

CATEGORIZATION OF NEW PSYCHOACTIVE SUBSTANCES (NPS)

Drugs: substances that impact the body's functions and can change mood or behavior. They include both prescription medications and recreational substances, each with varying effects and regulations. Drugs can be of natural or synthetic origin.

In a general manner, drugs can be categorized into three major groups: depressants, stimulants and hallucinogens. According to the European Drug Report 2023, the most consumed illicit drug in Europe is cannabis. Between the depressant drugs there are opioids, in which is included heroin, one of the most known and largest consumed in Europe. Hallucinogens comprise drugs that alter a person's perception of reality such as ketamine, LSD and psilocybin (also known as mushrooms). Stimulants group comprises substances like cocaine, the second most commonly used illicit drug in Europe) and the amphetamine group, which includes amphetamine, methamphetamine, MDMA, among others. Caffeine and nicotine are non illicit stimulant substances. (It is important to point out that not all drugs are necessarily illicit, one major depressant consumed drug worldwide is alcohol).

Traditional drugs encompass substances that have been widely used and understood for medical or recreational purposes over time, such as opioids, cannabis, cocaine, and alcohol. These substances have well-established effects, risks, and cultural contexts.

New psychoactive substances (NPS), often known as synthetic drugs or “legal highs”, tend to be either analogues of existing controlled drugs/pharmaceutical products or newly synthesized chemicals, created to mimic the actions and psychoactive effects of licensed medicines and other controlled substances. By their number, nature and composition, NPS pose significant challenges for drug consumers, clinicians – both in drug services and, more broadly, researchers, forensic toxicologists, healthcare systems and drug control policy globally – and have been described as a ‘growing worldwide epidemic’.

Differences between classical and NPS:

One key difference is that while traditional drugs have a longer history of use and research, NPS often lack comprehensive understanding regarding their pharmacology, safety profiles, and long-term effects. Additionally, traditional drugs are typically regulated and subject to legal controls, whereas NPS frequently emerge in legal gray areas, making them challenging to monitor and control.

Types of NPS:

1. Synthetic cannabinoids:

Group of substances that act agonistically at cannabinoid receptors 1 and 2 (CB1 and CB2) mimicking activity of tetrahydrocannabinol (THC) and thus causing cannabis-like effects including mood elevation, relaxation or euphoria. In contrast to THC, many synthetic cannabinoids are direct agonists and have an increased affinity and potency at CB1 receptor that mediates psychotropic cannabinoid effects, leading to: agitation, irritability, drowsiness, psychosis, paranoia, hallucinations, delusions, confusion, disorientation, aggression, altered mood and perception, loss of consciousness or memory, seizure, hypertension, tachycardia, chest pain, nausea, dizziness, cardiovascular effects and/or acute kidney injury.

- **Demographics:** primarily young males, although usage is seen across a range of ages up to 75 years. **Psychographics:** price, legal status, and availability.

2. Synthetic stimulants: synthetic cathinones, hallucinogens or dissociatives.

2.1. Synthetic cathinones, also known as bath salts: are by far the largest and most studied group. They are designed to replicate the effects of traditional stimulant controlled drugs, such as cocaine, MDMA and amphetamines. Synthetic cathinones derived from cathinone, an active β -ketone amphetamine present in leaves of khat (*Catha edulis*), which mode of action is based on mediation of monoamine (e.g. norepinephrine, dopamine and serotonin) release or reuptake inhibition, being frequently associated with increased energy, empathy, openness and libido. These drugs demonstrate psychostimulant and hallucinogenic properties; however, cause amphetamine-like effects, including neurologic (agitation, anxiety, paranoia, psychotic headaches), cardiovascular or gastrointestinal (hypertension, tachycardia, chest pain, hyperthermia, nausea, emesis), and/or renal (acute renal failure) effects. The administration route can be varied from taken in pill/tablet form (most common) to insufflated, swallowed, inhaled, smoked, injected or used rectally.

2.2. Hallucinogens, including tryptamines, lysergamides and phenethylamines. Most hallucinogens share a common mechanism of 5-HT_{2A} receptor modulation of serotonergic activity, although there is an increasing understanding of the role of the glutamatergic system, and some dissociative hallucinogens also have activity at κ opioid receptors. Administration routes include inhalation, nasal insufflation, oral ingestion (pill or blotter paper), sublingual/buccal administration, and intravenous injection. Users experience euphoria and joy, alterations in time/space perception, increased creativity and insight, accelerating and broadening thought processes and content, promoting novel thought associations, and providing psychedelic, spiritual and mystical experiences; however, adverse effects are also observed, including complications associated with serotonergic and sympathomimetic toxicity and a broad range of mental health crises.

- Demographics: predominantly young adults under 25, with a broad age range extending to older demographics. Users are more likely to be male, with a high level of education. Psychographics: self-exploration, spiritual attainment, and the desire for novel sensory experiences.

2.3. Dissociatives, like ketamine, phencyclidine (PCP) and methoxetamine (MXE)). Routes of use include inhalation, nasal insufflation, oral ingestion and intravenous injection. The effects of dissociatives include the sense of a disconnection between thoughts, identity, memory and consciousness, as well as sensory and tactile distortions, euphoria and depersonalisation. Common serious adverse effects include neurological impairment, renal and bladder injury.

- Demographics: wider age range, including users aged 50 or older; educated, urban residents, but with a tendency towards older age groups. Psychographics: enhancement of mental and physical abilities, facilitation of social interactions.

3. Synthetic depressants: synthetic benzodiazepines and synthetic opiates.

3.1. Synthetic benzodiazepines, commonly consumed for non-medical purposes, are used for its hypnotic and anxiolytic effects, to manage the acute effects of stimulants or to self-treat withdrawal symptoms. Users also reported some anticonvulsant, muscle relaxant and amnesic properties.

3.2. Synthetic opioids: group of drugs that act as full μ -opioid receptor agonists, the same receptors of opiates, like morphine and codeine that are extracted from *Papaver somniferum*, causing similar effects, like: euphoria, anxiolysis, feelings of relaxation and drowsiness. Undesirable side effects include nausea, dizziness, constipation, vomiting,

tolerance and respiratory depression. Fentanyl analogues and other new synthetic opioids have variable potencies at this receptor. Overdoses of synthetic opioids can cause symptoms as: altered mental status, decreased consciousness, pinpoint pupils, bradycardia, hypotension, hypoxia and hypothermia and respiratory depression, respiratory depression and, even, death.

- **Demographics:** young to middle-aged adults, a majority living in urban settings, and a significant proportion being employed. **Psychographics:** desire to cope with pain, boredom, emotional distress, anxiety, sleep issues, or to facilitate social interactions but with a focus on relaxation and stress relief rather than stimulation.

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OERs description form - Infographic

General Information

Resource Title: Categorization of New Psychoactive Substances (NPS)

Authors: Gheorghe, Andreea Daniela; Medkova, Michaela; Parvu, Ciprian-Laurentiu; Santos, Ana Rita; Veiga-Matos, Jéssica

Creation Date: April 19th, 2024.

Target: The infographic is targeted both towards the groups most vulnerable to NPS, especially to young people, such as highschool and university students, but also to the general public. It can be accessed via the internet, or physically as flyers, leaflets, etc.

Resource Description

Resource Type: Infographic

Learning Objectives: The user should acquire knowledge about what are the NPS, including the varieties and/or types of NPS. Additionally, the infographic can also help high school teachers keep track of the subjects covered during the lesson and better synthesize the information.

Content structures: NPS are characterized by its similar and mimetizing effects of classic drugs. Traditional drugs already have extensive research about their desired and adverse effects, while NPS lack this information. Therefore, they pose an enormous problem to the health care professionals and police forces. NPS can be essentially divided into 3 groups: synthetic depressants, like synthetic benzodiazepines and synthetic opioids; synthetic stimulants, including synthetic cathinones, hallucinogens and dissociatives; and synthetic cannabinoids.

OERs description form - Interactive group (Kahoot Quiz)

General Information

Resource Title: Categorization of NPS

Authors: Gheorghe, Andreea Daniela; Medkova, Michaela; Parvu, Ciprian-Laurentiu; Santos, Ana Rita; Veiga-Matos, Jéssica

Creation Date: April 19th, 2024.

Target: The Kahoot is targeted both towards the groups most vulnerable to NPS, especially to young people, such as highschool and university students, but also to the general public. It can be accessed via the internet, or physically as flyers, leaflets, etc.

Resource Description

Resource Type: Kahoot Quiz

Learning Objectives: The user should acquire knowledge about what are the NPS, including the varieties and/or types of NPS. The Kahoot was used as a tool of active learning, making the course takers engage more with the theme developed, and it functions as a continuation of the infographic.

Content structures: In this type of active learning tool, we used the quiz format to develop a game, “Two truths and one lie”, as a goal to grab the attention of the highschoolers in a better way.

Work Process

Initial Research: We conducted a preliminary research phase to familiarize ourselves with the topic generally, and to find a few relevant academic resources.

Tools Used: For research, we used Google Scholar and PubMed, for graphic design we used Canva, and for the interactive side of the project we used Kahoot to design a quiz.

Work Division: Everyone did research, Rita finished the Kahoot game and Andreea-Daniela finished the Infographic in Canva.

Personal Reflection:

Michaela: learned about NPS, what the term means, possible risk effects and consequences and very interesting was also working in a group of people from around the world online.

Andreea: I learned new infos about NPS and also it was a really amazing experience focused on different types of view.

Ciprian: This experience was very outside-of-the-box for me, as I'm not acquainted with toxicology and pharmacology, and I had to use my knowledge of communication studies and sociology in a more novel way for me.

Rita: During this work experience, I've managed to learn how to more effectively work in online groups. Developing active learning materials is of the utmost importance when it comes to teaching about NPS, since that the most affected age range are teens.

Jéssica: During the BIP-INES project, I had the opportunity not only to learn more about NPS but also develop my working-in-groups experience, including carrying out presential and online activities.

Personal Contribution:

Andreea: I summarized the information from my colleagues research and I tried to underline the classification of NPS using a Canva infographic and choosing a suitable design.

Ciprian: I did a preliminary research phase in order to find relevant studies and/or reports on the topic of the classification of NPS, and then focused on the demographic and the socio-economic side of the subject.

Michaela: I did a part of research and was ready to help if any problem occurs.

Jéssica: Personally, I carry out the research part about the NPS, including definitions and types of NPS.

Rita: I carried out a part of the research about the categorization of NPS. Also, I developed the interactive quiz in Kahoot.

Challenges Encountered: Not everyone is well versed in knowledge of chemistry and toxicology, and Kahoot as a platform can be confusing at times.

Key Learnings:

- Definition of NPS;
- Types of NPS and to categorize them;
- Importance of categorization;
- Most affected social groups.

Feedback and Evaluation:

Self-Evaluation: how do you evaluate the final outcome of your work? According to what criteria? Our final outcome is easy to understand for young people (clarity) and has relevant information (relevance) that can be accessed by everyone (availability).

What would you have done differently, also considering the works of others? Although we are happy with our results, the Kahoot platform could be more accessible.

Measurable Objectives For Both Tools

At the end of the application of the tools, the course takers should be able to:

- accurately distinguish between the different types of NPS
- understand what differentiates the major types of NPS
- understand why categorization of NPS is so important
- apply the information in every-day circumstances
- participate efficiently in the collective effort of harm reduction

Ciprian's research:

Introduction to Novel Psychoactive Substances: A Sociological and Demographic Overview

The landscape of psychoactive substance use is ever-evolving, with the introduction and dissemination of Novel Psychoactive Substances (NPS) posing new challenges to public health, law enforcement, and drug policy frameworks globally. These substances, often referred to under the broad and somewhat nebulous umbrella term "Novel Psychoactive Substances" (NPS), encompass a rapidly expanding array of compounds. According to Soussan and Kjellgren (2016), NPS are marketed as legally ambiguous alternatives to more traditional illicit drugs such as amphetamine, heroin, LSD, and cannabis. By 2014, the European Monitoring Centre for Drugs and Drug Addiction had identified 101 novel substances in Europe alone, raising the total number of NPS being monitored to an unprecedented 450. This burgeoning diversification underscores the pressing need for comprehensive understanding and regulation.

NPS are primarily engineered to mimic the psychotropic effects of their illicit counterparts, representing a formidable public health challenge due to the increase in both intoxications and fatalities attributed to their use. Neicun et al. (2020) highlight that over recent decades, the emergence of NPS—alternatively known as "legal highs," "research chemicals," or "designer drugs"—has garnered significant attention from an array of stakeholders, including researchers, policy officers, healthcare providers, and enforcement agencies, particularly within high-income countries. This attention is a testament to the complex and multifaceted nature of the issue, straddling the domains of health, legality, and social impact.

Moreover, the proliferation of NPS is matched by an increase in synthesis and availability, leading to a corresponding rise in associated harm and fatalities. U.N. Publications (2018) report that despite the increasing reports of harm and fatalities associated with NPS use, drug treatment and health services remain inadequate, with a persistently low proportion of individuals suffering from drug use disorders receiving necessary treatment—only one in six. The dire consequences of this gap in service provision are highlighted by the stark statistic that approximately 450,000 people died in 2015 as a result of drug use, with 167,750 of these deaths directly attributable to drug use disorders, most commonly involving opioids.

Contextual Information Regarding the Use of NPS in Europe

Major Role of Cannabis in Drug Treatment Admissions

- Cannabis is increasingly significant in drug treatment admissions.
- The evolving cannabis market is characterized by high-THC content products and new commercial products based on cannabis extracts.
- The average THC content in cannabis resin and herb has doubled in the last decade, indicating a shift towards higher potency cannabis.
- The need for increased surveillance to understand the public health impact of these developments is emphasized.

Diverse Drug Production Within Europe

- Both established and new drugs are produced within Europe for local and global markets.
- More laboratories and production sites are being detected, indicating a shift in production tactics by organized crime groups.
- Access to cheaper, novel precursor chemicals and processing equipment facilitates diverse drug production.
- This diversification poses challenges for European and international laws and monitoring efforts.

Continuing Availability of High-Strength MDMA

- The innovation and scaling-up of synthetic drug production in Europe have resulted in the availability of high-content MDMA tablets and high-purity powders.
- Increases in MDMA content and purity, including products with extremely high levels of MDMA, pose considerable health risks.

- There is a pressing need for greater user awareness, prevention, harm reduction messaging, and interventions.
Persistent Problem of New Psychoactive Substances (NPS)
- The introduction of new psychoactive substances to the market has stabilized, yet over 50 new substances are detected annually.
- Approximately 400 previously reported NPS are detected on the European market each year.
- The persistent detection of NPS underscores their ongoing challenge and the necessity for continued monitoring and response strategies.

Detailed Assessment of NPS Users: Demographic, Psychographic, Behavioral, and Attitude Characteristics

The emergence and proliferation of Novel Psychoactive Substances (NPS) have introduced new dynamics into the realm of drug use, characterized by a distinct user demographic, psychographic profiles, behavioral tendencies, and attitudes toward substance use. This chapter delves into these aspects, drawing on insights from Neicun et al. (2020) and Soussan and Kjellgren (2016), to provide a nuanced understanding of NPS users.

Demographic Characteristics

The demographic profile of NPS users is predominantly young adults, particularly those between the ages of 18 and 25, indicating a significant youth inclination towards these substances. Contrary to this youthful trend, the prevalence among individuals aged 50 or older remains notably stable. The majority of NPS users are white Americans, men, and tend to live on their own in large metropolitan areas. This demographic is also characterized by a relatively higher level of education, with most having a college education or higher. Interestingly, a significant portion of NPS users are actively employed, either full-time or part-time, suggesting that NPS use permeates various social and economic strata.

Psychographic and Behavioral Characteristics

NPS users exhibit a pattern of polysubstance use, combining traditional illicit drugs with classic synthetic drugs. This trend is underscored by a significant overlap between NPS use and prior consumption of substances such as LSD, ecstasy, cannabis, and cocaine. The propensity for polysubstance use points to a broader quest for varied psychoactive experiences among NPS users. Furthermore, the majority of users report pleasure and enjoyment as their primary motivation for using NPS, with appreciable levels of satisfaction from the drug effects and intentions to reuse the substances. This pursuit of hedonic experiences is a central psychographic trait that defines the NPS user community.

Attitude Characteristics

The attitudes of NPS users towards the substances they consume are marked by a nuanced appreciation of the effects, both positive and negative. The perceived addictive potential of NPS is generally considered low, although this varies significantly across different drug groups. This perception may reflect a degree of denial or a genuine belief in the lesser addictiveness of certain NPS types. Motivations for using NPS also vary between drug groups, with hallucinogens often used for self-exploration and spiritual attainment, while stimulants and GABAergic drugs are associated with social facilitation and coping mechanisms for pain, boredom, and anxiety.

Challenges and Insights

The detailed assessment of NPS users highlights several key insights and challenges. Firstly, the demographic skew towards young adults and the pattern of polysubstance use indicate a need for targeted prevention and harm reduction strategies. Secondly, the primary motivation of pleasure and enjoyment, coupled with varying attitudes towards different NPS groups, underscores the complexity of addressing NPS use. This complexity necessitates a nuanced understanding of the motivations, perceptions, and experiences of NPS users to develop effective intervention strategies. Lastly, the association between NPS use and mental health issues points to the importance of integrating mental health support into the broader response to NPS use.

Based on the insights from Neicun et al. (2020) and Soussan and Kjellgren (2016), the demographic and psychographic profiles of the most likely users of Novel Psychoactive Substances (NPS) can be segmented according to the different types of NPS. These profiles encompass synthetic cannabinoids, hallucinogens, stimulants, and depressants, each attracting distinct user groups with unique motivations and usage patterns.\

Synthetic Cannabinoids

- **Demographics:** Primarily young males, though not exclusively a youth phenomenon. Usage is seen across a range of ages up to 75 years, with a slight preference among older individuals compared to other NPS types. Users often live in urban areas and have a varied level of education.
- **Psychographics:** Users are motivated by circumstances such as price, legal status, and availability. They may seek substitutes for traditional cannabis due to legal constraints or detection avoidance. The experience of severe side effects is more commonly reported, reflecting a preference for traditional cannabis when available.

Hallucinogens

- **Demographics:** Predominantly young adults under 25, with a broad age range extending to older demographics. Users are more likely to be male, with a high level of education, and reside in large metropolitan areas.
- **Psychographics:** Motivated by self-exploration, spiritual attainment, and the desire for novel sensory experiences. Users value the introspective and profound experiences offered by hallucinogens, indicating a drive towards non-ordinary states of consciousness. There is a lower perceived addictive potential, aligning with use patterns focused on specific, meaningful experiences rather than habitual use.

Stimulants

- **Demographics:** Appeals to a wider age range, including users aged 50 or older. The demographic profile is similar to that of hallucinogens, with a significant representation of educated, urban residents, but with a tendency towards older age groups.
- **Psychographics:** Users are motivated by the enhancement of mental and physical abilities, as well as the facilitation of social interactions. Stimulants are often used as "social lubricants" or for cognitive enhancement, reflecting a utilitarian approach to NPS use. The pattern of use suggests a balance between recreational and functional motivations.

Depressants

- **Demographics:** While specific demographic data is limited, depressant users likely mirror the broader NPS user base, with a skew towards young to middle-aged adults, a majority living in urban settings, and a significant proportion being employed.
- **Psychographics:** The use of depressants is motivated by the desire to cope with pain, boredom, emotional distress, anxiety, and sleep issues. This group may also seek to facilitate social interactions but with a focus on relaxation and stress relief rather than stimulation. The perceived addictive potential may vary, with a recognition of the risks associated with habitual use.

Overarching Trends

- **Demographics:** NPS users predominantly consist of young to middle-aged adults, with a significant proportion being male, white Americans, and residing in urban areas. A notable percentage have a college-level education or higher and are actively employed.
- **Psychographics:** A common thread among NPS users is the pursuit of pleasure and enjoyment, alongside a pattern of polysubstance use. There is a general tendency towards exploring varied psychoactive experiences, with specific motivations varying by NPS type. Mental health issues also appear to be a significant factor, with a higher prevalence of NPS use among individuals experiencing psychological distress or depressive episodes.

The risks posed by Novel Psychoactive Substances (NPS) to education systems can be substantial, often mirroring and sometimes exacerbating the challenges traditionally associated with classic drugs. Below is a schematic breakdown that compares the impact of NPS and classic drugs on educational environments, focusing on areas such as student well-being, academic performance, and institutional integrity.

Accessibility and Legal Ambiguity

- **NPS:** Often marketed as legal alternatives to illicit substances, leading to easier access for students. The constantly evolving nature of these substances complicates regulatory efforts, potentially making them more accessible within educational settings.
- **Classic Drugs:** Generally regulated under established legal frameworks, leading to a clearer understanding of their illegality. Efforts to combat their distribution are more straightforward but still challenging.

Knowledge and Awareness

- **NPS:** There is a significant lack of reliable information on the effects, potency, and long-term consequences of NPS, making it difficult for educators and students to fully understand the risks.
- **Classic Drugs:** The effects and risks of classic drugs are better understood, allowing for more effective educational interventions and preventive measures within schools.

Health and Safety Risks

- **NPS:** The unpredictable and often unknown chemical compositions of NPS can lead to severe, sometimes fatal, health reactions. The lack of data on these substances increases the risk of overdose and poisoning.
- **Classic Drugs:** While the use of classic drugs also poses significant health risks, there is a broader base of knowledge on how to manage and treat substance-related incidents.

Academic Performance

- **NPS and Classic Drugs:** Both can negatively impact student cognition, memory, and motivation, leading to decreased academic performance. However, the unpredictable effects of NPS may pose additional risks to learning and engagement.

Social and Behavioral Issues

- **NPS:** The novelty and perceived "safe" status of NPS may lead to increased experimentation among students, potentially exacerbating issues of substance abuse and associated behavioral problems.
- **Classic Drugs:** Social and behavioral issues related to classic drug use are well-documented, including increased risk of absenteeism, disengagement, and disciplinary actions.

Institutional Challenges

- **NPS:** Educational institutions may struggle to keep up with the rapidly changing landscape of NPS, requiring constant updates to policies and prevention strategies. Detection of NPS use can be challenging, complicating enforcement efforts.
- **Classic Drugs:** Schools and colleges may already have policies and procedures in place to address classic drug use, but must remain vigilant to adapt to changing trends and maintain a safe environment.

Prevention and Intervention

- **NPS:** The development and implementation of effective prevention and intervention strategies are hindered by the limited understanding of NPS trends and effects. Tailored approaches are needed to address the unique challenges of NPS.
- **Classic Drugs:** There is a wealth of resources and established programs aimed at preventing and addressing classic drug use among students. These can serve as a foundation but need to be adapted to address NPS as part of a comprehensive substance abuse strategy.

Conclusion

The introduction and proliferation of NPS in educational settings compound existing challenges posed by classic drugs. Both demand proactive, informed, and adaptive responses from educational institutions to safeguard student well-being, maintain academic standards, and ensure a supportive learning environment. The key differences in accessibility, awareness, and health risks between NPS and classic drugs necessitate a dynamic and multi-faceted approach to drug education, prevention, and intervention within schools and colleges.

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