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Characterizing users of new psychoactive substances using psychometric scales for risk-related behavior

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HIGHLIGHTS

- This manuscript shows that NPS users are more impulsive and show a higher level of sensation seeking.
- This manuscript shows that NPS users have more peers who use substances and have lower risk perception of drug use.
- In conclusion, NPS users show more risk-related behavior compared to non-drug users and even illicit drug users.

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ABSTRACT

Introduction: Studies investigating risk-related behavior in relation to new psychoactive substance (NPS) use are sparse. The current study investigated characteristics of NPS users by comparing risk-related behavior of NPS users to that of illicit drugs (ID) users and licit substances users and non-users (NLC) users.
Methods: In this cross-sectional study we included 528 individuals across an age range of 18–72 years. Using a web-based questionnaire we collected self-report data on substance use, sensation seeking, impulsivity, peer substance use and risk perception of substance use.
Results: NPS and ID users had a higher level of sensation seeking compared to NLC users (NPS users: $p < 0.001$; ID users: $p < 0.001$). NPS users ($p < 0.001$), but not ID users ($p = 0.16$), had increased levels of impulsivity compared to NLC users. NPS users had significantly higher scores for sensation seeking ($F_{1,423} = 51.52$, $p < 0.001$) and impulsivity ($F_{1,423} = 6.15$, $p = 0.01$) compared to ID users. Additionally, NPS users had significantly more peers who use substances compared to ID and NLC users. Also, NPS and ID users had lower risk perception for most substances than NLC users. NPS users had lower risk perception for most substances than ID users.
Conclusions: The findings highlight that NPS users show substantial more risk-related behavior than both ID and NLC users. Therefore, NPS users might be considered as a distinctive group of substance users that need another approach in terms of prevention.

1. Introduction

The international drug market has undergone radical changes during the past years, both in supply as well as consumption. New psychoactive substances (NPS), also referred to as research chemicals, designer drugs, or legal highs, are substances with a psychoactive effect that are recently added to the consumer market and used as a drug. NPS often imitate the effects of existing illicit drugs such as cocaine, amphetamines, ecstasy or cannabis and chemically resemble their illicit counterparts. However, because the chemical structure of these substances differs slightly from that of illicit substances, new substances are created, often not yet controlled by legislation. An ever-growing list of NPS has been reported by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) of >450 different NPS between 2005 and 2014, with more than half of those reported in the last three years (EMCDDA, 2014; EMCDDA, 2015).

These developments paralleled with a growing number of research reports about effects and risks of NPS. For instance, psychopharmacological studies have tried to analyse what subjective psychological and physical effects can be attributed to some NPS (Freeman et al., 2012; Linsen et al., 2015; Winstock et al., 2011b; Bäckberg, Beck, Hultén, Rosengren-Holmberg, & Helander, 2014; Bernson-Leung, Leung, & Kumar, 2014; Borek & Holstege, 2012; de Jong, van Vuren, Niesink, & Brunt, 2013; Kueppers & Cooke, 2015; Stoica & Felthous, 2013). In

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addition, animal studies have also attempted to characterize pharmacological and toxicological effects of a number of these substances in greater detail (Aarde, Huang, Creehan, Dickerson, & Taffe, 2013; Anneken, Angoa-Pérez, & Kuhn, 2015; Baumann et al., 2012; Baumann et al., 2013; Baumann et al., 2014; Bonano, Glennon, De Felice, Banks, & Negus, 2014). Although the sheer multitude of NPS that have been reported so far renders it impossible to study them all in detail, research coupled to chemical information have led to a functional classification of these substances into groups, such as dissociatives (methoxetamine) or synthetic cathinones (mephedrone, methylone) for example (Prosser & Nelson, 2012; UNODC, 2013).

Information concerning the prevalence of use or characterization of NPS users is still scarce. The 2014 Global Drug Survey, which reached 80,000 respondents (mainly drug users) worldwide, found last year prevalence rates of NPS use of around 10% for some countries (e.g. United States, United Kingdom) (Global Drug Survey, 2014). Strikingly, the prevalence of use of some NPS was comparable to that of established illicit compounds, such as cocaine or GHB (Goossens, Frijns, van Hasselt, & van Laar, 2014; Winstock & Mitcheson, 2011a). However, general prevalence studies are hampered by the fact that prevalence of use of most NPS is low and the number and types of NPS on the market changes continuously.

There is even more uncertainty about the characteristics of NPS consumers. A number of studies have tried to characterize users of other illicit drugs, such as ecstasy or MDMA (3,4-methylenedioxymethamphetamine) (Breen et al., 2006; Ramo, Grov, Delucchi, Kelly, & Parsons, 2010; Singer, Linares, Ntiri, Henry, & Minnes, 2004). Moreover, several studies have tried to focus specifically on factors that are associated with risk behavior, such as impulsivity (Butler & Montgomery, 2004; Quednow et al., 2007; Taurah, Chandler, & Sanders, 2014) and sensation seeking (de Win et al., 2006; Laviola, Adriani, Terranova, & Gerra, 1999; Martins, Storr, Alexandre, & Chilcoat, 2008; Wu, Liu, & Fan, 2010). In these studies it was shown that the use of MDMA was associated with a higher propensity for sensation seeking and impulsivity as compared to non-illicit drug users. In line with this, other studies have showed an association between reduced risk perception and substance use (Kilmer, Hunt, Lee, & Neighbors, 2007; Yacoubian, Boyle, Harding, & Loftus, 2003) Also, peer substance use seems to be a close approximation of the initiation of taking illicit drugs (Branstetter, Low, & Furman, 2011; Fallu et al., 2010; Scherrer et al., 2008; Simons-Morton, 2007).

Only a few attempts have been made to characterize NPS users. Some studies have described NPS users being largely similar to regular club drug users, with NPS being adopted into the repertoire of existing illicit drugs (Champion, Teesson, & Newton, 2015; Lawn, Barratt, Williams, Horne, & Winstock, 2014; Moore, Dargan, Wood, & Measham, 2013; Winstock & Barratt, 2013). Another study came up with a description of E-psychonauts, young and highly educated male users, that mainly use NPS for expansion of personal experiences (Orsolini, Papanti, Francesconi, & Schifano, 2015). One study has tried to identify risk-related behavioral variables in NPS users (Bruno et al., 2012). In this study NPS users showed more frequent use of multiple substances (i.e. cocaine, psychedelics, cannabis) than regular ecstasy users with no experience with NPS. Recent binge use of stimulants was much higher among NPS users than regular ecstasy users. However, this study did not investigate psychological proxy measures of risk behavior, such as sensation seeking or impulsivity.

Considering that persons using drugs with known risks, exhibit increased risk-related behavior as compared with individuals who do not use illicit drugs (Butler & Montgomery, 2004; Quednow et al., 2007; Taurah et al., 2014), we hypothesize that individuals who use NPS, substances with unknown risks, have an even higher propensity for taking risks than users of traditional illicit substances. The current study aims to describe risk-related behavior of nightlife visitors that use NPS and compare it with the risk-related behavior of nightlife visitors that do not use NPS. To this aim, impulsivity and sensation seeking are assessed using validated standardized questionnaires. Additionally, sociodemographic factors, peer substance use and risk perception are investigated, as these have been related to illicit drug use (Bahr, Hoffmann, & Yang, 2005; Palamar & Kamboukos, 2014; Yacoubian et al., 2003).

2. Methods

2.1. Sample and measures

2.1.1. Sample

In this cross-sectional study we included 528 individuals aged between 18 and 72 years. Data were collected from the 1st of October 2014 until the 1st of December 2014 using recruitment through open online media. A link to the survey was placed on two Dutch websites (partyflock.nl and drugsforum.nl), the Unity website and Unity Facebook, a peer-education project in the Netherlands for alcohol and drugs. These are the same channels of recruitment as used for the Dutch users in the Global Drug Survey (Global Drug Survey, 2014). The websites aim at people interested in electronic dance music, nightlife and drug use. NPS use was mentioned in the recruitment text of the survey to specifically attract users of these substances, no exclusion criteria were used. The survey was based on opportunistic sampling, which is considered most feasible in obtaining drug using populations, in particular users of (low prevalent) NPS (Winstock & Mitcheson, 2011a). Participants were asked to fill out an online questionnaire on substance use and personality. Answers about substance use were used as criteria to categorize participants into three groups; 1) Non-users, licit substance or cannabis users (NLC); containing individuals that have never used licit or illicit substances in their life and individuals that have used or currently use tobacco, alcohol and/or cannabis,[1] 2) Illicit drug (ID) users, containing individuals that have used illicit drugs at least once in their life and 3) NPS users, including individuals who have only used NPS or used NPS alongside illicit drugs at least once in their life. NPS were defined by us as (mostly uncontrolled) substances that recently emerged on the consumer market. A list of the most common NPS in the Netherlands was given to choose from (based on the Dutch market monitor DIMS, see van der Gouwe, 2016) as well as an open field for participants to fill out other possible NPS.

Filling out the questionnaire took approximately 20 min. Participants had to be 18 years or older. There was no financial compensation. Participants gave online informed consent. The study was approved by the ethical committee of the Trimbos Institute.

2.1.2. Measures

Sensation seeking and impulsivity are classical traits of (substance associated) risk behavior, so these were selected as measures of risk behavior (Butler & Montgomery, 2004; Quednow et al., 2007; Taurah et al., 2014; de Win et al., 2006; Laviola et al., 1999; Martins et al., 2008; Wu et al., 2010). In addition we were also interested in peer substance use and risk perception of substance use, since both have shown to be correlates with risky behavior (Branstetter et al., 2011; Fallu et al., 2010; Scherrer et al., 2008; Simons-Morton, 2007).

To assess sensation seeking we used the four-item self-report Brief Sensation Seeking Scale (BSSS) (Vallone, Allen, Clayton, & Xiao, 2007) in which individuals are asked to rate to which extent they (dis)agree with statements such as "I like to explore unknown and strange places" on a five-point Likert scale. The sum of these scores was subsequently used as outcome measure. A higher score indicates a higher level of sensation seeking behavior.

Impulsivity was measured by four items (2, 5, 11 and 15) of the 23-item self-report questionnaire, the Substance Use Risk Profile Scale

[1] Although cannabis is controlled in the Netherlands, it does not fall under the same restricted legislation category as other substances of abuse. Besides, cannabis is widely available through coffee shops and considered as a so called "soft drug".