HHS Public Access

Author manuscript

*Hum Psychopharmacol*. Author manuscript; available in PMC 2021 January 07.

Published in final edited form as:

*Hum Psychopharmacol*. 2020 January ; 35(1): e2719. doi:10.1002/hup.2719.

# A qualitative descriptive analysis of effects of psychedelic phenethylamines and tryptamines

**Joseph J. Palamar**, **Patricia Acosta**

Department of Population Health, New York University School of Medicine, New York, New York

## Abstract

**Objective:** The number of novel psychedelic phenethylamines and tryptamines has continued to increase, but little academic research has focused on the effects of these substances. We sought to determine and compare the subjective effects of various substances.

**Methods:** We conducted in-depth interviews with 39 adults (75.4% male and 87.2% White) who reported experience using psychedelic phenethylamines and/or tryptamines. Participants described the effects of compounds they have used. We examined the subjective drug effects in a qualitative descriptive manner.

**Results:** Participants reported on the use of 36 compounds. The majority (64.1%) reported the use of 2C series drugs, with 2C-B use being most prevalent; 38.5% reported the use of NBOMe, and 25.6% reported the use of DOx. With regard to tryptamines, 46.2% reported use, and 4-AcO-DMT was the most prevalent drug used in this class. 2C-B was often described as being more favorable than other 2C series compounds with the effects described as being comparable with MDMA and LSD. NBOMe effects were generally described in an unfavorable manner, and the effects of DOx were often described as lasting too long (12–36 hr). The effects of 4-AcO-DMT were often described as mimicking psilocybin.

**Conclusion:** Knowing the effects of various compounds can inform education, prevention, and harm reduction efforts regarding the use of these drugs.

### Keywords

drug effects; new psychoactive substances; phenethylamines; psychedelics; tryptamines

## 1 | INTRODUCTION

The drug landscape has drastically changed over the past decade, in part, due to the continued emergence of new psychoactive substances (NPS). By the end of 2018, at least 730 different NPS had been discovered in Europe alone (European Monitoring Centre for Drugs and Drug Addiction, 2019). Although the majority of NPS discovered are synthetic cannabinoids and synthetic cathinones, many new phenethylamines and tryptamines have

**Correspondence** Joseph J. Palamar, Department of Population Health, New York University School of Medicine, 180 Madison Avenue, Room 1752, New York, NY 10016. joseph.palamar@nyulangone.org.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

also emerged in recent years (European Monitoring Centre for Drugs and Drug Addiction, 2015).

Pyschedelic phenethylamines and tryptamines have received little attention from researchers, in part, because use is not as prevalent as other more common drugs. For example, <1% of adults in the United States is estimated to have used tryptamines such as *N,N*-dimethyltryptamine (DMT), α-methyltryptamine (AMT), or 5-MeO-DIPT ("Foxy") in the past year (Palamar & Le, 2018). Psychedelic phenethylamines and tryptamines are also associated with far fewer poisonings and deaths and are confiscated ffar less frequently than more common phenethylamines (e.g., methamphetamine), cocaine, cannabis, opioids, and other drugs (Gummin et al., 2018; U.S. Drug Enforcement Administration, 2019).

Although psychedelic phenethylamine and tryptamine use is far less prevalent than the use of more common psychoactive drugs, among uncommon drugs and NPS, these two classes appear to be most prevalent. Although it is difficult to estimate the prevalence of the use of these drug classes because most drug surveys do not query use, a recent study in the United States examined type-in responses for the use of uncommon drugs not specifically queried in the 2005–2017 National Surveys on Drug Use and Health (Palamar & Le, 2019). Two thirds of type-in mentions (65.8%) were psychedelic phenethylamines (with names of 37 different compounds typed in). 2C series compounds were the most prevalent subclass and composed nearly half (48.9%) of drug mentions. 2C-B, 2C-E, and 2C-I were the most commonly reported 2C series compounds, and the self-reported use of DOx and NBOMe series phenethylamines was far less common. Tryptamines accounted for 9.1% of all type-in responses in this study, and a wide variety of compound names ($n$ = 19) were typed in across years (Palamar & Le, 2019). Indeed, many of these compounds are not "new," but we consider them both uncommon and novel—compared with more common drugs.

Not only has there been very little focus on the epidemiology of the use of psychedelic phenethylamines and tryptamines, but very few academic articles discuss effects of such compounds in detail. Much coverage also focuses on poisonings, in which the main focus is adverse effects and not general effects. Despite the lack of academic literature focusing on the effects of these drugs, rich descriptions can often be located on online message forums such as BlueLight, in which "psychonauts" (those who explore altered states of consciousness through various drugs; Orsolini et al., 2017) and other individuals post reports describing their experiences (Enghoff & Aldridge, 2019; Lamy et al., 2017). Other rich sources of information are the seminal works authored by Dr. Alexander Shulgin and Ann Shulgin: *Phenethylamines I Have Known and Loved (PiHKAL)* and *Tryptamines I Have Known and Loved (TiHKAL)* (Shulgin & Shulgin, 1991, 1997). These books describe the effects of hundreds of such psychedelic compounds. However, many newer compounds have emerged since the publication of these books, and despite the availability of documented effects in these books and on the internet, academic articles focusing on the effects of specific compounds—newer or older—are severely lacking.

In this paper, we seek to document and compare the self-reported subjective effects of various psychedelic phenethylamines and tryptamines in a qualitative descriptive manner,

using data based on in-depth interviews with the users. We intend for this information to help educate users and potential users.

## 2 | METHODS

### 2.1 | Study design

A purposive sample of 39 adults was recruited from 2015 to 2018 through study flyers on social media and on online drug forums frequented by psychonauts. Individuals were also recruited by the lead investigator at harm reduction conferences and via referral from other participants. This loose design allowed us to interview a variety of individuals with different experiences both inside and outside of the United States. To be eligible for this study, individuals must (a) have been age ≥18, (b) speak English, and (c) self-identify as being highly experienced with the use of various NPS or other uncommon drugs such as psychedelic phenethylamines and tryptamines. A screening was conducted over the phone or in person by the lead investigator to ensure eligibility. Of those who screened, four (of 43) were deemed ineligible as they reported little to no experience with NPS. After providing verbal consent to participate, those deemed eligible were either interviewed in person or over the phone. Interviews were largely unstructured and open-ended. The only structured portion of the interview was about perceptions of drug use in the nightclub/festival scenes (when applicable) as this was the main focus of the parent study. All participants were asked to name all NPS and uncommon synthetic drugs they had ever used, and prompts were included to ensure that no drug category was skipped (e.g., they were asked about tryptamines if they did not specify the use of any). One by one, the interviewer asked participants to discuss perceived effects of each drug used. Interviews were recorded and typically lasted about an hour. Participants who completed the interview were compensated $50.

### 2.2 | Analysis

Interviews were transcribed by an author, and multiple cycles of coding were conducted (Saldaña, 2014) using Atlas.ti version 8 software (Friese, 2018). Another author double-coded all transcripts for accuracy. Dominant and/or repeated codes were then categorized into themes along with quotations summarizing specific themes. After a consensus was reached regarding classification of codes and themes, quotations in each domain were summarized. Because our aim was to describe and compare the effects of various compounds, we present the results in a qualitative descriptive manner (Colorafi & Evans, 2016). Analyses were limited to psychedelic phenethylamines and more novel tryptamines; thus, we did not focus on phenethylamines, which do not commonly have psychedelic effects (e.g., amphetamine and MDMA), and we also did not focus specifically on DMT as this is known to be a more prevalent and researched tryptamine (Palamar, Barratt, Ferris, & Winstock, 2016; Winstock, Kaar, & Borschmann, 2014). The New York University Langone Medical Center institutional review board approved all study methods. We also obtained a Certificate of Confidentiality from the National Institutes of Health to further protect confidentiality of participants.

# 3 | RESULTS

## 3.1 | Participant characteristics

Characteristics of participants are presented in Table 1. The majority of participants were male (75.4%), White (87.2%), and resided in the United States (8.6%). The mean age was 26.9 (*SD* = 5.3) with a range from 18 to 38. Specific compounds reportedly used by participants are listed in Table 2. The majority of drugs discussed were psychedelic phenethylamines (i.e., 2C, NBOMe, and DOx), and almost half of the sample (46.2%) discussed tryptamines.

## 3.2 | 2C series drugs

**3.2.1 | 2C-B—**2C drugs were the most common drugs reportedly used by this sample with the majority (64.1%) reporting the use of one or more 2C compounds. 2C-B (2,5-dimethoxy-4-bromophenethylamine) was the 2C series compound most commonly used (by 68.0% of 2C users). Compared with more common psychedelics like LSD, the effects of 2C-B were described as non-ego-threatening, not "mentally challenging" or confusing, and not leading to "an extreme headspace." The high was sometimes described as having only minor visuals or as being visual but "clear."

> 2C-B is the best for visuals. The mind is very clear. It's very easygoing to the ego. There's no hangover, it's super clean, if you don't abuse it.

> The visuals are light and pastelized. It doesn't have the head space of acid. It's kind of dreamy and melty.

Describing the drug as "light" or easy to handle was a common theme. This "light" high appeared to allow users to be more functional while high as compared with psychedelics with stronger effects. One participant described 2C-B as "the Diet Coke of psychedelics" and another described it as being a "beginner psychedelic" because of its light effects.

> 2C-B is like all the visuals of acid without the "I'm gonna contemplate the inside of my head really hard thing." It's less the intense thought process that goes in acid, like I can have a conversation with a person that's still pretty normal and grounded and I'm still getting visuals.

> They (2C drugs) change the way sound sounds, they change the way things look, but they didn't produce the same headspace change that LSD and mushrooms produce.

However, some users pointed out that there is a steep dose curve in that adding a few milligrams to a dose can greatly affect one's high. Thus, visuals were described as not being very strong unless larger doses were used.

> In higher doses, it is about as visual as LSD. In lower doses, the visuals are quite different.

Many users of 2C-B compared the effects with those commonly produced by MDMA or LSD, and many users described the effects as resembling both MDMA and LSD or a "candy flip," which is when both of these drugs are used simultaneously or in tandem. Like

MDMA, 2C-B effects were commonly described as being entactogenic, with users more able to be in touch with their emotions. The effects were also described as including a "body high" and as being euphoric and/or erotic, with increased sensitivity to touch and touch feeling pleasurable.

> I had described it (2C-B) as a clear-headed candy flip. I had the love and social ability and empathy that I get from MDMA mixed with very geometric, colorful visuals that I get from LSD, and my head space was very clear.

> 2C-B felt like a cross between LSD and MDMA, but it also had its own distinct character. There still was some sort of visual hallucinations of sound warping and stuff, but it did feel a lot closer to that kind of empathogenic headspace that MDMA brings on. Although at the same time it didn't have the same degree of sort of forceful positive mood push that MDMA has. 2C-B is a little bit more unpredictable, much like LSD or mushrooms where something could set you off into a more of a bad trip, negative headspace kind of place.

**3.2.2 | 2C-E and 2C-I—**2C-E (2,5-dimethoxy-4-ethylphenethylamine) and 2C-I (2,5-dimethoxy-4-iodophenethylamine) were used by about half of those reporting 2C use. We discuss these two compounds in the same subsection because both were commonly described as being more visual and trippy than other 2C series compounds. Below, some participants discuss how these compounds are associated with more extreme visuals than other 2C compounds. They were also noted to be more stimulating of the auditory sense and to allow users to delve "more deeply into their psyches" than 2C-B.

> 2C-E is as visual as it gets, which was one of the downsides of 2C-E. As you're taking it, you're dealing with hallucinations for quite some time.

> 2C-I was extremely visual. I had more intense visual experiences with that than mushrooms.

As is seen in some quotations from the participants above, strong psychedelic effects were not always discussed in a positive manner because effects can be too overwhelming or last for longer than desired. Others described 2C-E as having a "less positive push" than 2C-B, and one participant mentioned that 2C-E provides too intense of a high for most people to take at a party, suggesting that more peaceful or quiet atmospheres may be more conducive to experiencing a more "positive" high.

Users of 2C-I and 2C-E noted other more unique physical effects such as "jittery eyes" (nystagmus), a common effect of MDMA, and a few participants complained about nausea, with one attributing nausea to associated vasoconstriction.

> The one sort of downside is that they (2C-E and 2C-I) are also incredibly nausea-inducing. So you're trying to have a really fun time and trying not to move the same time.

> 2C-E was pretty crazy. It's pretty hallucinogenic. Definitely warped reality. I think 2C-E made me feel more physically nauseous (than 2C-B), and same with 2C-I.

**3.2.3 | Other 2C compounds—**Other 2C compounds were much less prevalent and not discussed to the same extent as 2C-B, 2C-E, and 2C-I. Below, we briefly describe the reported effects of 2C-B-Fly (2-[8-bromo-2,3,6,7-tetrahydrobenzodifuran-4-yl]ethan-1-amine), 2C-C (2,5-dimethoxy-4-chlorophenethylamine), 2C-D (2,5-dimethoxy-4-methylphenethylamine), 2C-P (2,5-dimethoxy-4-propyl-phenethylamine), 2C-T-2 (2,5-dimethoxy-4-ethylthiophenethylamine), and 2C-T-7 (2,5-dimethoxy-4-[*n*]-propylthiophenethylamine).

2C-B-Fly was described by one participant as feeling like a cross between LSD and MDMA, similar to how many participants described the high associated with 2C-B use. This user also described the effects as being more energetic than LSD and having visual aspects closer to MDMA although colors are brighter, more vivid, and "more colorized."

2C-C was described by one participant as being emotionally stimulating with mild visuals and no auditory hallucinations, and another mentioned that 2C-C specifically did not lead to meaningful spiritual experiences. The effects of 2C-C were typically not described in a positive manner. One participant in particular described the adverse effects resulting from 2C-C use:

> I just remember feeling predominantly side effects—namely mild nausea, sedation and malaise with minimal changes to head space. No visuals, no emotional change other than the general feeling of ickiness, which lasted for about three hours.

The only effects described regarding 2C-D were that use can increase mental clarity, a sense of alertness, and a carefree attitude. Both participants reporting the use of 2C-P only commented that the effects are longer acting than other 2C drugs with one mentioning that the trip can last for 18 hr. 2C-T-2 was described by one participant as being "the most valuable" 2C compound for achieving a space to work out emotional baggage and interpersonal relationships. Although 2C-T-2 was described as heightening the senses, one participant described the drug as being associated with nausea, so much to the extent that he said the "T" should refer to "toilet."

Finally, 2C-T-7 was used by three participants and was typically described in a positive manner. For example, one user described it as being a safe and "reputable substance" that has very consistent or reproducible effects, without erratic symptoms or neurosis. One user explained that the effects are somewhat similar to the effects produced by 2C-B but with more of an empathogenic feeling with "softening of emotions." A few participants compared the effects with those of LSD, and one, for example, explained that the high from 2C-T-7 is more of a controlled experience than LSD. Another compared it with both LSD and mescaline.

> 2C-T-7—they call it the 7th Heaven or the Blue Mystic. It feels like if LSD and mescaline had a baby, it would be 2C-T-7. It makes your serotonin levels go up and see amazing visuals. There's no comedown, no hangover.

### 3.3 | NBOMe series drugs

Over a third (38.5%) of participants reported NBOMe (*N*-methoxybenzyl) use. Two thirds (66.7%) of NBOMe users specifically reported the use of 25I-NBOMe (2-(4-iodo-2,5-dimethoxyphenyl)-*N*-[(2-methoxyphenyl)methyl]ethanamine); a third (33.3%) discussed unspecified use of NBOMe (along with or in addition to 25I), and only a few participants specifically reported use of 25B- and 25C-NBOMe (*N*-(2-methoxybenzyl)-2,5-dimethoxy-4-bromophenethylamine and *N*-(2-methoxybenzyl)-2,5-dimethoxy-4-chlorophenethylamine), respectively. Due to a large lack of specificity of the compound(s) reportedly used, we discuss NBOMe use in terms of any NBOMe use rather than the effects of specific NBOMe compounds.

The majority of experiences discussed resulting from NBOMe use was described in a negative connotation, and some participants also discussed adverse outcomes they had witnessed among peers. The negative experience for some apparently begins with the taste of the tab, which was often described as bitter, metallic, or caustic. A few users noted that the effects began quickly with the “come up” being fast. In fact, one participant mentioned he witnessed another user experience a “very immediate phenethylamine-induced psychosis” after use.

NBOMe was described as having a heavy “body load,” and some described the high as being overwhelming. Similarly, others complained of “sensation overload” and paranoia. For example, these users described NBOMe effects as being speedy and too intense.

> It felt too much like a bad roll (a bad ecstasy high) mixed together with the kind of psychedelic that doesn't mesh well with me. This was definitely more a speedier, more visually-intensive kind of trip to me. This just felt like, hey let's go play roller derby with your brain and see what happens.

> The third or fourth time [I took NBOMe], was one of the strangest experiences I've had in my life–[it] really, really distorted my senses. There would be moments where it would feel like time would stop. Everything would freeze around me … and it would go back to normal.

One participant stressed that setting/environment is important when using a drug like NBOMe, at least regarding the potential for experiencing paranoia.

> The first time I tried 25I it was not in a festival type of thing; I just dosed with a friend and we went to the beach and that was more enjoyable. But after we left the beach, we went into the local town, and that's where the paranoia really kicked up and there was some nausea. So I think it's really, really dependent on the setting.

Perceived feelings of hypertension and even the sensation of physical pain were also reportedly experienced after using NBOMe.

> I've had some good experiences on it (NBOMe) but the more I did it, the more negative effects I would notice. It causes much more hypertension than any other psychedelic I've done. There's this constant feeling of being like this when I'm on it and just that sort of feeling can affect your mental state when you're in a psychedelic state.

> That (NBOMe trip) was physically painful. I was in so much pain I screamed all the color out of the world.

LSD was a common comparison when participants described the effects of NBOMe. Although one user noted that the NBOMe high feels similar to that of LSD, others described NBOMe effects as less pleasurable. For example, one user stated that his NBOMe trips were "never too profound or life-changing compared to LSD experiences." Although the same user was the only participant to compare the effects of two different NBOMe compounds and state that 25C felt more empathogenic than 25I and more like MDMA rather than being as visual.

> It's psychedelic, but it's not. Like with LSD, you feel like you have your ego, your brain. You're chopping onions and you can see it layer by layer. You can see things in a clear, mathematical or analytical way. With NBOMe, it's like a tea that you cannot see the bottom. It's something very strange. I do not like it.

Some users stressed the importance of dose size with some implying that doses used by people are often too large. Mentions of NBOMe-related deaths were also common.

> Obviously there are also all sorts of reported deaths from it. It seems like the difference between a good experience and a death is not that far away in dosage.

> The thing with NBOMe is you're gonna have a fun time if you do a really small dose. If you do any more than that, you can die pretty quickly.

> It didn't feel dangerous in a sense like "Oh my god, I'm going to die" from a physical perspective. Maybe I had a properly dosed one. It didn't seem super intense like the DOs (DOxs).

### 3.4 | DOx series drugs

DOx compounds were the least prevalent psychedelic phenethylamines reportedly used by participants with a quarter (25.6%) reporting use. Even though some participants specified which DOx compound was used (i.e., DOB [1-(4-Bromo-2,5-dimethoxyphenyl)-2-aminopropane], DOC [2,5-dimethoxy-4-chlorophenylethylamine], DOI [2,5-dimethoxy-4-iodophenylethylamine], and DOM [2,5-dimethoxy-4-methylphenylethylamine]), we discuss experiences below regarding all DOx use and specify which compound was discussed when possible.

Almost all participants who discussed their DOx use mentioned the length of high as their main description, and the high was also sometimes described as being very intense. The intensity and length of the high were usually described as being adverse effects. The effects of various DOx were often described as lasting 12–36 hr with effects lingering even after a night's sleep.

> I didn't like how long DOB lasted … I don't like tripping for like 36 hours. That's how long it lasted.

The other aspect of DOx use, also often described as being negative, was vasoconstriction and related sensations resulting from use.

> [With] DOC, I feel a lot of pressure in my back. It's the category of drugs, the DOx … they are very heavy to the body and you can feel the vasoconstriction—the veins being more compressed. I don't like it so much. I've tried DOM one time. It wasn't a very good experience for sure.
>
> The main downsides (of DOB) were the muscle tensions, but if you had a Flexeril (cyclobenzaprine—a muscle relaxer) on hand or something on the come down, it was pretty nice.

This participant also compared the effects of DOB with LSD.

> DOB lasted like 25 hours. The come-up and come-down was very slow. It lacked a lot of the emotions of LSD. It was still intense. It still was emotional but you could tell that it was more phenethylamine, like you could tell that it was more stimulating in some ways but the visuals were really cool.

## 3.5 | Tryptamines

**3.5.1 | 4-AcO-DMT—**We also asked participants about their use of tryptamines. We consider most tryptamines "novel" with exception of DMT, as this compound is more prevalent and more extensively researched. However, although we did not focus specifically on DMT, many participants compared various tryptamines with DMT. 4-AcO-DMT (4-acetoxy-*N,N*-dimethyltryptamine, O-acetylpsilocin, or psilacetin) was the most prevalent tryptamine reported with 30.8% of the sample reporting use and two thirds (66.7%) of tryptamine users reporting use.

4-AcO-DMT—often pronounced as "4-akko-DMT"—was reported by most users as producing similar effects as psilocybin mushrooms with less nausea. One participant referred to this compound as "silly pills," which is a play on the name psilocybin. This particular compound was often preferred over natural mushrooms due to the lack of adverse side effects such as nausea, which the natural mushroom tends to produce. Thus, participants often suggested that 4-AcO-DMT allows one to achieve the same high as psilocybin without adverse physical effects such as nausea and heavy body load. One participant did complain of dry mouth and mentioned that although 4-AcO-DMT feels similar to psilocybin, he said it lacks the "organic" feel produced by psilocybin.

> 4-AcO-DMT feels very similar to mushrooms and there's no plant matter to consume to possibly upset your stomach so I found it's much nicer.
>
> I think I do have a slight preference for 4-AcO-DMT specifically over shrooms because it's a little bit easier because there's less nausea and the visuals are very similar as far as the intensity.
>
> 4-AcO-DMT was a similar kind of effect [to shrooms]; similar time course of four to six hours. But it was a lot less physical discomfort with that experience than most of the times that I've eaten mushrooms. The experience itself is pretty short but positive and it never felt like it got me as far out there as LSD or mushrooms did.

Despite "DMT" being included in the chemical name, some participants felt the high from 4-AcO-DMT is unlike DMT. When smoked, DMT leads to very quick and intense high and lasts for only a short duration, but 4-AcO-DMT effects are much longer lasting. For example, one participant reported the high lasting 6–7 hr. However, perceived differences in the effects between DMT and 4-AcO-DMT might have been due, in part, to smaller doses being used. Some participants did mention that at high doses, the effects can in fact be somewhat comparable with DMT.

> 4-AcO-DMT at a very high dose can actually be very DMT-like, at a level where it's not safe to be outside.

Two participants described their experiences taking what Erowid.com describes as a "strong" dose (20–35 mg) and a "heavy" dose (≥30 mg):

> It's very stimulating. Very strong. The visuals are almost the same as DMT. For the dose I took, like 25 mg, 27 was my maximum, maybe 29. I had visuals equal to DMT, which has amazing mind symbols. If you like warmness … you can feel it in the face. Super crazy.

Although 4-AcO-DMT was the most prevalent tryptamine used among this sample, it was also the most discussed. Below, we describe the effects of some other tryptamines, but these compounds were discussed to a much lesser extent.

**3.5.2 | 4-HO-MET—**The second most prevalent tryptamine was 4-HO-MET (4-hydroxy-*N*-methyl-*N*-ethyltryptamine, metocin, or methylcybin) which was used by about a quarter (27.8%) of tryptamine users (and 12.8% of the sample). Three of the four participants who described the high described it as "light" or "mild," similar to how many participants described 2C-B.

> 4-HO-MET is a very light substance. It basically makes you just laugh and you can easily do it just sitting in a cafe. It just makes everything hilarious and then you get nice visuals. So this is something that you do to socialize and the dosing is pretty cheap.

> 4-HO-MET seems to be a lot milder [than 4-AcO-DMT] in terms of its head space so you're not getting the same amount of confusion.

Despite the high being "light," allowing users to be more "clearheaded" and functional, a few participants commented on strong visual effects.

> They (effects) were relatively clear-headed. I could walk around, I could walk to the corner store and get some food if I wanted to, and visually, the display was stunning beyond belief. Just exquisite visuals.

> As far as like visual effects go it seems to be like a greater amount of visuals at an equivalent dosage [than 4-AcO-DMT].

**3.5.3 | 5-MeO-DMT—**Only three participants used and discussed 5-MeO-DMT (5-methoxy-*N,N*-dimethyltryptamine), and the effects described tended to be different than other tryptamines discussed. Some participants explained that 5-MeO-DMT effects are more

comparable with DMT effects, particularly with regard to headspace and shortness of the trip. Although participants described the trip as less visual than DMT. Two participants also noted respiration as being difficult during the high.

> Traditional DMT is sort of one experience and the closest to that would be 5-MeO-DMT. It's very similar to the traditional DMT, but it's less visual. You go on a DMT trip, but you don't have the visuals. You just have the head space.

> 5-MeO-DMT made me feel very distant and spacey, almost dissociative, and there was a great pressure on the chest and some mild visuals, like closed-eye visuals like the hypnogogic imagery before going to sleep. It doesn't last very long. Open [eyes] would produce mild hallucinations if looking at a surface that didn't have any visual distractions on it so if you look at the ceiling, you would see mild waves and stuff.

**3.5.4 | Other 5-MeO compounds—**5-MeO compounds were less prevalent in this sample of experienced tryptamine users. We received few comments about the effects of individual compounds in this subclass, and these compounds tended to be described as being more sexual than other compounds. One participant also pointed out that 5-Meo-DIPT ("Foxy Methoxy" or "Foxy") gained notoriety in the United States as a sexual enhancement drug.

> 5-Meo-DIPT, Foxy, or Moxy (5-Meo-MIPT) are tryptamines that are distinct. A lot of people I know that like them think they're very aphrodisiac and much more stimulant and a party drug.

> My opinion on 5-MeO-MIPT is that it was a very sexual chemical … it feels good to touch things, and that sort of sensation certainly lends itself to sex but I wouldn't call it innately an aphrodisiac.

These increased sensations of touch are likely why some users compared the "body high" with the high associated with MDMA use. The effects of 5-MeO compounds were also described as being shorter lasting than other tryptamines.

> I would actually say that it is closer to MDMA in its effects. The whole series of 5-MeO and 4-MeO … they're both very closely related in their effects so it tends to be a body high kind of thing. At higher doses it can get more psychedelic, but it's not that psychedelic.

## 4 | DISCUSSION

In this paper, we documented and compared the self-reported subjective effects of various psychedelic phenethylamines and tryptamines in a qualitative descriptive manner. We conducted this investigation to help fill in the gaps in the published literature because the majority of detailed user reports of effects are only available on online message boards.

Psychedelic phenethylamines were the most commonly used drugs by individuals in this sample. Within this class, 2C series drugs were most prevalent, followed by NBOMe and DOx series drugs. Although drugs in these subclasses all have psychedelic effects and affect

visual, auditory, and/or tactile sensations, unlike tryptamines, these drugs are also stimulants, so they often lead to different effects.

Contrary to NBOMe and DOx series compounds, which were typically described in an unfavorable manner, 2C series compounds were typically described more favorably. Although adverse effects associated with 2C use were rarely mentioned in this sample, published literature suggests that some individuals do experience agitation, aggression, dysphoria, hypertension, hyperthermia, and/or seizures after using 2C series drugs (Dean, Stellpflug, Burnett, & Engebretsen, 2013). The main 2C series compounds discussed by participants were first synthesized by Shulgin in the 1970s, and the effects of these compounds are also described in PiHKAL (Shulgin & Shulgin, 1991). 2C-B was the most prevalent 2C series compound used in this sample. Participants often described 2C-B as being a “light” drug and compared the effects with those of MDMA and LSD. Many users described entactogenic effects similar to MDMA. We believe that these descriptions add to previous literature that notes that 2C-B use is associated with euphoria and mild hallucinations (Gonzalez, Torrens, & Farre, 2015; Papaseit et al., 2018). The use of other 2C series compounds was less common, and the effects have not been described in great detail in the published literature. Of note, our participants reported that 2C-I and 2C-E are more intense than 2C-B, and Shulgin himself felt that 2C-E in particular can lead to extreme hallucinations as well as other unpleasant side effects (Dean et al., 2013). Previous research also reports some 2C series users experiencing unpleasant hallucinations, as well as tachycardia, hypertension, and/or hyperthermia, but these appear to be more likely when larger doses are used (Dean et al., 2013).

NBOMe is the newest subclass of psychedelic phenethylamines examined in this paper (with 25I-NBOMe first discovered in 2003). NBOMe appears to be the most dangerous out of the psychedelic phenethylamines as it is extremely potent and active at sub-milligram doses, which makes doses difficult to measure. NBOMe has been associated with many poisonings and deaths (Poulie, Jensen, Halberstadt, & Kristensen, 2019). This drug was typically described in an unfavorable manner by users, and quick onset of effects, heavy body load, and even physical pain was reported by various users. However, we must keep in mind that such effects are dependent on various factors including dose, so it is unknown whether such adverse effects reported were a result of doses being too large or perhaps even due to unintentional use as sometimes people use NBOMe thinking it is LSD (Martins et al., 2017). Reviews focusing on subjective effects of NBOMe suggest that use can indeed induce euphoria, feelings of love and empathy, and life-changing experiences, and use can also lead to feelings of depersonalization and derealization (Zawilska & Andrzejczak, 2015). Our results also partially corroborate past literature suggesting that use can lead to unpleasant hallucinations, panic, agitation, hypertension, seizures, acute psychosis, and/or excited delirium that can result in cardiac arrest (Srisuma, Bronstein, & Hoyte, 2015; Suzuki et al., 2015; Zawilska & Andrzejczak, 2015).

DOx series compounds were the least prevalent among participants interviewed. This class has the longest history out of the psychedelic phenethylamines as Shulgin first synthesized these in the 1960s. DOM in particular was prevalent in the Haight-Ashbury district of San Francisco in 1967 under the name STP (“Serenity, Tranquility and Peace”; Smith, 1969).

There were many cases of acute toxicity in the late 1960s, in part, because street doses were too large and many users likely thought the drug was LSD. As our participants described, the length of high is perhaps the most recognizable feature of this series with highs for some users reportedly lasting up to 36 hr. Again, the effects largely depend on the dose, but a seemingly unending trip can be unpleasant, especially if one is experiencing adverse side effects. Similar to NBOMe, some users also complained of vasoconstriction after DOx use, and previous literature also suggests that the use of DOB, for example, can lead to cramps (with pain), depersonalization, convulsions, coma, and death (Balikova, 2005).

Tryptamines were the other major psychedelic class of interest in this study. The main properties of tryptamines are psychedelic, unlike the psychedelic phenethylamines, which also have stimulant effects. Of the most common tryptamines used by this sample, the majority of these compounds were first discovered or first synthesized as early as the 1930s (e.g., 5-MeO-DMT), 1950s (e.g., 4-AcO-DMT), or in the 1970s (e.g., 4-HO-MET and 5-MeO-DIPT). However, use does not appear to be very prevalent (Palamar & Le, 2019; Palamar, Martins, Su, & Ompad, 2015), and most of these compounds do not have much of a presence in the published literature.

4-AcO-DMT was the most commonly used tryptamine by participants, and this compound also appears to be among the most prevalent novel tryptamines in recent years (Palamar & Le, 2019; Palma-Conesa et al., 2017). Although some participants felt the effects are comparable with those of DMT in high doses, the effects of more common (lower) doses were commonly compared with psilocybin. In fact, 4-AcO-DMT has been described as a chemically modified psilocin precursor (Geiger, Wurst, & Daniels, 2018). 4-AcO-DMT is often described as having a faster onset of action than psilocybin with a high of shorter duration, and as many of our participants noted, use allows them to avoid the nausea commonly associated mushroom ingestion (Geiger et al., 2018). Despite 4-AcO-DMT being among the most prevalent tryptamines, and having been discovered in the 1950s, little academic research has focused on recreational use of this compound.

4-HO-MET, like 2C-B, was described as more of a mild high, but as more visual than 4-AcO-DMT, although effects of this compound still reportedly feel similar to psilocin (Tittarelli, Mannocchi, Pantano, & Romolo, 2015). Few academic studies have examined subjective effects of 4-HO-MET. One phenomenological study was conducted in which users described euphoria, tingling sensations, changes in perception, synesthesia, and intensified perceptions, thoughts, and feelings (Kjellgren & Soussan, 2011), but comparisons were not made to other compounds.

5-MeO-DMT has been more widely researched than most other tryptamines discussed by our participants, but few reports focus on subjective effects, which include visual, auditory, and time perception distortions and emotional experiences (Davis, Barsuglia, Lancelotta, Grant, & Renn, 2018). As discussed by those interviewed, the effects are indeed comparable with those of DMT, especially when smoked, as when smoked, the effect onset can begin within seconds (Ott, 2001). Finally, 5-MeO-DIPT (“Foxy”) was also used by a few of our participants, and they noted sexual effects of the drug. Although sometimes described as a sex drug on the internet, academic literature does not seem to describe sexual effects of the

drug. However, multiple studies in Asia have linked use of 5-MeO-DIPT to increased risk for HIV diagnosis, likely due to risky sexual behavior involving the drug (Hayashi, Wakabayashi, Ikushima, & Tarui, 2017; Kuwahara et al., 2008; Shan et al., 2018).

There are several limitations in this study. The results were derived from a relatively small sample, and many compounds used were of low prevalence in the sample, which may limit generalizability. Because interviews were open-ended, we did not systematically ask questions about specific drug effects but instead simply asked participants to describe their experiences. Subjective effects can vary between users, and the effects are usually dependent on the dose used and on the route of administration. It is possible that some purported compounds reportedly used were in fact not the compounds actually used, and low purity and/or adulteration or contamination with other substances is a possibility. Participants rarely stated the dose or route of administration when describing positive or negative effects, which is another limitation. Finally, our findings can by no means be considered definitive but rather offer more of a foundation for additional qualitative or quantitative research on drug effects in the future.

In this paper, we documented and compared self-reported subjective effects of various psychedelic phenethylamines and tryptamines. There are an extensive number of user reports describing the effects of these drugs available online, but very little academic literature focuses on drug effects. We believe that qualitative research into effects of such drugs (and other NPS and uncommon drugs) needs to continue, and we believe that user reports posted online may be a rich source of information for researchers to continue to explore drug effects in detail.

Finally, we intend for the information in this report to help educate both users and potential users and to inform both prevention and harm reduction efforts. The drugs explored in this paper are uncommon compared with more “traditional” drugs such as cannabis, LSD, and cocaine; therefore, both the general public and clinicians alike may not be familiar with these drugs or their effects. Although it may not be necessary for the general public to acquire an understanding about such rare drugs, users and potential users of these substances should educate themselves in order to prevent or minimize potential adverse or untoward effects. Clinicians require more education regarding drug effects in general, and although it should not be expected for all clinicians to be fully informed about dozens of new or uncommon psychedelic drugs, basic knowledge of effects of various drug classes (e.g., tryptamines) may help them advise patients, and knowing which (trustworthy) sources to direct patients to may also be essential. Harm reduction workers may be most likely or willing to acquire and disseminate information on these drugs to potential users. Research on these drugs needs to continue in order to expand the knowledge base, and dissemination of this information is sorely needed.

## ACKNOWLEDGEMENT

The research reported in this publication was supported by the National Institute on Drug Abuse of the National Institutes of Health under Awards K01DA038800 (PI: Palamar) and R01DA044207 (PI: Palamar). The content is solely the responsibility of the authors and does not necessarily represent the official views of the funders.

Funding information

National Institute on Drug Abuse, Grant/Award Numbers: K01DA038800, R01DA044207



## REFERENCES


Balikova M (2005). Nonfatal and fatal DOB (2,5-dimethoxy-4-bromoamphetamine) overdose. Forensic Science International, 153(1), 85–91. 10.1016/j.forsciint.2005.04.022 [PubMed: 15979834]

Colorafi KJ, & Evans B (2016). Qualitative descriptive methods in health science research. HERD: Health Environments Research & Design Journal, 9(4), 16–25. 10.1177/1937586715614171

Davis AK, Barsuglia JP, Lancelotta R, Grant RM, & Renn E (2018). The epidemiology of 5-methoxy-*N,N*-dimethyltryptamine (5-MeO-DMT) use: Benefits, consequences, patterns of use, subjective effects, and reasons for consumption. Journal of Psychopharmacology, 32(7), 779–792. 10.1177/0269881118769063 [PubMed: 29708042]

Dean BV, Stellpflug SJ, Burnett AM, & Engebretsen KM (2013). 2C or not 2C: Phenethylamine designer drug review. Journal of Medical Toxicology, 9(2), 172–178. 10.1007/s13181-013-0295-x [PubMed: 23494844]

Enghoff O, & Aldridge J (2019). The value of unsolicited online data in drug policy research. International Journal on Drug Policy, in press., 73, 210–218. 10.1016/j.drugpo.2019.01.023 [PubMed: 30711411]

European Monitoring Centre for Drugs and Drug Addiction. (2015). New psychoactive substances in Europe. An update from the EU Early Warning System March 2015: http://www.emcdda.europa.eu/attachements.cfm/att_235958_EN_TD0415135ENN.pdf accessed November 6, 2019.

European Monitoring Centre for Drugs and Drug Addiction. (2019). European drug report 2019: Trends and developments: http://www.emcdda.europa.eu/publications/edr/trends-developments/2019 accessed November 6, 2019.

Friese S (2018). ATLAS.ti 8 Windows—User manual: http://downloads.atlasti.com/docs/manual/atlasti_v8_manual_en.pdf accessed November 6, 2019.

Geiger HA, Wurst MG, & Daniels RN (2018). DARK classics in chemical neuroscience: Psilocybin. ACS Chemical Neuroscience, 9(10), 2438–2447. 10.1021/acschemneuro.8b00186 [PubMed: 29956917]

Gonzalez D, Torrens M, & Farre M (2015). Acute effects of the novel psychoactive drug 2C-B on emotions. BioMed Research International, 2015, 643878. doi:10.1155/2015/643878, 1, 9 [PubMed: 26543863]

Gummin DD, Mowry JB, Spyker DA, Brooks DE, Osterthaler KM, & Banner W (2018). 2017 annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 35th annual report. Clinical Toxicology (Philadelphia, Pa.), 56(12), 1213–1415. 10.1080/15563650.2018.1533727

Hayashi K, Wakabayashi C, Ikushima Y, & Tarui M (2017). High prevalence of quasi-legal psychoactive substance use among male patients in HIV care in Japan: A cross-sectional study. Substance Abuse Treatment Prevention Policy, 12(1), 11 10.1186/s13011-017-0097-2

Kjellgren A, & Soussan C (2011). Heaven and hell—A phenomenological study of recreational use of 4-HO-MET in Sweden. Journal of Psychoactive Drugs, 43(3), 211–219. 10.1080/02791072.2011.605699 [PubMed: 22111404]

Kuwahara T, Nakakura T, Oda S, Mori M, Uehira T, Okamoto G Yamamoto Y (2008). Problems in three Japanese drug users with human immunodeficiency virus infection. Journal of Medical Investigation, 55(1–2), 156–160. 10.2152/jmi.55.156 [PubMed: 18319560]

Lamy FR, Daniulaityte R, Nahhas RW, Barratt MJ, Smith AG, Sheth A Carlson RG (2017). Increases in synthetic cannabinoids-related harms: Results from a longitudinal web-based content analysis. The International Journal on Drug Policy, 44, 121–129. 10.1016/j.drugpo.2017.05.007 [PubMed: 28578250]

Martins D, Barratt MJ, Pires CV, Carvalho H, Vilamala MV, Espinosa IF, & Valente H (2017). The detection and prevention of unintentional consumption of DOx and 25x-NBOMe at Portugal's Boom Festival. Human Psychopharmacology, 32(3). 10.1002/hup.2608

Orsolini L, St John-Smith P, McQueen D, Papanti D, Corkery J, & Schifano F (2017). Evolutionary considerations on the emerging subculture of the e-psychonauts and the novel psychoactive substances: A comeback to the shamanism? Current Neuropharmacology, 15(5), 731–737. 10.2174/1570159X15666161111114838 [PubMed: 27834144]

Ott J (2001). Pharmepena-psychonautics: Human intranasal, sublingual and oral pharmacology of 5-methoxy-*N,N*-dimethyl-tryptamine. Journal of Psychoactive Drugs, 33(4), 403–407. 10.1080/02791072.2001.10399925 [PubMed: 11824699]

Palamar JJ, Barratt MJ, Ferris JA, & Winstock AR (2016). Correlates of new psychoactive substance use among a self-selected sample of nightclub attendees in the United States. American Journal on Addictions, 25(5), 400–407. 10.1111/ajad.12403 [PubMed: 27419383]

Palamar JJ, & Le A (2018). Trends in DMT and other tryptamine use among young adults in the United States. American Journal on Addictions, 27(7), 578–585. 10.1111/ajad.12803 [PubMed: 30260086]

Palamar JJ, & Le A (2019). Use of new and uncommon synthetic psychoactive drugs among a nationally representative sample in the United States, 2005-2017. Human Psychopharmacology, 34(2), e2690 10.1002/hup.2690 [PubMed: 30843283]

Palamar JJ, Martins SS, Su MK, & Ompad DC (2015). Self-reported use of novel psychoactive substances in a US nationally representative survey: Prevalence, correlates, and a call for new survey methods to prevent underreporting. Drug and Alcohol Dependence, 156, 112–119. 10.1016/j.drugalcdep.2015.08.028 [PubMed: 26377051]

Palma-Conesa AJ, Ventura M, Galindo L, Fonseca F, Grifell M, Quintana P, … Torrens M (2017). Something new about something old: A 10-year follow-up on classical and new psychoactive tryptamines and results of analysis. Journal of Psychoactive Drugs, 49(4), 297–305. 10.1080/02791072.2017.1320732 [PubMed: 28569652]

Papaseit E, Farré M, Pérez-Mañá C, Torrens M, Ventura M, Pujadas M González D (2018). Acute pharmacological effects of 2C-B in humans: An observational study. Frontiers in Pharmacology, 9, 206 10.3389/fphar.2018.00206 [PubMed: 29593537]

Poulie CBM, Jensen AA, Halberstadt A, & Kristensen JL (2019). Dark classics in chemical neuroscience: NBOMes. ACS Chemical Neuroscience, in press. 10.1021/acschemneuro.9b00528

Saldaña J (2014). The coding manual for qualitative researchers (2nd ed.). Los Angeles, CA: Sage Publications.

Shan D, Yu MH, Yang J, Zhuang MH, Ning Z, Liu H Zhang DP (2018). Correlates of HIV infection among transgender women in two Chinese cities. Infectious Diseases of Poverty, 7(1), 123 10.1186/s40249-018-0508-2 [PubMed: 30509315]

Shulgin A, & Shulgin A (1991). PIHKAL: A chemical love story. Berkeley, CA: Transform Press.

Shulgin A, & Shulgin A (1997). TIHKAL: The continuation. Berkeley, CA: Transform Press.

Smith DE (1969). The psychotomimetic amphetamines with special reference to DOM (STP) toxicity. Journal of Psychedelic Drugs, 2(2), 37–41. 10.1080/02791072.1969.10524413

Srisuma S, Bronstein AC, & Hoyte CO (2015). NBOMe and 2C substitute phenylethylamine exposures reported to the National Poison Data System. Clinical Toxicology, 53(7), 624–628. 10.3109/15563650.2015.1054502 [PubMed: 26065360]

Suzuki J, Dekker MA, Valenti ES, Arbelo Cruz FA, Correa AM, Poklis JL, & Poklis A (2015). Toxicities associated with NBOMe ingestion-a novel class of potent hallucinogens: A review of the literature. Psychosomatics, 56(2), 129–139. 10.1016/j.psym.2014.11.002 [PubMed: 25659919]

Tittarelli R, Mannocchi G, Pantano F, & Romolo FS (2015). Recreational use, analysis and toxicity of tryptamines. Current Neuropharmacology, 13(1), 26–46. 10.2174/1570159x13666141210222409 [PubMed: 26074742]

U.S. Drug Enforcement Administration. (2019). National Forensic Laboratory Information System: NFLIS-Drug Midyear Report 2018: https://www.nflis.deadiversion.usdoj.gov/DesktopModules/ReportDownloads/Reports/NFLISDrug2018MY.pdf accessed November 6, 2019.

Winstock AR, Kaar S, & Borschmann R (2014). Dimethyltryptamine (DMT): Prevalence, user characteristics and abuse liability in a large global sample. Journal of Psychopharmacology, 28(1), 49–54. 10.1177/0269881113513852 [PubMed: 24284475]

Zawilska JB, & Andrzejczak D (2015). Next generation of novel psychoactive substances on the horizon—A complex problem to face. Drug and Alcohol Dependence, 157, 1–17. 10.1016/j.drugalcdep.2015.09.030 [PubMed: 26482089]

**TABLE 1**

Participant characteristics ($n$ = 39)

| Participant characteristic | *n* | % |
|---|---|---|
| Age | $M$ = 26.9 ($SD$ = 5.3) | Range = 18–38 |
| Sex | | |
| Male | 29 | 75.4 |
| Female | 10 | 25.6 |
| Race/ethnicity | | |
| White | 34 | 87.2 |
| Black | 1 | 2.6 |
| Hispanic | 2 | 5.1 |
| Other | 2 | 5.1 |
| Country | | |
| United States | 33 | 84.6 |
| Canada | 2 | 5.1 |
| Mexico | 1 | 2.6 |
| Netherlands | 1 | 2.6 |
| Poland | 1 | 2.6 |
| Portugal | 1 | 2.6 |
| Where recruited | | |
| Participant referral | 17 | 44.7 |
| Harm reduction or drug conference | 9 | 23.7 |
| Social media | 7 | 18.4 |
| Investigator-initiated email | 5 | 13.2 |
| Dance party | 1 | 2.6 |

Abbreviations: $M$, mean; $SD$ = standard deviation.

**TABLE 2**

Psychedelic phenethylamine and tryptamine use by the sample

| Participant characteristic | *n* | % within full sample | % within drug group |
|---|---|---|---|
| 2C | | | |
| Any 2C | 25 | 64.1 | — |
| 2C-B | 17 | 43.6 | 68.0 |
| 2C-E | 13 | 33.3 | 52.0 |
| 2C-I | 12 | 30.8 | 48.0 |
| 2C-C | 4 | 10.3 | 16.0 |
| 2C-T2 | 4 | 10.3 | 16.0 |
| 2C-T7 | 3 | 7.7 | 12.0 |
| 2C-B-Fly | 2 | 5.1 | 8.0 |
| 2C-D | 2 | 5.1 | 8.0 |
| 2C-P | 2 | 5.1 | 8.0 |
| 2C-T | 1 | 2.6 | 4.0 |
| 2C, not specified | 1 | 2.6 | 4.0 |
| NBOMe | | | |
| Any NBOMe | 15 | 38.5 | — |
| 25I-NBOMe | 10 | 25.6 | 66.7 |
| NBOMe, not specified | 5 | 12.8 | 33.3 |
| 25C-NBOMe | 2 | 5.1 | 13.3 |
| 25B-NBOMe | 1 | 2.6 | 6.7 |
| DOx | | | |
| Any DOx | 10 | 25.6 | — |
| DOB | 5 | 12.8 | 50.0 |
| DOC | 4 | 10.3 | 40.0 |
| DOM | 2 | 5.1 | 20.0 |
| DOI | 1 | 2.6 | 10.0 |
| Tryptamines | | | |
| Any tryptamine | 18 | 46.2 | — |
| 4-AcO-DMT | 12 | 30.8 | 66.7 |
| 4-HO-MET | 5 | 12.8 | 27.8 |
| 5-MeO-DIPT | 3 | 7.7 | 16.7 |
| 5-MeO-DMT | 3 | 7.7 | 16.7 |
| 5-MeO-MIPT | 3 | 7.7 | 16.7 |
| DPT | 2 | 5.2 | 11.2 |
| 3,4-AcO-DMT | 1 | 2.6 | 5.6 |
| 4-AcO-DIPT | 1 | 2.6 | 5.6 |
| 4-AcO-MET | 1 | 2.6 | 5.6 |
| 4-AcO-MIPT | 1 | 2.6 | 5.6 |
| 4-HO-DPT | 1 | 2.6 | 5.6 |
| 4-HO-MPT | 1 | 2.6 | 5.6 |

| Participant characteristic | *n* | % within full sample | % within drug group |
|---|---|---|---|
| 4-MeO, not specified | 1 | 2.6 | 5.6 |
| 5-MeO-AMT | 1 | 2.6 | 5.6 |
| 5-MeO-DOT | 1 | 2.6 | 5.6 |
| 5-MeO-MIT | 1 | 2.6 | 5.6 |
| AMT | 1 | 2.6 | 5.6 |