posts from all three forums was 13,082. All collected posts were in the English language. The gathering of data took place during October 2013, and the latest retrieved post was written October 22.

Analysis

The 60 discussion threads were analyzed individually by reading all posts in each of them in pursuit of recurrent topics of discussion. The analysis process was characterized by openness and a bias-free attitude and was undertaken through a systematic exploration of discussion topics and patterns in each thread. More specifically, each post was examined and interpreted for the underlying topic. Every time a new topic emerged in each specific thread, a code was created and related to that thread. For example, the thread titled “*Big n Dandy 2-FA (2-fluoroamphetamine) thread*” contained the following post: “*I used this substance for the first time and experienced chest pains and aches all over the body*”, which was coded as “*Sharing experienced side effects*”. Eventually, all the 60 discussion threads had a set of codes and multiple accompanying quotations to support the codes. Also, the codes were repeatedly checked for consistency through confirmation by comparison with other posts on the same topic in the same thread. On occasion, previously coded threads were re-read as new topics

emerged in other threads, which could have been missed. At one point, the codes were saturated, meaning no new topics emerged, which was interpreted as indicating that the largest part of discussion topics was covered by the analysis. Next, codes with coherent meaning were arranged into 51 categories. Eventually, the categories were combined into four overarching themes that characterized the discussions.

Ethical Considerations

Our research involved the collection and analysis of already existing information that was published on public Internet forums. No terms of access or special permissions restricted the discussions from public access. A discrete and observational approach was undertaken, and no interactions or interventions with forum discussions or members were made. The information available was therefore considered to be an observation of public behavior online, in compliance with the ethical guidelines and recommendations provided by SACHRP (2013). In order to further strengthen the anonymity of the forum members, we stripped the data set from user aliases and URLs. Also, a careful assessment of anonymity and search engine visibility for every presented quotation was undertaken before publishing. Certain quotation details have been altered in order to further protect the users' anonymity.

Results

The analysis revealed four general themes which characterized the NPS discussions on international Internet forums: (1) uncovering the substance facts, (2) dosage and administration, (3) subjectively experienced effects, and (4) support and safety. The findings indicate that the discussions involved an extensive exchange of knowledge about NPS and how to use them safely. The discussions were also characterized by a communal process in which forum users supported each other and contributed with cumulative experiences and knowledge whenever a new thread of discussion brought awareness to a previously unfamiliar substance of interest. More specifically, the initial and continuous characteristic of this generative process was to uncover the substance facts, which incorporated elaborate theoretical speculation of origin, classification, and molecular structure, as well as pharmacological action, tolerance, and toxicity. Many users displayed a very high level of knowledge, which reflects a dedicated interest in NPS as well as a focus on preparation and safety. The first theme dealt primarily with substance identification, pharmacology, and assessed not only purity but

also legal status and acquisition. The second theme focused on administration techniques, dose recommendations, technical talk about equipment, and preferred settings for drug use. The third theme involved a multitude of self-reported experiences, in which many different aspects of intoxication were depicted in great detail. The users emphasized both positive and negative experiences. The last theme incorporated the efforts of the communities to prevent and minimize harm by sharing information about potential risks of the harmful effects or contraindications of a substance. Also, online support and guidance were given to intoxicated persons who experienced bad or fearful reactions.

Study 2: “Chasing the High” – Experiences of Ethylphenidate as Described on International Internet Forums

Aim

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.

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. The “leading edge” communities and “key online resources” for accurate and timely information about NPS were used as data sources (Deluca et al., 2012). The local search engines of the eight identified Web sites were used to find experience reports involving ethylphenidate use specifically. A total of 100 ethylphenidate reports were found and collected. 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. The gathering of data took place in August 2014. The earliest report included 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 (Braun & Clarke, 2006) 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 pre-conceptions 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.

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 on Human Research Protections, 2013). 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. Ethylphenidate appeared as a potent psychostimulant with an imminent abuse potential. It was mainly used for recreational purposes, and the users' retrospective evaluations of the substance ranged from highly negative to positive. 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. The drug was administered in several different ways; of which insufflation was the most common although it appeared to cause severe corrosive side effects on the mucous membrane.

Study 3a: The users of Novel Psychoactive Substances: Online survey about their characteristics, attitudes and motivations

Aim

The aim of the present study was to investigate the characteristics, including attitudes and motivations, of a self-selected sample of international NPS users.

Data collection

The data were collected through an online survey, which was promoted at the international drug discussion forum bluelight.org. The survey consisted of three parts. The first part concerned background data including age, gender, country of residence, established drug use history, and number of different NPS used

within the last five years. The second part of the survey contained a set of NPS specific questions including substance name, way of acquisition, and 11 visual analogue scale (VAS) items with end points 0 (“Not at all”) to 100 (“Highly appreciated/motivated”), etc. The first three items investigated the extent to which the participants (1) appreciated the effects, (2) planned on using the substance again, and (3) estimated the addictive potential. The next eight VAS items concerned the motivation for using the specified NPS. The participants were asked to evaluate the extent to which they were motivated by (1) pleasure and enjoyment, (2) facilitation of social situations, (3) enhanced mental or physical abilities, (4) coping with pain, boredom, emotions and problems like anxiety and sleep deprivation, (5) self-assertion or self-confidence, (6) habit or addiction, (7) self-exploration or spiritual attainment, and (8) circumstances such as price, legal status, availability or non-detectability in screening tests. The eight motives were abstracted from the literature on motivations for drug use. The NPS specific set of questions was repeated for (and limited to) each of every participant’s three most recent and distinct NPS experiences. The survey software ensured that the initially stated number of used NPS determined the number of repetitions, meaning that every participant reported between one and three cases of NPS use. In the third part of the survey the respondents were asked to fill out the World Health Organization (WHO) Wellbeing Index (WHO-5), which is a well validated five-item questionnaire for assessing subjective and psychological well-being (Topp, Østergaard, Søndergaard, & Bech, 2015). The survey was online between November 2014 and February 2015 and yielded 1551 cases of NPS use reported by 619 participants.

Analysis

Each case of NPS use was categorized according to one of the following effect classes: hallucinogen, stimulant, dissociative, GABA activating drugs (henceforth GABA), synthetic cannabinoid, opioid and other-than-NPS. We categorized the following as other-than-NPS: (1) cases involving a combination of drugs, or (2) cases based on one of the following substances: alcohol, nicotine, cannabis, cocaine, LSD, amphetamine, heroin, psilocybin, and mescaline. According to Corazza et al., (2013), “novel” does not necessarily mean new but also incorporates long-existing substances “which have recently become popular in the drug market”. Therefore, a few grey-zone cases were categorized as novel if they were frequently reported. Next, the data were analyzed using

common statistical procedures in SPSS (descriptives and frequencies). A one-way- ANOVA was used to analyze if the motivation for using NPS was significantly different between drug groups.

Ethical considerations

The participants were informed about the study and its purpose before participating. They were also informed that participation was completely voluntary, and that they could withdraw from the study at any time without specifying why, as long as the survey was uncompleted. In addition, participation was anonymous and no questions about identity were asked. In order to participate the users had to verify being 18 years or older and that their latest use of NPS took place less than two years ago. The collected data have been carefully handled throughout to protect individual privacy so no unauthorized people can access it. The study was ethically approved by Karlstad University Ethical Review Board, dnr C2014/419.

Results

The sample consisted of 619 respondents from 42 different countries. The users' mean age was 27.6 years and the mode age was 18 years for both genders. A significant difference in age between males and females was found. The users reported an overall good emotional well-being despite extensive experience of both established and novel drugs. Lifetime experience of at least one illicit and established drug was 99%. The number of different NPS experienced by each respondent during the last five years varied although 85% had used more than one unique NPS. The most frequently occurring substance groups were hallucinogens followed by stimulants and dissociatives. The main incentive for use of NPS in general was pleasure and enjoyment. The mean appreciation of drug effects across all NPS, and the extent to which the respondents planned on using the specified NPS again, was relatively high compared with the reported addictive potential of NPS at large, which was low. However, both the motivations and the attitudes varied significantly between drug groups. For example, the use of hallucinogens was substantially motivated by self-exploration and spiritual attainment and showed very low levels of addiction potential while the use of opioids and especially GABA activating substances was mainly motivated by coping and showed much higher levels of addiction potential. Synthetic cannabinoids were the least appreciated and least likely to be used again, and were mainly motivated by circumstances such as availability and legality.

Study 3b: additional analysis (unpublished)

Aim

The retrospective comments following the publication of **Study 3a** contained inquiries about any underlying and condensed motivations which could generate further knowledge about the reasons for NPS use at additional levels of magnification. Therefore, the aim of **Study 3b** was to check for underlying relationships between the motivations investigated in **Study 3a** which could give additional perspectives on the data, and how such underlying motivations would relate to drug types and the variable well-being.

Methods

The data collection and participants were the same as in **Study 3a**. A principal component factor analysis was conducted to check for underlying relationships between the motivation items in **Study 3a**. An analysis of variance test (ANOVA) was conducted to compare the effects of drug type on each of the potential factor analysis components respectively, which were made up of the mean sum of motivation items in each component. A test of correlations between the potential components and the well-being index data was also conducted.

Results

The principal component factor analysis revealed two components which in combination explained a total of 49.7% of the variance for the set of motivation items. The first component explained 25.1% of the variance, and was labeled “*Use of NPS for enhancement and enrichment*” due to high loadings on the motivation items seen in Table 1 in the appendix, and the second component explained 24.6% of the variance and was labeled “*Use of NPS for coping and problem solving*” due to high loadings also seen in Table 1 in the appendix. The motivation item “*self-exploration or spiritual attainment*” was not retained due to high cross-loadings on component 1 and negative loadings on component 2.

Furthermore an analysis of variance test (ANOVA) was conducted to compare the effects of drug type on each of the two components respectively, which were made up of the mean sum of motivation items in each component. The results showed that there were significant differences between group means for both component 1 ($F_{(5,1383)} = 21.3, p < .001$) and component 2 ($F_{(5,1383)} = 67.7$,

$p < .001$). A post hoc LSD test revealed several significant differences, see table 2-3 and figure 1 in the appendix for complete and illustrative overview of the means and their differences. The most striking effect for component 1 (“*Use of NPS for enhancement and enrichment*”) was the difference between stimulants and synthetic cannabinoids (*mean difference* = 18.8). For component 2 (“*Use of NPS for coping and problem solving*”) the equivalent main difference was found between opioids and hallucinogens (*mean difference* = 34.1) and GABA and hallucinogens (*mean difference* = 33.1). Drawing upon the above findings, it was found useful to investigate any relationships between each component and other data from **Study 3a**. A test of correlations between the two components and the well-being index data from **Study 3a** revealed that component 1 (“*Use of NPS for enhancement and enrichment*”) did not correlate with well-being ($r = -.021$, $n = 1388$, $p = 0.413$) while component 2 (“*Use of NPS for coping and problem solving*”) correlated negatively with well-being ($r = -.328$, $n = 1388$, $p < .001$).

Study 4: The diverse reasons for using Novel Psychoactive Substances – A qualitative study of the users' own perspectives

Aim

The aim of the present study was to explore and characterize the users' own and self-reported reasons for NPS use among a self-selected sample of 613 international users online.

Data Collection

The data for the present study were extracted from a larger data set of NPS user characteristics which were collected through an online survey promoted at the international drug discussion forum bluelight.org. In addition to the already published survey results (Soussan & Kjellgren, 2016), the 619 participants were asked to answer the following open-ended question: “*What were your reasons for consuming novel psychoactive substances? Write as elaborately as you like*”. Nearly all the participants (613) chose to reply by submitting their self-reported reasons for using NPS, which constituted the data for the present study. The open-ended question was presented before any other questions about motivation in the survey to ensure that the participants remained unbiased. In total, the raw data amounted to 34 719 words of written text.

Participants

The sample consisted of 613 self-selected participants (512 males, 101 females) from 42 countries. The ten most frequently occurring countries were: USA (48.9%), United Kingdom (14.2%), Canada (7.3%), Sweden (5.5%), Holland (3.8%), Australia (3.4%), Germany (2.6%), Finland (1.0%), France (1.0%), and Poland (1.0%). It was required that the participants were 18 years or older, and that they had used at least one NPS within the last two years. The mean age among the males was 27.2 years (SD = 9.3, median = 25, range = 18-75) and the females were slightly older (mean = 29.8, SD = 10.1, median = 27, range = 18-66). The mean age for all the participants was 27.6 years (SD = 9.5) and the mode age for both genders was 18 years.

Analysis

The raw data were analyzed qualitatively using the protocol for inductive thematic analysis outlined by Braun and Clark (2006), which seeks to identify recurring patterns of responses or meaning in the data. The analysis was data-driven, and undertaken with as much openness and bias-free attitude as possible to avoid potentially deleterious effects of the researchers' preconceptions. The data were primarily approached at the explicit or semantic level of meaning although a few occasional interpretations at the implicit or latent level were needed in order to distinguish what the participants meant to say. In the first phase of the analysis, the material was thoroughly read and re-read several times to get familiar with the data. Next, the data were systematically divided into basic and meaningful units of information called coded elements (CEs). For example, the following data extract generated three CEs: *"They are easily available (1) with interesting effects (2) and of good quality (3)"*. In the subsequent step of the analysis, the 2 158 CEs were analyzed for resemblances and similar meaning, which resulted in the identification of categories of recurring patterns of broader meaning. Next, the interrelationship between categories was investigated at an even higher level of abstraction. Eventually, the categories were related and subordinated into nine overarching themes that characterized the self-reported reasons for using NPS. During the analysis, each theme was systematically reviewed and refined by repeatedly returning to the raw data for verification and support of the themes. Moreover, the data within themes were continuously examined for internal coherence while a clear and identifiable distinction between themes was preserved. The results were confirmed individually by the

authors, and the coding and themes were audited by two additional researchers knowledgeable about NPS and experienced in thematic analysis.

Ethical Considerations

The sample was self-selected and participation was completely voluntary. Prior to partaking in the survey, the participants were informed of the purpose of the study, and that they could withdraw participation at any time without specifying why, as long as the survey was uncompleted. Before taking the survey the participants were asked to verify being 18 years or older. No identity related questions were asked so that the participants could remain anonymous. The data did not contain any implicit or explicit identity markers. The collected data have been treated with integrity and no unauthorized people can access it. The study has been ethically reviewed by the Karlstad University Ethical Review Board with the reference number C2014/419.

Results

The analysis showed that the participants used NPS because these compounds reportedly: 1) enabled safer and more convenient drug use, 2) satisfied a curiosity and interest about the effects, 3) facilitated a novel and exciting adventure, 4) promoted self-exploration and personal growth, 5) functioned as coping agents, 6) enhanced abilities and performance, 7) fostered social bonding and belonging, and 8) acted as a means for recreation and pleasure. The consumption of NPS was also driven by 9) problematic and unintentional use. The present study contained richer, inductively generated, and more comprehensively described reasons for NPS use than previous accounts. The present study also revealed qualitatively derived differences in motivations across drug types. For instance, the results showed that the novel benzodiazepines, opioids and stimulants were commonly used in conjunction with coping and problematic use while the psychedelics are associated primarily with self-exploration and spiritual attainment. It also appeared that the users' perception of risk was different from more dominant accounts, and that NPS were used not only for opportunistic reasons but also for their more experientially beneficial properties such as purity.

Discussion

The aim of the present investigations was to contribute to the bridging of the knowledge gap pertaining to the field of Novel Psychoactive Substances (NPS) and its community of online users by; thematizing their discussions on the “leading edge” online drug forums (**Study 1**), analysing their experiences of the novel stimulant ethylphenidate (**Study 2**), surveying their characteristics, attitudes, and motivations (**Study 3a**), investigating any underlying relationships between the motivation items in **Study 3a (Study 3b)**, and exploring their self-reported reasons for NPS use (**Study 4**). These undertakings are especially important considering that the increasing number of available NPS constitutes a challenge for legislators, public health agencies, and researchers alike. The speed at which the drug market evolves in combination with a lack of scientific knowledge about the effects of NPS and the users’ motivations for use is impeding for both health care professionals and prevention strategists. Concurrently, recent acute intoxications and fatalities related to the use of insufficiently documented novel stimulants are alarming. Also, hidden populations of drug users in online communities are assumed to be an inconspicuous and under-researched group in society which the scientific community may want to investigate further. The present studies contributed to the research field of NPS by addressing the lack of information about the experienced effects, and by documenting the characteristics of the users, including their attitudes and motivations for use. Furthermore, the studies contributed with knowledge about the online NPS communities and the ongoing discussions and their instrumental value. On the whole, the investigated population of NPS users and their experiences appeared to be characterized by diversity although general features and commonalities also were found. As will be shown, the investigations into the users’ own and self-reported perspectives on NPS use revealed substantial variation in terms of the experienced effects, attitudes, harm potential, and motivations although strong social identity and focus on harm reduction were exhibited. This information will hopefully prove to be of importance to all parties involved in NPS related prevention of harm.

The online NPS community

The definition of an online community was stated as “*an Internet-connected collective of people who interact over time around a shared purpose, interest, or need*” (Yuqing Ren et al., 2007). Needless to say, the overarching shared purpose, in this case, consti-

tutes drug use. However, **Study 1** revealed more in-depth knowledge about the NPS community and the related discussions and their instrumental value. The common denominator and shared purpose that permeated the discussions was a focus on harm reduction and safe drug use. Among other things, the forums appeared to serve as user-governed early warning systems in which the users alerted each other of encounters with harmful aspects of NPS use or potentially hazardous substances. The results from **Study 1, 2, and 4** highlight the safety orientation of these communities and the users' support of each other by volitional sharing of experienced effects, subjective substance evaluations, and advice on how to minimize risks and prevent harm. In addition, acute help and guidance occurred. They also assisted each other in uncovering the concealed psychoactive component in branded NPS, and shared information on safe dosage and administration practices. On the whole, the findings point to an extensive and cumulative exchange of peer to peer generated drug knowledge with an underlying intention of harm reduction, which is supported by similar studies (Chiauzzi et al., 2013; Duxbury, 2015; Móró & Rácz, 2013; Rönkä & Katainen, 2017). The theory of drugs, set and setting (Dalgarno & Shewan, 2005; Zinberg, 1986) state that the outcome of a drug experience is determined by factors which frequently occurred as topics of discussion in **Study 1 and 2**, such as pharmacological properties, expectancies, and contexts. Careful consideration of these determinants purportedly reduces the risk of side-effects to a minimum, which provide an explanation into the workings of community harm reduction.

The instrumental value described above is, according to the literature on psychological processes in online communities (Bagozzi & Dholakia, 2002; Shen et al., 2010; Yuqing Ren et al., 2007), one of two predictors of member attachment and community identification. The other predictive value derives from the interaction with fellow members and the consumption of a social and emotional experience. This type of social togetherness and bonding was noticed in an earlier study (Kjellgren et al., 2013) and further substantiated by **Study 1, 2, and 4**. For example, **Study 1 and 4** revealed that the seeking of social belongingness and relatedness was a prominent feature of NPS use. In addition, the frequent and mutual sharing of drug experiences demonstrated in **Study 1, 2 and 4** can be interpreted as an expression of self-disclosure and self-presentation, which increase the likelihood of social bonding (Yuqing Ren et al., 2007). An unanticipated and surprising indication of the members' community commitment was

the fact that principally all the participants ($n = 613$) in **Study 4** chose to leave an elaborately written account of their reasons for NPS use although that was the only non-required part of the survey. Taken together, the investigated communities evidently satisfied both instrumental and relational needs, which reflect a robust social identity and group cohesiveness.

According to social identity theory (SIT), the individual members' sense of self is informed by the characteristics they share with the group, which to varying degree dissolves the boundaries between self and community. This relatively self-less identification and belongingness to social groups result in, among other things, volitional knowledge contribution, higher level of engagement, commitment to community goals, and an overall more positive experience (Bagozzi & Dholakia, 2002; Shen et al., 2010), which help explain the dedicated interest, persistence and eager non-selfishness displayed by the users in the present investigations. Furthermore, online community interaction is known to foster offline well-being if the topic of discussion is stigmatizing (Pendry & Salvatore, 2015), which may have contributed to the participants' overall good emotional well-being despite extensive drug use history (**Study 3a**). Several researchers have also pointed out that anonymous discussion of stigmatizing topics, as seen in the present studies, allows for an otherwise unattainable closeness with like-minded peers, which plays a crucial role in enhancing social identity, group norms and community commitment (Bagozzi & Dholakia, 2002; Pendry & Salvatore, 2015; Yuqing Ren et al., 2007). SIT suggests that the type of group cohesiveness and social identity presented by the online NPS communities should influence downstream behaviors (Tajfel & Turner, 1986). A verification of this was found in **Study 4**, which exposed the presence of experimental and guinea-pig-like use of NPS in service of the online community and its harm reductive purpose. This confirms the previously presented moral incentive hypothesis which states that individual members consume novel drugs in the name of community knowledge production, so called "*citizen science*" (Duxbury, 2015). **Study 1** established that the sum of self-reported evaluations of a substance's effects contributed to a collectively generated picture of that particular substance's usefulness. This dimension of the "*citizen science*" process may play a part in explaining why some NPS become established on the drug market and others not.

High levels of instrumental and relational value not only result in stronger social identity but also in favorable evaluations of one's own group and discriminations against other groups (Yuqing Ren et al., 2007). That may at least partly explain why some of the participants in **Study 2** and **4** displayed a strong counter public attitude, general dissatisfaction with public health, and salient risk-negligence. The following quote perhaps illustrates the mistrust and resentment towards institutionalized out-groups and us as researchers: *"I feel certain you will lump together my answers under the heading addiction. You would rather drive people to abuse than listening to people because you feel it is degrading to lower yourself to their level by taking them seriously"*. Further evidence of the suspicion towards institutions was put forth by **Study 1**, which revealed that users with acute NPS-induced fearful reactions or potentially harmful conditions turned to fellow forum members rather than professionals. A strong sentiment of dissatisfaction with public health was also noted in **Study 4**. Noteworthy, those attitudes appeared to drive self-medication behaviors with novel and untested compounds. The prominent counter public attitude has been documented elsewhere, and constitutes an immanent obstacle for public harm reduction efforts (Barratt et al., 2014; Duxbury, 2015). According to advancements in SIT, a reinforcer of sustained group conflict and source of continued derogatory out-group evaluations is the lack of contact between groups (Cuhadar & Dayton, 2011). A suggested solution to the seemingly occurring alienation and stigmatization of drug users would therefore be to initiate and promote contact between groups, although under certain conditions to avoid perpetuated conflict. These findings also highlight the previously debated dilemma whether prevention should focus on a reduction in overall use or a reduction in overall harm (Midford, 2010; Móró & Rácz, 2013), and whether we should sustain an exclusively prohibitive and pathologising discourse on drug use or complement it with an alternative harm reductive approach (Barratt et al., 2014). Overviewing the findings of the present investigation, it seems like the users have taken the matter into their own hands.

Online user generated data

The quality and validity of online user generated data have been an underlying concern among the scientific community for some time. Some sources suspected online data to be biased and unreliable, including the inability to confirm substance identity and purity (Davey et al., 2012; Wood & Dargan, 2012). It

might also be argued that the content of anonymously generated user data is biased by fake-good intent or exaggerated drug romanticizing. Some users might even have reported their experiences selectively to justify drug taking. However, the present investigations, based on formal survey accounts as well as non-intrusive observations of spontaneous member interactions and discussions, demonstrate that online communities are an undervalued and potential source of data for accurate and timely information on NPS. An examination of the most frequently discussed NPS showed that they in all but one case appeared in online discussions before detected by the EMCDDA (**Study 1**). This means that online forums could be used for quicker monitoring and assessment of risks and trends. Moreover, the discussions and self-reports used in the present investigations were found to be comprehensive, nuanced and accurately depicted. **Study 1** concluded that the users' concern with social support and community engagement was a noticeable reason for their sincere reports. The users' connoisseur-like depictions were in many cases scientifically characterized with meticulous attention to details. The trustworthiness of the data was affirmed by 1) the absence of exaggerated, drug romanticizing, and one-sidedly distorting experiences, 2) the presence of several contrasting and data rich accounts of experiences, 3) the congruence between the present findings and the knowledge derived from other sources. For example, the experienced effects of the novel stimulant ethylphenidate in **Study 2** matched the effects found in the literature on psychostimulants remarkably well. In addition, an investigation into the self-reported side effects of synthetic cannabinoids not only harmonized with the results of clinical case studies but also revealed poorly documented residual and long-term symptoms (Soussan & Kjellgren, 2014b). Furthermore, the number of positive and negative evaluations in **Study 1** and **2** was evenly distributed, mirroring a relatively balanced and objective standpoint of the users as a collective, especially when compiled into a whole data set. These findings are in line with recent research stating that online drug forums are a valid and reliable source of information (Beharry & Gibbons, 2016; Paul et al., 2016; Stetina et al., 2008). **Study 3a, 3b, and 4** also testify to the previously highlighted usefulness of sub-population surveys in uncovering hidden population characteristics (Wood & Dargan, 2012). In any case, the information available in these communities constitutes an undeniable reality and preferable source of information among adolescents with sensitive or health- and drug-related issues of concern (Borzekowski & Rickert, 2001; Eurobarometer, 2011;

Gray et al., 2005), which make the present studies an important contribution regardless of the validity concern. Importantly though, the content facing youth in search of drug-related information on the Internet appears to be realistically portrayed. Some have argued that we live in a new era and that it may be time to round up the discussion on online data quality and accept the premise that *“the users determine the quality of content through a collective ‘bottom-up’ approach (rather than ‘top-down’) that reflects their needs, knowledge, and real-life experiences”* (Deshpande & Jadad, 2009).

The NPS user characteristics

The participants in **Study 3a** originated from 42 countries, which highlights the widespread use of NPS and the global phenomenon it has evolved into. **Study 3a** disclosed that the users of NPS in general were characterized by a desire for novelty and diversity, reflected through their extensive drug experience and number of NPS used. The lifetime experience of established drugs was 99% and the majority of the participants (85%) had used multiple NPS, and close to 30% had used nine or more NPS. In total, the 619 participants had used a staggering number of 177 different NPS. **Study 4** provided further evidence of the participants’ inclination for novelty and adventurous experiences through the use of a wide variety of NPS. In spite of this, they appeared to have good emotional well-being (WHO-5), and they used marginally less alcohol than the average worldwide consumption, which supports the notion that inconspicuous and recreational “psychonauts” with a view of themselves as non-problematic, populate online drug forums (Stetina et al., 2008; Walsh, 2011).

The typical NPS user is often characterized as a young male (Corazza et al., 2014; Orsolini et al., 2015; Werse & Morgenstern, 2012), and the findings of **Study 3a** largely confirmed that view. The mode age was 18 years and the majority of participants were males (517 males, 102 females). The overrepresentation of men might partly be explained by the self-selected sampling strategy. However, significant sex differences in all phases of drug use and abuse are well documented (Becker & Hu, 2008). Among other things, men are two to three times more likely than woman to develop dependency problems although women more rapidly increase their frequency of use and generally find it more difficult to stop (Becker & Hu, 2008). The apparent sex differences can be explained by everything from biological perspectives to the impacts of social and cultural constructions. The latter recognizes the effects of norms and gender

socialization in learning of and rigidly conforming to or resisting certain traits during adolescence which are associated with increased likelihood of developing a drug using identity (Anderson, 1998). For example, opioid misuse among woman has been linked to the opposition of gender role expectations, and greater male exposure to drug opportunities was speculated to reflect different levels of parental monitoring in early age (Van Etten & Anthony, 2001). Another constructivist argument includes the notion that disorderly behavior, such as drug use, is associated with more stigma and disapproval for woman than for men (Storbjörk, 2011). Biologically oriented studies, based on rat responses to stimulants, provide neural evidence for sex differences in drug use (Becker & Hu, 2008). Moreover, men score significantly higher than woman on the sensation seeking scale, which is known to correlate with experimental drug use and excessive risk taking (Zuckerman, 2015). The bias towards males in **Study 3a** may therefore be relatively representative of the online NPS community.

Moving beyond the general and most obvious user characteristics allowed for more nuanced and in-depth knowledge about the users. For instance, looking at the participants' mean age (28) and range (18-75) revealed that the use of NPS is not exclusively a youth male phenomenon. This is supported by another study of NPS users in which the median age was 27, and the sample consisted of a quarter of middle aged adults (Barratt et al., 2013). Contradicting the general view, a study of novel stimulant users in Slovenia showed that males and females were evenly distributed (Sande, 2016). In addition, lifetime experience of NPS varies greatly between contexts and populations. The differences in user characteristics most definitely reflect regional variations, dissimilar sampling methods, and a wide range of targeted substances. It is likely that parts of the observed variation can be reduced to methodological limitations. Nevertheless, it is likely that the population of online NPS users is more diverse than initially believed. As mentioned, hidden populations of healthy and normally functioning adults are known to exist among substance users in online communities. The proposal here is that the users appear to be relatively incoherent in terms of individual characteristics but more coherent in terms of social identity, shared purpose, and dedicated interest. In other words, the evidence points to the existence of sub-populations within the online community as a whole. For instance, **Study 1** demonstrated that many users were thoughtful, knowledgeable and well-informed, which is in line with other accounts (Davey et al., 2012; Werse & Morgenstern, 2012). A study aimed at identifying the characteristics of

“psychonauts” in NPS related communities described them not only as knowledgeable and verbally fluent but as individuals with above average employment conditions, high introspection capacities, and attention to their inner “soul” (Orsolini et al., 2015). Interestingly enough, other NPS users have proved to be low in literacy, prone to risks, and less informed in general (Corazza et al., 2014; Kaló et al., 2017; Maxwell, 2014), which again testifies to a reasonably diverse NPS community.

The evidence for sub-populations within the community is quite comprehensive although clearly demarcated characteristics of each sub-type are lacking. Previous research has attempted to identify user categories and different online drug discourses but no common understanding seems to have been reached yet. For example, a thrill oriented “drugs are fun” discourse and an opposing harm reduction discourse have been documented (Barratt et al., 2014). In addition, a set of five user types, e.g. the “psychonaut” and the “omnivore”, was identified based on differences in previous drug experience, substances of interest, and intentions for use (Werse & Morgenstern, 2012). The present investigations contribute with the following knowledge on the matter. **Study 2** uncovered two broad and contrasting user discourses which included not only the meticulous and safety first oriented harm reduction advocates but also the careless, risk-neglecting and sensation seeking type. **Study 3a** and **4** revealed a possible third user type oriented towards self-medication, coping and the alleviation of personal ailments. These findings were backed up by the analysis of underlying incentives in **Study 3a** (**Study 3b**), which showed that the motivations for NPS use could be reduced to two broader orientations labeled “*enhancement and enrichment*” and “*coping and problem solving*”. It is also noteworthy that the motivation item “*self-exploration and spiritual attainment*” cross-loaded and was discarded, which in conjunction with the findings of **Study 1, 2, and 4** and other studies (Orsolini et al., 2015; Werse & Morgenstern, 2012) point to the presence of non-problematic “psychonauts” and their interest in harm reduction, self-exploration, and introspection beyond enhancement and coping. Although speculative and in need of more research, the present investigations point to three relatively demarcated user orientations; the sensation seeking enhancer, the self-medicating pursuer of coping, and the well-informed self-explorer. Additional support for this proposition was found when investigating the differences between the factor analysis components in **Study 3b** and drug types, which showed that the “*enhancement and enrichment*” orientation to a larger degree

was associated with use of stimulants while the “*coping and problem solving*” orientation to a larger degree was associated with the use of opioids and GABA. This fit between enhancement and arousing drugs on the one hand, and coping and sedative drugs on the other, maps intuitively well with the theory of Self-Regulatory Focus (SRT) (Higgins, 1997; Scholer & Higgins, 2012). SRT posits that people have strategically different ways in which they reduce the discrepancies between current states and desired end-states. Two self-regulatory orientations are outlined; 1) promotion focused individuals are concerned with advancements and the accomplishment of goals through eager approach strategies, and 2) prevention focused individuals are occupied with non-losses and the averting of negative outcomes through vigilant avoidance strategies. The degree of engagement in an activity (e.g. drug use) is affected by the fit between a person’s self-regulatory orientation and the strategic means used to attain a desired end-state. In light of this, the fit between enhancement and use of arousing drugs, and the fit between coping and use of sedative drugs, are quite obvious, and give further support to the existence of these user orientations. Especially considering that people who lean towards promotion are known to be chronic thrill-seekers while prevention oriented people are more likely to take risks when negative deviations from the neutral state occur. That perhaps explains why a focus on coping correlated negatively with well-being (**Study 3b**). In other words, those driven by coping and self-medication are likely to score lower on well-being. Regarding the self-exploring user orientation, **Study 3a** showed that the use of hallucinogens to a larger extent was associated with “*self-exploration and spiritual attainment*”, which maps well with the view of users orientated towards introspection and harm reduction beyond enhancement and coping. The prevalent accounts of harm reduction in the present and others’ investigations combined with the fact that hallucinogens, by far, was the most frequently used drug type indicate that the “psychonaut”-like self-explorer is a common orientation in the online NPS community. The following quotes from the data set perhaps illustrate the differences in mentality between the sensation seeker, the self-medicator, and the self-explorer; “*I eyeballed a clumsy average line for maximum effect*”, “*I have sleeping issues and the doctors won’t write me a prescription*”, “*I always play safe and self-experimented with a 1 mg allergy test*”. Importantly though, the impression is that these user types are not rigid personalities but rather parallel orientations that a person can have a different degree of at any given moment, precisely as the prevention and promotion systems coexist and are influenced

by situational factors (Scholer & Higgins, 2012). The main point is that the online NPS community appears to be diverse and seldom in consistency with the traditional view of drug users as “junkies”. Further research is needed to fully investigate these user characteristics.

The extreme form of promotion focused and enhancement oriented individuals appearing in **Study 2, 4** and other studies (Barratt et al., 2014; Werse & Morgenstern, 2012) were interpreted as sensation seekers. The sensation seeking personality trait is a robust predictor of risky behavior and drug consumption in particular (Andrucci et al., 1989; Yanovitzky, 2005). Individuals with a sensation seeking disposition are characterized by a willingness to seek out precisely the type of varied, novel, and experimental experiences NPS facilitate, despite apparent risks. In fact, sensation seekers find not only the pleasurable drug use rewarding but also experience the illegal risk taking exciting. **Study 4** demonstrated that some of the participants sought out NPS in order to induce a novel and exciting adventure regardless of potential risks, which were not overlooked but more or less ignored. The unpredictable and non-ordinary nature of NPS was experienced as an attractive feature and perceived as intriguing rather than deterring. The risk-negligence and carelessness displayed by some of the users of ethylphenidate in **Study 2** were puzzling but comprehensible from a sensation seeking perspective. Similarly, against the backdrop of Self-Regulatory Focus theory, it becomes apparent that these individuals are overly concerned with chronic thrill-seeking, enrichment, and positive deviations from the neutral state. In other words, they appeared to be propelled by concern for negative deviations from the neutral state and the neutral state itself. The documented correlation between sensation seeking qualities and number of experienced drugs (Zuckerman, 2015) helps explain the drive for novelty as well as the extensive and diverse drug use experience data from **Study 3a** (previously presented). The sensation seeking qualities of some of the users may also predict and explain the indulgent use of ethylphenidate and other insufficiently researched NPS. In addition, the act of going against the conventional appeals to them, which might explain their opposition to both the harm reductive discourse and the dominant prohibitive stance of public prevention (Barratt et al., 2014). This puts one-sidedly risk oriented prevention policies in a quandary situation as both the number of increasing NPS and any attempt to regulate them most likely are seen as opportunities for new adventures by many users. Furthermore, risk oriented prevention targeting a population of risk-negligent users

is likely to be ineffective at best (Hornik, Jacobsohn, Orwin, Piesse, & Kalton, 2008). In the worst case, external regulation and prohibitive prevention may paradoxically become counterproductive by serving as the key incentive for engagement in risky behavior (Crossley, 2002). A boomerang effect may occur if the sensation seeker engages in use of prohibited NPS as a rebel type of response to the oppositional and dominant societal discourse.

The experienced effects and motivations for use

Besides the diversity of user characteristics, a variety of experienced effects were found. The results from **Study 2** revealed numerous effects and side effects related to the use of ethylphenidate which could be of use to health care providers and the like. Ethylphenidate purportedly increased sociableness including enhanced intimacy, empathy, and better communication skills. The effects also included pleasurable stimulation and euphoria. In addition, the users' displayed an increased ability to concentrate and focus. Routine-like tasks and normally tedious responsibilities were done with less resistance and more motivation. It appeared that these effects were used as tools, especially the cognitive enhancing effects, which were applied for e.g. improved studying capacities. This demonstrates that the already increasing use of pharmaceuticals (e.g. methylphenidate and modafinil) for cognitive enhancement and study aids (Dresler et al., 2013; Farah et al., 2014; Ragan et al., 2013) has been extended to include ethylphenidate as well. According to the framework theory of non-addictive drug use, they engaged in "*drug instrumentalization*"; the consumption of psychoactive drugs for their effects on the mental state and the promotion of non-drug related behaviors and achievement of personal goals (Müller & Schumann, 2011). This notion was further substantiated by **Study 1** and **4**, which exposed that NPS were used to enhance performance and abilities like focus, energy and social skills. The users also stated that they wanted to optimize goal attainment through the use of drugs by building a toolkit of NPS for specific purposes and occasions. Considering the above makes it clear why the underlying motivation and orientation towards "*enhancement and enrichment*" in **Study 3b** to a greater extent was associated with use of stimulants. It also reveals why the sensation seeking and promotion focused individuals concerned with advancements and positive deviations from the neutral state would choose stimulants as drug of choice.

The effects were, however, not always appreciated. Ethylphenidate occasionally induced a diametrically different state with concentration difficulties, restlessness, and anxiety. Another ordeal type of experience concerned the administration. Insufflating the drug appeared to cause corrosive nose burn and bleeding. The users also reported an unpleasant increase in temperature, heart rate, and blood pressure, and they experienced profuse sweating and muscle tensions. On the whole, ethylphenidate appeared as a two-sided, insidious, and potent novel stimulant with effects and risks in line with traditional counterpart stimulants like amphetamine. The evident harm potential is quite alarming in light of it being cheap, available, legally ambiguous, and used recreationally. Interestingly, the high abuse liability was congruent with the characteristics of the novel stimulant mephedrone (Freeman et al., 2012; Winstock, Mitcheson, Ramsey, et al., 2011) but differed considerably from the novel hallucinogens 4-HO-MET (Kjellgren & Soussan, 2011), which showed no signs of compulsive redosing or dependency. A possible reason for this could be that the effects of stimulants to a large degree are determined by inherent pharmacological action while the outcome of hallucinogens primarily is influenced by set and setting (Metzner, 1998). Further evidence of drug group dependent harm potential was found in **Study 4**, which demonstrated that abuse and addiction were exclusively related to the use of novel benzodiazepines, opioids and stimulants. Moreover, **Study 3a** concluded that the estimated addiction potential varied considerably between drug groups. In consistency with the discrepancy between 4-HO-MET and ethylphenidate mentioned above, the hallucinogens received significantly lower mean scores on addictiveness (9) than the stimulants (48) on a 0 to 100 visual analog scale. The variations in potential harm were further validated by the participants' approval of the different motivations for using NPS, which showed that habit and addiction constituted only a minor incentive for use of hallucinogens (8) but much more so for stimulants (26), GABA (32), and opioids (51). In addition, the past year use of established drugs reported in **Study 3a** revealed a similar drug group pattern where the use of hallucinogens was more prevalent but considerably less frequent (8 times) than stimulants (45 times) and opioids (83 times). Hence, there are reasons to believe that the prevalence, frequency of use, and the addiction potential of NPS are drug group dependent, which again testify to the complexity surrounding the field of NPS when approaching it from a closer look than the broad-brush perspective of NPS in general. Similarly, **Study 3a** reported that the most frequently used sub-

stances were hallucinogens, stimulants, and dissociatives followed by GABA, synthetic cannabinoids, and opioids. The hallucinogens accounted for 40% of the total number of reported substances, and the results from **Study 4** verified the participants' preference for hallucinogens and their promotion of self-exploration and personal growth. In fact, many participants declared an exclusive interest in hallucinogens and even looked down on other drug types: *"I am a psychedelic connoisseur, clean from negative substances like heroin or cocaine"*. About half of the retrospective evaluations of ethylphenidate in **Study 2** were characterized by the same type of negative judgments and resentment towards stimulants. These findings add to the previously stated conclusion that non-problematic "psychonaut"-like self-explorers with an affinity for hallucinogens, introspection, and harm reduction dominate the community of online NPS users.

The abuse and addiction theories seldom acknowledge non-problematic use (Müller & Schumann, 2011), which is quite remarkable considering the differences in abuse liability mentioned above. Furthermore, the addictive potential of NPS in general was estimated to be low (**Study 3a**), and the self-reported data contained few accounts of problematic use (**Study 4**). The theories of addiction would explain these results as an expression of denial or inability to gain insight into one's own distress due to the addiction, or that the users are in an intermediary step towards addiction (Goode, 2012; West, 2006). However, a more plausible explanation is that the investigated population of online NPS users consisted mainly of well-informed and knowledgeable harm reduction advocates with an affinity for self-exploration through the use of hallucinogens. This is backed up not only by the present investigations but also epidemiological and clinical data suggesting that most people are not and will never become problematic users (Müller & Schumann, 2011; Nicholson et al., 2002). Nevertheless, the abuse potential of ethylphenidate in **Study 2**, and the apparent addictiveness of particular drug groups found in **Study 3a** and **4** demonstrate that the community unquestionably consisted of some abuse and addiction driven persons. For instance, the positive reinforcement and self-administration theory of drug abuse certainly overlap with the findings in **Study 2**. It was apparent that some users were "chasing the high" whenever the effects subsided and a buildup of tolerance occurred. The compensatory effects of physical adaptation to ethylphenidate manifested as highly unpleasant withdrawal symptoms which caused the users to redose. Besides the physical dependence tendencies, the users also redosed compulsively in order to re-induce the pleasurable effects,

which is perfectly in line with the positive-incentive theory of addiction. The role of dopamine in the reward and habit forming effects of addictive drugs further explains the addictive potential of ethylphenidate since it acts as a dopamine and norepinephrine reuptake inhibitor (Gibbons, 2012). The fact that many users redosed in vain can be explained by the incentive sensitization theory (Berridge et al., 2009; West, 2006). It claims a difference between wanting (positive-incentive value) and liking (hedonic value), and that the two are related in the initial phase of drug use but as tolerance builds up and the craving gets sensitized the two fall out of proportion. The process of addiction develops as the user is rewarded for wanting something that never fulfils the anticipated pleasure. Hence, the vicious circle of compulsive redosing observed in **Study 2**. The principle criticism against the paradigm of reinforcement and the “hijacking” of the brain’s reward circuits is that it does not distinguish between drug types (Badiani et al., 2011), which the current studies established is a crucial determinant of abuse potential. The reinforcement paradigm is primarily based on mouse model studies and use of stimulants. Perhaps that is why those theories translate well to the use of ethylphenidate but not as well to drugs in general, especially not the hallucinogens.

The self-medication model of addiction apparently has some explanatory value as well. **Study 2**, **3a**, **3b**, and **4** demonstrate that coping and the alleviation of personal problems through self-medication with novel drugs was an incentive for use. Self-medication and coping were mainly associated with sedative drugs like opioids and GABA activating substances, which support two previously mentioned conclusions. First, that the abuse potential of NPS is drug group dependent. Second, that the self-medicating and “*coping and problem solving*” oriented group of individuals have a preference for opioids and GABA activating NPS. Nearly all the addiction theories have one thing in common, namely a passive, vulnerable, and pathologising perspective on humans. Perhaps its experimental mouse model basis reflects why. Both the theory of addiction and the “*drug instrumentalization*” framework include the concept of cost-benefit analysis although the latter views it as a rational appraisal process and the former as a non-active miscalculation of sorts. All the models of addictions, including self-medication, could easily be included in an instrumental perspective on drug use since the drug serves a function regardless of it being coping or the alleviation of withdrawal. Several researchers have pointed to the need of updating the pathologising discourse with a focus on the adaptive functions of risky be-

havior in general and drug use in particular (Barratt et al., 2014; Ellis et al., 2012; Müller & Schumann, 2011; Nicholson et al., 2002). The participants' resentment and mistrust in public health and institutions evidently stem from the experience of exposure to these pathologising views (**Study 4**). We should not forget that the self-medicators are humans with perceived psychological issues of concern. Therefore, viewing drug use as merely a maladaptation or intermediary step towards addiction is too unrefined and rarely points to a solution in the same way as an understanding of the adaptive fitness benefits of drug use would do (Ellis et al., 2012; Müller & Schumann, 2011). In addition, the pathologising discourse thwarts the possibilities for investigations of the transition point between problematic and non-problematic drug use.

Proceeding on the differences between a general and more specific perspective on the motivations for NPS use; the overall reported reasons for use of ethylphenidate in **Study 2** were recreation and the pleasurable effects. However, a selection of underlying incentives for use of ethylphenidate were found, such as compulsive redosing, addiction, facilitation of social situations, cognitive enhancement, and escapism. Likewise, **Study 3a** showed that the main incentive for use of NPS in general across all drug groups was pleasure and enjoyment, which is in line with the literature on explicit reasons for NPS use and drug use in general (e.g. Boys et al., 2001; Corazza et al., 2014; Johnson et al., 2013; Sande, 2016). It is also noteworthy that some of the taken-for-granted incentives for NPS use found in the literature, such as being cheap, legal, and available, constituted a significantly less approved of motivation than pleasure and enjoyment. Though, moving beyond the all-encompassing approach to NPS and the obvious pleasure and enjoyment incentive revealed several distinct and diversified attitude and motivation profiles at the level of drug groups. The results demonstrated that the use of hallucinogens was substantially motivated by self-exploration and spiritual attainment, which differed significantly from novel opioids and GABA activating substances which were used mainly for coping with pain, boredom, emotions, problems, and sleep etc. Stimulants were to a greater extent associated with the enhancement of mental and physical abilities as well as the facilitation of social situations. Furthermore, synthetic cannabinoids were the least appreciated, least likely to be used again, and the main reasons for use were enabling factors such as price, legal status, availability, and non-detectability in drug screening tests. This was interpreted as an expression of displacement to substituted alternatives from traditional cannabis, which has

proven to be the drug of preference for the majority of users (Winstock & Barratt, 2013). **Study 1** and **2** also documented that users intentionally searched for legal and accessible alternatives to classified counterparts. These findings highlight the dilemma of regulatory action as it may propel the emergence and usage of unpredictable and potentially harmful NPS (King, 2014), which is particularly troublesome considering the previously highlighted predicament associated with the sensation seeking nature of some of the participants and their drive for excitement, novelty and new adventures through the use of NPS.

Although the different drug groups to some extent overlap in effects, motivation and attitudes, it is clear that they attract users for different reasons such as inner exploration, self-medication, cognitive enhancement, novel sensation seeking and so forth. The point here is not only to outline the specific effects, attitudes, and motivations but also to show that approaching NPS in terms of drug groups can reveal crucial information to legislators, prevention strategists and health care personnel, especially considering that a more nuanced understanding of the different pathways to drug use is believed to be essential in enabling effective treatment, prevention and consequently a reduction in harm (Adams et al., 2003; Boys et al., 2001). Hence, identifying not only the general but the specifics of NPS use will most likely improve the efficiency of interventions aimed at preventing the behavior or reducing its harm. In compliance, van Amsterdam et al. (2013) highlight the problematic nature of generic classification as it could potentially fuel the emergence of NPS that are more harmful than the ones they replace. Instead they propose a scientific benefit-risk evaluation of specific NPS in order to minimize the influence of media and public opinion on policy making, for which the results of the present investigation could be a part of. Moreover, the results from the present investigations can be used to understand the field of NPS structurally in the sense that it is too diverse for a one stop solution to prevention.

Further knowledge about the experienced consequences of legal control was revealed by **Study 4**, which aimed at investigating the users' own and self-reported reasons for NPS use inductively. That was considered important since most other studies on the reasons for NPS use, including **Study 3a**, had a top-down methodological approach with deductively generated motivations adopted from e.g. the body of alcohol research. The purpose of **Study 4** was also to describe the self-reported reasons in more detail and depth than any previous

account. The comprehensive self-reports contributed to more knowledge about the experienced effects of legal control and substance displacement. First, the participants confirmed the scientific view that supply reduction of established drugs drives the users towards displacement to substituted NPS, which points to the previously described dilemma of legal control. The participants also verified the attractiveness of enabling factors such as price, legal status, and availability. However, NPS were not always seen as inferior substitutes to established drugs but as more favorable compounds in their own right. In contrast to the prevailing media image and growing scientific concern about NPS as risky (e.g. Baumeister et al., 2015), NPS reportedly allowed for safer and more convenient drug use circumstances. It is quite remarkable that the users' perspective on NPS as relatively safe differs diametrically from the institutionalized accounts of NPS as risky. Somewhat broadly speaking, that which the public defines as risky (the drug effects) are often seen as exciting new adventures by many users, and that which the public considers to be prevention (prohibition and legal control) is seen as a risk by the users. Public institutions may not fully have acknowledged that the perceived threat of criminalization, stigmatization, street dealer interactions, and drug impurities following the wake of prohibition most often were considered a greater risk than the possible harmful drug effects. Prevention strategies based exclusively on risks and external control may therefore benefit from the recognition that those strategies could push some users towards high-risk behaviors. A previously mentioned example of this was discovered in **Study 1**; users in acute distress turned to fellow community members rather than medical professionals. The question how risk-negligent sensation seeking individuals can be reached by public health interventions without causing boomerang effects remains unanswered. Several researchers have argued that the intertwined relationship between pleasure and risk should be acknowledged in order to better resonate with drug users (Barratt et al., 2014; Pennay, 2015). Recognizing the benefits and not only the costs would also make it easier to alter the cost-benefit ratio. It was also proposed that we should appreciate the adaptive function of risky behavior and work with instead of against individuals who engage in risky behavior (Ellis et al., 2012; Müller & Schumann, 2011).

To sum up, **Study 4** contributed with richer and more in-depth knowledge about the users' own and self-reported reasons for NPS use. For instance, the participants' curiosity and interest about the effects were described with more

detail than previous accounts. It appeared that they were deeply captivated by every aspect of NPS and engaged in self-experimentation for the satisfaction of personal curiosity and for the sake of the community good, which reflect the previously mentioned robust social identity and focus on harm reduction. Drawing upon Self-Determination Theory (SDT) in framing the results of **Study 4** revealed some thought-provoking insights. According to SDT, the motivation for a behavior can differ in regards to its relative autonomy, that is, the extent to which a behavior emanates from the self. The degree of self-endorsement ranges from amotivation to different forms of externally regulated motivations to intrinsic motivation (Deci & Ryan, 2012; Ryan & Deci, 2000b). The latter is seen as the prototype of self-determined persons and is characterized by a propensity for novelty, challenges, and exploration. Intrinsic motivation is also identified by spontaneous interest, curiosity, and enjoyment. Over-viewing the results of **Study 4** showed several examples of intrinsic motivation. As mentioned, the participants were driven by a natural curiosity and studious interest. Also, SDT assumes that intrinsic motivation is expressed by the inherent tendency to partake in the type of challenge, novelty and exploration that NPS cater, which might help explain the users' persistence in pursuing NPS. In fact, the basic need for novelty, exploration, and the exercising of one's capacities are seen as vital for cognitive and social development. In addition, the users' commitment to self-exploration and personal growth give further support of intrinsic motivation as SDT assumes that humans have an inherent tendency towards growth and processes that foster those needs. Moreover, the use of NPS was often characterized as inherently recreational, and although the participants sometimes deliberately pursued pleasure, they also sought to experience NPS for the sake of enjoying the experience. These examples of engagement in an activity for the rewards inherent in the activity itself were also reported elsewhere. Several studies demonstrate that the content or outcome of the drug experience (good/bad or euphoria/fear) was less important than experiencing per se (Kjellgren et al., 2013; Kjellgren & Soussan, 2011). SDT posits that intrinsic motivation for several reasons can be thwarted by for example social demands and responsibilities. Therefore, extrinsic motivation relates to the engagement in an activity in order to attain some separable outcome or instrumental value (Ryan & Deci, 2000a). Turning to the results of **Study 2, 3a, and 4** and the framework of "*drug instrumentalization*" shows that the participants intentionally pursued e.g. pleasure, sociableness, enhanced performance, or other

states in which the user could attain personal goals. The optimization of drug use for specific purposes and the toolkit like approach to NPS give further support to the notion of externally motivated persons. As stated, the relative autonomy of external motivation differs depending on the extent to which the value and regulation of a behavior have been internalized, which range from lack of control, to passive compliance, to self-control, to active personal commitment and self-congruence. The participants' inclination for use of NPS in order to cope or self-medicate can be seen as more controlled and less self-endorsed activities. At the very end of the externally regulated and controlled end of the spectrum were addiction and dependency. Taken together, the reasons for NPS use appeared to fall along a locus of causality continuum ranging from intrinsically and self-determined to passive compliance and lack of control. These insights arguably have several implications for prevention strategies and the reduction of drug related harm. According to SDT, the basic psychological needs of autonomy, competence, and relatedness are frustrated by extrinsic motivation while higher levels of intrinsic motivation correlates with well-being, life-satisfaction, and better overall performance (Ryan & Deci, 2000b, 2008). Hence, NPS users driven by more controlled reasons such as coping, self-medication, and addiction are likely more susceptible to harm, ill-being, and dissatisfaction, which was supported by **Study 3b** showing that " *coping and problem solving*" correlated negatively with well-being. Conversely, more intrinsically motivated persons, seemingly the well-informed and self-exploring harm reduction advocates with overall good emotional well-being (**Study 3a**), most likely make up the larger part of the non-problematic, healthy, and normally functioning population of "hidden" drugs users online (Stetina et al., 2008; Walsh, 2011). Thus, identifying not only the explicit reasons for NPS use but also the type of motivation and degree of relative autonomy could be of utmost importance in making prevention more effective. Also, the promotion of more self-endorsed forms of extrinsic motivation could be an indispensable strategy for integrating social values and responsibilities while hopefully reducing drug related harm. According to SDT (Deci & Ryan, 2012; Ryan & Deci, 2008), this is accomplished by providing social conditions that nurture and respect the innate psychological needs rather than exerting exaggerated amount of external control that could lead to more of an already occurring alienation of drug users. Put more bluntly, imposing external legal control on those who already are heavily externally regulated (addicts) is likely to be ineffective at best.

Furthermore, imposing control on those who are relatively self-determined and intrinsically motivated (self-explorers) is likely a waste of resources. SDT emphasizes the importance of an autonomy supportive attitude when socializing behaviors, which among other things begins with the acknowledgment of the socialized persons' own perspective (Ryan & Deci, 2000b). This is in line with the previously mentioned strategy of discontinuing the pathologising and maladaptive view of problematic drug users and instead working with instead of against them (Ellis et al., 2012). The present investigations have hopefully contributed to a better understanding of the online community of drug users and their perspectives, experienced effects, attitudes, and motivations for use.

Summary and conclusions

The increasing number of NPS and the lack of knowledge about the users, the experienced effects and the motivations for use constitute a challenge for public health and the research community. The aim of the present investigations was to contribute to the bridging of the knowledge gap pertaining to the field of NPS and its community of online users. The results showed that the online NPS community is characterized by an extensive and cumulative exchange of peer to peer generated knowledge in service of the shared purpose appearing as harm reduction. Besides this instrumental value, the communities acted as a platform for relatedness and social experiences. Taken together, strong group attachment, cohesiveness and social identity appeared to drive not only the volitional knowledge contribution but also non-selfish and perceivably moral drug use behaviors. The NPS community was also characterized by a prominent counter public attitude and mistrust in institutionalized health care. The use of online data gathered from these communities was concluded to be a time efficient and accurate source of information for research.

The users appeared to be driven by a quest for novelty and diversity, and they had extensive experience of both established and novel drugs. They had an overall good emotional well-being and appeared as knowledgeable. The results demonstrate that the specific user characteristics were diverse although the majority of users were young males. Several parallel and broadly categorized user orientations were outlined; 1) the risk-negligent sensation seeking with interest in stimulating drugs and enhancement, 2) the self-medicating pursuer of coping with mistrust in public health and proneness for sedative drugs, and 3) the well-informed self-explorer advocating harm reduction and hallucinogenic drugs.

The effects and potential harm of NPS appeared to be distinctly linked to drug groups. For example, the novel stimulant ethylphenidate appeared as a two-sided, insidious, and potent novel stimulant with an imminent harm potential and effects in line with traditional counterpart stimulants like amphetamine. The users of the novel hallucinogen 4-HO-MET, on the other hand, did not report any tendencies of compulsive redosing or abuse. Surveying the users of NPS revealed a similar pattern where the stimulants, opioids and GABA activating substances were linked to greater abuse potential than the hallucinogens. The general reasons for use of NPS across all drug groups were recreation, pleasure and enjoyment. However, going beyond the broad brush approach to NPS revealed several distinct motivation profiles. For example, the hallucinogens were used mainly for self-exploration and spiritual attainment while the stimulants were used for enhancement of performance, and opioids were used primarily for coping. A study into the users' own and inductively generated motivations revealed a multitude of richer and comprehensively described reasons for NPS use than previous accounts. In short, the users were moved to user NPS by a natural curiosity and spontaneous interest. They also wanted to facilitate novel and exciting adventures, promote self-exploration, and enhance personal abilities. In addition, NPS were used for coping and increased sociableness. Some users were also driven by problematic use and abuse.

The findings of the present investigations can contribute to a more nuanced understanding of the field of NPS and its community of online users which could have important implications for public health, legislation, and prevention strategies. The following conclusions might be limited in scope due to the use of user generated data from online communities, which perhaps did not include less literate and equipped "street users". Nevertheless, the results highlight the previously debated dilemma whether prevention should focus on a reduction in overall use or a reduction in overall harm. It was also concluded that the dominantly prohibitive solution to the NPS situation may benefit from an updated view on most drug use as an adaptive function with instrumental value rather than a pathologic and maladaptive activity. The users' experience of exposure to these pathologising views and their mistrust in institutionalized health may initiate potentially harmful self-medicating behaviors and hinder the investigation of the transition point between problematic and non-problematic drug use. Moreover, users turned to community members rather than medical professionals in acute situations, which is quite alarming. Prohibitive action evidently drives the

development of and displacement to substituted NPS with effects and risks inferior to the drugs they replace. In addition, the smorgasbord of continually appearing NPS constitutes ever present opportunities for novel and exciting adventures for users with sensation seeking qualities and counter public attitudes. Not only that, sensation seekers are known to be attracted by illegal risk taking, which puts one-sidedly risk-oriented prevention strategies in further quandary. In other words, prohibition may paradoxically serve as the key incentive for engagement in harmful behaviors since the experienced risk of being stigmatized or criminalized made the users turn to, in their eyes, “safer” drug alternatives. It was also established that exaggerated amounts of external control can lead to rejection of social values and a worsening of the already occurring alienation and stigmatization of drug users.

Several suggestions were proposed. On the whole, we need to approach the field of NPS with more refinement than the broad brush approach of drugs in general. A one stop solution to such a diverse area of drug groups, user types, effects, and motivations for use is likely to be ineffective at best and counter-productive at worst. Approaching NPS in terms of drug groups reveals important knowledge about different risk- and motivation profiles which can be crucial to all parties with an interest in reducing NPS-related harm. A more nuanced understanding of the different pathways to drug use can enable more effective treatments and targeted harm reduction measures. It can also help maximize the effect of prevention efforts by allocating resources to where most harm prevails. Furthermore, the present investigations could be a part of the proposed science based benefit-risk evaluations of NPS in order to reduce the adverse effects of potentially harmful substances but also to minimize the influence of media and public opinion on policy making. Another suggestion involved the recognition of the intertwined relationship between benefits and risks, and the development of appropriate harm reduction messages to better resonate with drug users. Turning to human motivation theories, it was suggested that the identification of type of motivation (intrinsic vs extrinsic) most likely would make targeted prevention more effective and resource efficient. Promoting more self-endorsed motivation and providing autonomy supportive conditions that acknowledge and respect the perspectives of the users and their psychological needs will likely minimize the occurring alienation and stigmatization. On the same note, it was established that the resolution between opposing groups start with the initiation of contact between them, for which the present

investigation could be a starting point. Simply and clearly, it was expressed as working with instead of against the users. After all, it perhaps goes without saying that any kind of prevention of harm begins with the listening and recognition of the targeted persons' perspective. In that sense, the present investigation has hopefully contributed to a better understanding of the community of online NPS users and their experienced effects, attitudes and motivations for use.

Limitations and future research

The present investigations are not without limitations. The use of online data entails a validity concern that revolves around an inability to confirm the reported substances' identity or purity. Anecdotal data from online sources have also been suspected to be biased, and the use of a self-selected sample of NPS users might have limited the results' representativeness of a wider population. However, a range of recent research points out that the Internet provide a wealth of information which could be of use when investigating NPS (Beharry & Gibbons, 2016; Stetina et al., 2008). In fact, the Internet have successfully been used as data source in several studies of NPS and their patterns of human use (Beharry & Gibbons, 2016; Bruno et al., 2013; Deluca et al., 2012; Winstock & Ramsey, 2010; Wood & Dargan, 2012). In addition and as concluded previously in the discussion, the present investigations confirmed the validity of online and self-reported data. The current and others research (Stetina et al., 2008; Walsh, 2011) claim that research on the Internet can reveal otherwise inaccessible and hidden populations. The evident bias towards experienced, connoisseur-like, and knowledge-seeking users might have limited the results' representativeness of the population at large. Less literate and equipped "street users" with addiction and dependency problems who are currently living under poor conditions are not likely to be the typical user of drug discussion forums, which may have limited the scope of some of the conclusions. The sample being self-selected may also have contributed to bias. Another limitation is the fact that the forum and the survey were in the English language, more or less excluding NPS users from non-English-speaking parts of the world. However, the bias towards well-informed and experienced users could just as well have contributed to richer and more nuanced responses and the validity of substance identities than otherwise. Also, the aim of the present studies was to investigate the online community and its assumed hidden population of drug users rather than offline populations of drug abusers.

Another possible limitation concerns the methodological approach used in several of the studies. It can be argued that it is difficult if not impossible to remain bias free and without distorting preconceptions when arriving at codes, categories, and themes during qualitative research. A different analyst could potentially come up with different interpretations and results. However, there were several measures undertaken to ensure that the analysis was as bias free as possible. The most important measure was not to start with a guiding theory or testable hypothesis during the analysis. Instead, an explorative aim and a bottom-up approach were used when collecting, analyzing, and reporting the data. More specifically, the goal was not to fit the self-reported data into preconceived psychological theory or pre-given categories. The concept of reflexivity was taken into consideration, which meant to sustain an attitude of attending to the effects of the researcher throughout the process. The most important measures to accomplish this and to avoid bias in qualitative research were: 1) follow the research protocol outlined in the Methods section scrupulously, 2) including multiple researchers to confirm the analysis, and 3) continuously back-track the higher levels of abstraction (categories and themes) and verify them systematically reviewing the original data set for support. There was a constant circle of verification going on during the analysis, which is another important step we strive towards in order to ensure validity. When the methodological protocol is followed the data reveal themselves or emerge little by little in every step. The representative quotations are examples of this process.

Perhaps not a limitation but worth mentioning anyway is that **Study 4** investigated the reasons for NPS use at the general level of magnification without respect to drug groups, which might seem peculiar since one of the conclusions of **Study 3a** was that drug groups should be taken into greater consideration. However, the data for **Study 3a** and **Study 4** were collected by the same survey, and in order to ensure that the participants remained unbiased by the preconceived and constructed motivation items used for **Study 3a** when replying to the open ended question used for **Study 4**, the question was presented before any substance specific questions. Although the data collection design of **Study 4** precluded a systematic and statistical investigation of substance-specific differences like in **Study 3a**, the analysis and final report of **Study 4** still contained drug group specific information whenever it appeared qualitatively in the analysis.

The conclusions might have been limited by the fact that variables such as sensation seeking qualities, intrinsic and extrinsic motivation, and promotion and prevention focus were not measured with standardized scales. Therefore, future research should set out to investigate the NPS users in terms of the mentioned parameters. For example, we should more deeply study the relationship between the degree of self-determined drug use and relative harm. Measuring different personality traits like sensation seeking and highly sensitive personality and relating them to drug group preferences, well-being, and relative harm would constitute an important contribution. Moreover, gender differences are clearly present in all phases of drug use and abuse (Becker & Hu, 2008), and should therefore be investigated in regards to NPS. Future research should also explore a likely transition point between problematic and non-problematic drug use. Moreover, the effects of prohibition and external control on help-seeking behaviors should be studied in greater detail. Also, the development of a standardized NPS motivation scale with validity and reliability would benefit the scientific community.

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Appendix

Table 1

The results of the principal component factor analysis in **Study3b** conducted to check for underlying relationships between the motivation items in **Study 3a**.

Motivation item	Enhancement and enrichment	Coping and problem solving
Motivated by pleasure and enjoyment	,397	
Motivated by facilitation of social situations	,748	
Motivated by enhanced mental or physical abilities	,668	
Motivated by self-assertion and self-confidence	,746	
Motivated by coping with pain, boredom, emotions, problems, anxiety, sleep deprivation		,793
Motivated by habit or addiction		,772
Motivated by circumstances such as price, legal status, availability, non-detectability in screening tests		,645

Table 2

Multiple Comparisons table showing how drug groups differed from each other in regards to the underlying motivation component labeled “*Use of NPS for enhancement and enrichment*” found in **Study 3b**.

Enhancement and enrichment		Mean difference	Std. Error	Sig.	95% Confidence	
					Lower	Upper
Stimulants	Hallucinogens	12,36**	1,363	<.001	9,682	15,03
	Dissociatives	9,920**	1,973	<.001	6,049	13,79
	Opioids	11,14**	3,025	<.001	5,209	17,08
	Cannabinoids	18,81**	2,424	<.001	14,05	23,57
	GABA	9,479**	2,274	<.001	5,019	13,94
Hallucinogens	Dissociatives	-2,437	1,837	,185	-6,041	1,167
	Opioids	-1,214	2,938	,679	-6,978	4,549

	Cannabinoids	6,453 [*]	2,315	,005	1,912	10,99
	GABA	-2,877	2,157	,182	-7,108	1,354
Dissociatives	Opioids	1,222	3,266	,708	-5,184	7,629
	Cannabinoids	8,889 [*]	2,719	,001	3,556	14,22
	GABA	-0,440	2,586	,865	-5,512	4,632
Opioids	Cannabinoids	7,667 [*]	3,557	,031	0,691	14,64
	GABA	-1,662	3,456	,630	-8,442	5,116
Cannabinoids	GABA	-9,330 [*]	2,944	,002	-15,11	-3,554

*The mean difference is significant at the .05 level.

**The mean difference is significant at the .001 level.

Table 3

Multiple Comparisons table showing how drug groups differed from each other in regards to the underlying motivation component labeled *“Use of NPS for coping and problem solving”* found in **Study 3b**.

Coping and problem solving		Mean difference	Std. Error	Sig.	95% Confidence	
					Lower	Upper
Stimulants	Hallucinogens	11.96 ^{**}	1.504	<.001	9.012	14.91
	Dissociatives	-5.817 [*]	2.177	.008	-10.09	-1.547
	Opioids	-22.17 ^{**}	3.337	<.001	-28.71	-15.62
	Cannabinoids	-9.867 ^{**}	2.674	<.001	-15.11	-4.62
	GABA	-21.18 ^{**}	2.508	<.001	-26.10	-16.26
Hallucinogens	Dissociatives	-17.78 ^{**}	2.027	<.001	-21.76	-13.80
	Opioids	-34.13 ^{**}	3.241	<.001	-40.49	-27.77
	Cannabinoids	-21.83 ^{**}	2.554	<.001	-26.84	-16.82
	GABA	-33.15 ^{**}	2.379	<.001	-37.81	-28.48
Dissociatives	Opioids	-16.35 ^{**}	3.603	<.001	-23.42	-9.283

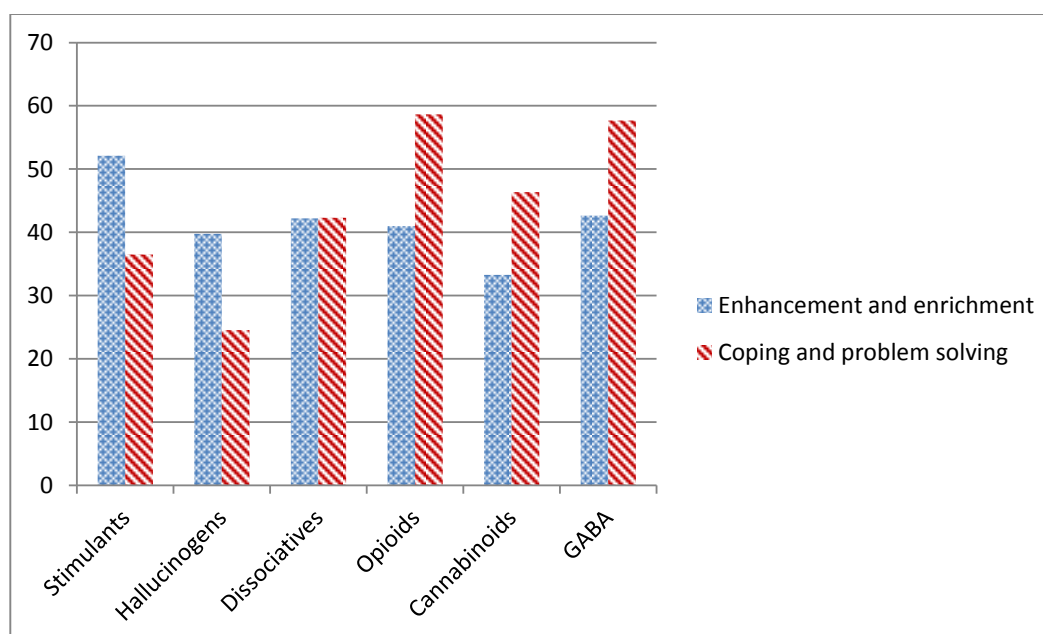
	Cannabinoids	-4.050	2.999	.177	-9.935	1.834
	GABA	-15.37**	2.853	<.001	-20.96	-9.771
Opioids	Cannabinoids	12.30 [†]	3.924	.002	4.603	19.99
	GABA	0.984	3.812	.796	-6.494	8.463
Cannabinoids	GABA	-11.32**	3.248	.001	-17.69	-4.944

*The mean difference is significant at the .05 level.

**The mean difference is significant at the .001 level.

Figure 1

The mean sum of motivation items in each of the two factor analysis components found in **Study 3b**, split by drug groups.



Novel Psychoactive Substances

The unprecedented increase of legally ambiguous and easily available Novel Psychoactive Substances (NPS) constitutes a challenge for legislators, public health agencies, and researchers alike. Therefore, the aim of the present investigations is to contribute to knowledge about the online NPS community, including the users' experienced effects and motivations for use. The findings demonstrate that the community is characterized by robust group cohesiveness, counter public attitudes, and a focus on harm reduction. A range of diverse reasons for NPS use were revealed and described in more detail than previous accounts. Several distinct motivation and risk profiles were identified at the level of drug groups. The results point to the occurrence of at least three user orientations including the risk-negligent sensation seeker, the self-medicating pursuer of coping, and the well-informed selfexplorer. It is concluded that the diverse field of NPS needs to be approached with more sophistication than the broad brush approach of drugs in general. A one fits all preventive solution is likely to be ineffective at best and counterproductive at worst. We may also benefit from recognizing most drug use as an adaptive function with instrumental value rather than something pathologic, which will run the risk of fueling potentially harmful behaviors like self-medicating and drug user stigmatization and alienation. Moreover, prohibition not only drives presumably harmful substance displacement but may also serve as the key incentive for engagement in risky behaviors. The current investigations could be a starting point for science based benefit-risk evaluations, greater appreciation of the users' views, and the development of more effective prevention.



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