

# Who is the typical psychedelics user? Methodological challenges for research in psychedelics use and its consequences

Petter Grahl Johnstad 

University of Bergen, Norway

## Abstract

**Aims:** This article argues that despite a resurgence in research on psychedelics over the last two decades, we still have little insight into the psychedelics user population. Furthermore, there is currently little agreement between researchers as to the long-term mental health consequences of psychedelics use. **Design:** In a methodological review of a range of studies in psychedelics use, it is demonstrated that these studies tend to focus on specific segments of the user population while excluding others. These population segments are probably connected to different patterns of use, which in turn are likely to result in different long-term consequences. **Results:** The divergent findings on the consequences of psychedelics use may be explained, at least in part, by the fact that different research strategies explore different segments of the user population. Studies focusing on user segments with problematic usage patterns tend to find that psychedelics use is negative for mental health, while studies on infrequent users tend to find that psychedelics use is positive for mental health. **Conclusion:** Because the field of psychedelics studies lacks a reliable model of the user population, it is difficult for researchers to contextualise and assess the broader validity of their findings. To remedy this situation, the article presents three theoretical models of the user population that afford us with tentative means of contextualising findings and thereby may clarify present disagreements.

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## Corresponding author:

Petter Grahl Johnstad, University of Bergen, Faculty of Social Sciences, Fosswinkels gate 6, 5007 Bergen, Norway.

Email: [Petter.Grahl.Johnstad@vlfk.no](mailto:Petter.Grahl.Johnstad@vlfk.no)



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**Keywords**

mental health consequences, methodology, psychedelics, usage pattern, user population

Recent years have seen a substantial increase in knowledge about the consequences of psychedelic drug use. Preliminary results indicate therapeutic effects from psychedelics on conditions including depression (Carhart-Harris et al., 2018), anxiety (Griffiths et al., 2016), and substance dependence (Bogenschutz et al., 2015). We know also that classical psychedelics such as psilocybin and lysergic acid diethylamide (LSD) are not toxic to mammalian organ systems in normal dosage (Nichols, 2004), although some newer phenethylamines have higher toxicity (Nichols, 2016). Furthermore, psychedelics are not regarded as reinforcing substances (Nichols, 2016). However, researchers on illegal drug use among the general population have long maintained that psychedelics can lead to mental health problems, including drug-induced psychosis. This research is mostly several decades old (Strassman, 1984; Vardy & Kay, 1983), although there are some more recent case studies (Sami et al., 2015). There is also some newer research on the association between 3,4-methylenedioxyamphetamine (MDMA) and psychiatric disorders including psychosis (McGuire et al., 1994; Schifano et al., 1998). Some present-day researchers regard the association between classical psychedelics use and psychosis as strong (Iversen et al., 2009; Paparelli et al., 2011), while others have found no association between psychedelics and mental health problems (Hendricks et al., 2015; Johansen & Krebs, 2015; Krebs & Johansen, 2013).

This diversity of findings is open to several interpretations. One possibility is that psychedelics have therapeutic potential when administered with care in clinical settings, in a context of what Carhart-Harris et al. (2018) called “psychedelic drug-assisted psychotherapy”, but that it is difficult to realise this potential for therapeutic effect in naturalistic use outside of

the clinic. It may also be possible, as Krebs and Johansen (2013) suggested, that the use of psychedelics among the general population has a beneficial effect on some people and a harmful effect on others. This variation may be linked to specific psychiatric conditions, so that psychedelics are perhaps helpful for people with depression, anxiety, or substance dependence disorder, but unhelpful for people on the edge of a psychotic condition. Thus, their therapeutic effect for some conditions may be counterbalanced by a harmful effect for others. A third interpretation, offered by Goodwin (in Carhart-Harris & Goodwin, 2017), is that clinical trials with psychedelics may tend to attract volunteers who are already positive to psychedelics and therefore predisposed to endorse their benefits.

With such a wide spectrum of findings and interpretations, we cannot at present say with confidence that we know what the overall consequences of psychedelic drug use are. I will contend in this article that there are two major factors serving to confound the analysis. The first is that psychedelics users have many different approaches to the use of these drugs, and differences in usage patterns very likely explain much of the difference in consequences of use. We know that some people take psychedelics infrequently in carefully planned sessions for spiritual, therapeutic and developmental reasons (Johnstad, 2018), while others perhaps use psychedelics very frequently for entertainment or escapist purposes, and we should not be surprised if these usage patterns result in very different long-term consequences. The second confounding factor is that we have, at present, little understanding of the relative frequency of different usage patterns among the population of psychedelics users. If the usage pattern has a significant impact on the consequences of use for an individual, it is clear that in order to

identify the overall consequences of psychedelics use on a societal level, we first need to understand the distribution of different usage patterns among the user population. Unfortunately, we currently have little insight into the population of psychedelics users, and cannot speak with any confidence about the distribution of usage patterns. As we do not know the extent of the user population, we also cannot obtain representative samples of this population. I will therefore argue that studies of psychedelics use are generally constrained to participant samples that very likely include only a subset, and often a quite specific subset, of the full population of users. If this analysis is correct, it would imply that findings from these studies have unknown validity outside the specific population subset from which their participants are recruited. One example of possible validity concerns resulting from non-representative participant samples is found in neuroimaging studies of ecstasy/MDMA users, where a comparison of the participants in such studies with respondents to the Global Drug Survey found that the former consumed 720% more pills over a year (Szigeti et al., 2018). This indicates that such neuroimaging studies have tended to focus on heavy ecstasy/MDMA users, and that their findings therefore have unknown validity for ordinary users.

This article is not intended as a methodological critique of any individual study or type of study, however. My purpose here is not to identify weaknesses resulting from inadequate research design, but rather to identify and analyse a range of methodological constraints pertaining to any research in this field. Studies of psychedelics use is at present a field without a foundation: because we do not have an overall picture of the population of psychedelics users, there is no contextual framework in which to place new findings. This makes it difficult to evaluate the validity of such findings, as we cannot say how the participants in these studies relate to the overall population of users. With a heavily studied drug such as alcohol, by contrast, we have a reliable model of the user

population that serves as a foundation for the interpretation of new findings. We know, therefore, that findings of very damaging consequences from heavy alcohol use do not apply directly to light users, who constitute the majority of the user population. Psychedelics have not been studied as intensively, and their use often takes place in secret and is, therefore, mostly invisible to us. This means that we know very little about what light and heavy use may look like, or which of the two is most common. Without an explicit model of the user population, there is the risk that individual findings are over-generalised on the basis of an implicit model that assumes the user population is structured similarly to the participant sample of the study, so that an observation based on one subset of the user population is taken as applicable to the whole population.

The purpose of this article is, therefore, to analyse how various types of research design will tend to exclude specific subsets of the population of psychedelics users, and to discuss the consequences of these systemic sampling “biases”. It is not my view that these biases might have been remedied through changes to the research design. Instead, I regard such biases as an unavoidable consequence of the fact that psychedelics studies lack a foundation in the form of a reliable model of the user population. In the future, it may be the case that further studies into psychedelics use have acquainted us with the user population to the extent that our understanding is comparable to our present understanding of alcohol users. This will afford us with an empirically based model that could serve as a foundation for the task of contextualising new findings, and the problem of systemic sampling bias will be history. At present, however, we do not have recourse to such an empirical model of the user population, and it remains unclear how to contextualise findings regarding one subset of psychedelic users within the framework of the overall population of users. Findings from one population subset therefore have indeterminate validity outside of this subset.

As a temporary remedy for the lack of an empirical model of the psychedelic user population, I will discuss several theoretical models that provide very different means of contextualising findings in the field of psychedelics studies. I do not believe we presently have evidence to judge which of these theoretical models is most accurate, but I think it will be clarifying to discuss findings about psychedelics use within the context of each model. This will help to turn implicit assumptions about the user population, which tend to remain unstated and are therefore difficult to discuss, into explicit statements that may be challenged, supported, improved upon, or rendered obsolete.

## Methodological review

This section analyses the selection bias predicament of various recruitment strategies used in a range of studies on the consequences of psychedelics use. Studies were picked for inclusion in this review not for their own merits or demerits, but because they exemplify a type of research design, and the intention behind their selection was primarily to obtain a wide range of different research designs for the discussion. For each type of research design, this discussion will attempt to identify which subset(s) of the user population are actually recruited into the study, and, perhaps more importantly, which (putative) subsets are rendered invisible. Because of the dearth of studies relating specifically to classical psychedelics, I have also included studies on the semi-psychedelic MDMA in this methodological review.

## Clinical studies

This section discusses four types of studies where participants take part in clinical tests on location. An overview of these studies and some (simplified) characteristics of their participant samples and findings is presented in Table 1. The first type of study investigated changes in health, cognition, and wellbeing among healthy volunteers who used psychedelics in their

private lives. Morgan (1999) recruited 25 polydrug users who had taken more than 20 tablets of ecstasy into a study of memory recall, finding significantly lower scores for ecstasy users than for non-users and polydrug-users who did not use ecstasy. Huxster et al. (2006) recruited 38 regular ecstasy users in a study of negative mood and cognitive function, with 20 participants continuing ecstasy use through the study period and 18 discontinuing use during this period. They found only modest and transient effects on mood and cognition from continued use. Hoshi et al. (2007) recruited 25 polydrug users who had used ecstasy on at least 25 occasions in a study of cognitive function. Compared with control groups, they found no significant effect of ecstasy use. Halpern et al. (2011) recruited 52 ecstasy users with limited exposure to other drugs in a study of cognitive function. Compared with a control group of non-users, they found only minor effects of ecstasy use. Exclusion criteria in the four studies varied somewhat, but all screened for drug addiction. Morgan (1999), Huxster et al. (2006), and Hoshi et al. (2007) also screened for psychopathology. Mean age was 22 years in the studies by Morgan (1999), Huxster et al. (2006), and Halpern et al. (2011), and 29 years in the study by Hoshi et al. (2007). The ecstasy groups in Hoshi et al. (2007) and Huxster et al. (2006) used ecstasy about three times per month. Morgan (1999) and Halpern et al. (2011) did not report frequency of ecstasy use, but Morgan's ecstasy group on average smoked 14 cannabis joints per week and consumed 35 units of alcohol per week. Similarly, the ecstasy group in Hoshi et al. (2007) used alcohol and cannabis on average every other day, and cocaine and amphetamines on a weekly basis. Huxster et al. (2006) reported other drug use as "grams lifetime", which is difficult to interpret, but 100% of their ecstasy user group used alcohol with MDMA, and 60% used cocaine with MDMA.

By controlling for psychopathology and addiction, these studies excluded the bottom tier of problem users. Participants were

**Table 1.** Clinical studies overview.

<b>Study</b>	<b>Recruitment strategy</b>	<b>Average age (years)</b>	<b>Excluded user segments</b>	<b>Dominant user segments</b>	<b>Usage frequency</b>	<b>Usage setting</b>	<b>Consequences of use</b>
Morgan (1999)	Poster ads & snowballing	22	(very) Problematic	Recreational	(High)	Party	Cognitive dysfunction
Huxster et al. (2006)	Email ads, flyers & snowballing	22	(very) Problematic	Recreational	Weekly	(Party)	Minor cognitive dysfunction
Hoshi et al. (2007)	Magazine ads & snowballing	29	(very) Problematic	Recreational	Weekly	(Party)	None
Halpern et al. (2011)	Case finders advertising at raves	22	(very) Problematic	Recreational	?	Party	None
McGuire et al. (1994)	Hospital referrals	23	Non-problematic	Problematic	Weekly	Party	Psychopathology
Schifano et al. (1998)	Drug treatment centre	23	Non-problematic	Problematic	Weekly	Party	Psychopathology
Grob et al. (2011)	Internet ads, flyers & healthcare referrals	40s	Problematic	Therapeutic	Rare	Clinic	Therapy
Carhart-Harris et al. (2016)	Healthcare referrals & snowballing	43	Problematic	Therapeutic	Rare	Clinic	Therapy
Griffiths et al. (2016)	Internet ads, flyers & healthcare referrals	56	Problematic	Therapeutic	Rare	Clinic	Therapy
Ross et al. (2016)	Cancer centre	56	Problematic	Therapeutic	(Rare)	Clinic	Therapy
Griffiths et al. (2006)	Flyers	46	Problematic / Recreational	Spiritual	Rare	Clinic	Mystical experience
Schmid & Liechti (2017)	Internet ads & snowballing	29	Problematic	Spiritual	Rare	Clinic	Mystical experience

generally young, although less so in the study by Hoshi et al. (2007), and their frequency of drug use indicates that the three studies recruited predominantly from (heavy) recreational users.

A second type of clinical study was based on patients in psychiatric hospitals or addiction clinics who used psychedelics prior to their admission and, at the time of study, were suffering from a variety of health problems. McGuire et al. (1994) recruited 13 MDMA users from a psychiatric hospital, most of whom were polydrug-using young males who had taken MDMA at “raves”. Usage frequency ranged “from one tablet per fortnight to ten tablets per day” (McGuire et al., 1994, p. 393). Schifano et al. (1998) recruited 150 MDMA users from an addiction treatment clinic, most of whom were polydrug-using young males who had taken MDMA at “disco clubs”. Their group of problematic users used MDMA on a weekly basis, and most had previous experience with opiates and cocaine. Both studies found reason to express concern over the association between MDMA use and psychopathology.

The participants in both McGuire et al. (1994) and Schifano et al. (1998) were young, frequent users of MDMA and a range of other drugs in party settings who ended up in either psychiatric hospital or an addiction clinic. To the extent that the negative health outcome was caused by psychedelic drug use, the participants were clearly problem users. We do not know to what extent their problematic usage pattern differed from a recreational pattern of MDMA and polydrug use, however.

A third type of clinical study also recruited from a population of patients, although in this case the patients suffered from disorders such as treatment-resistant depression (Carhart-Harris et al., 2016) and depression and/or anxiety due to life-threatening cancer (Griffiths et al., 2016; Grob et al., 2011; Ross et al., 2016), and psychedelics were administered at the clinic as an experimental treatment for the disorder. Sample sizes in these studies varied from 12 to 51. Exclusion criteria varied somewhat, but always

included lifetime history of psychotic illness and usually current substance use disorder. This probably means that all participants in McGuire et al. (1994) and Schifano et al. (1998) would have been excluded from participation in this third type of clinical study. All studies reported significant therapeutic effect from clinical psychedelic use.

One methodological critique of this type of study, voiced by Goodwin (in Carhart-Harris & Goodwin, 2017), is that they may tend to recruit volunteers with a pre-existing interest in psychedelic drugs who are predisposed to endorse their benefits. Even if the participants were not previous psychedelics users, the fact that they volunteered for clinical psychedelic trials means they were positive to psychedelics use. The studies also screened out any volunteers who could be classified as problem users.

Finally, a fourth type of clinical study investigated non-therapeutic effects of psychedelic in-house sessions on healthy volunteers. Griffiths et al. (2006) recruited 36 psychedelics-naïve volunteers screened for personal or family history of psychotic disorders into a study of mystical experience, finding that psilocybin use did occasion such experiences for a significant number of participants. Schmid and Liechti (2017) recruited 16 volunteers, nine of whom were psychedelics-naïve, for a similar study with LSD. They screened participants for age, recent illicit drug use, and personal or family history of psychotic disorders, and obtained similar results to those of Griffiths et al. (2006).

Although most of the participants in these studies were psychedelics-naïve, the fact that they volunteered for this type of research indicates a positive attitude to psychedelics. Participants in the study by Griffiths et al. (2006) had an average age of 46 years, while Schmid and Liechti (2018) screened out volunteers below the age of 25 years. Participants in both studies were highly educated, and problem users were excluded from participation.

The findings of these four types of clinical study are not directly comparable, as the studies that obtained evidence of positive effect were

**Table 2.** Quantitative surveys overview.

Study	Recruitment strategy	Average age	% Male	% University education	Consequences of psychedelics use
Carhart-Harris & Nutt (2010)	Internet ads	26	85%	?	Wellbeing and health
Lyvers & Meester (2012)	Internet ads	29	65%	68% degree 32% students	Mystical experience
Carbonaro et al. (2016)	Internet ads & snowballing	30	78%	51% degree	Bad trips difficult but beneficial
Forstmann & Sagioglou (2017)	Amazon Mechanical Turk	36	38%	79% college	Pro-environmental behaviour
Nour et al. (2017)	Internet ads	28	64%	85% university	Liberal political views, openness and nature relatedness

concerned with the use of classical psychedelics, while the studies that obtained evidence of negative effect were concerned with the use of MDMA. However, I would suggest that another factor for explaining their variation in outcome is that they studied quite different patterns of use. The first and second groups of studies found that weekly polydrug use involving ecstasy/MDMA in party settings often has negative consequences for health and cognition. While the first group of studies screened for some kinds of addiction and psychopathology, it is likely that the heavy recreational users they recruited were at risk of ending up as the kind of problem users in psychiatric hospitals and addiction clinics studied in the second type of study. By contrast, the volunteers for the third and fourth types of study were carefully screened for participation in on-site psychedelic sessions. The researchers were directly responsible for participant safety, and both ethical and pragmatic concerns therefore favoured the exclusion of not only problem users, but also heavy recreational users of the kind who use ecstasy on a weekly basis and cannabis every other day. Their volunteers were also likely to have a positive view of psychedelics. In the third type of study, the participants suffered from severe medical conditions and enrolled in the study out of a therapeutic motivation, and the psychedelics use was well planned and conducted in a supportive setting.

In the fourth type of study, the use had an explicit spiritual dimension.

In terms of participant age, it is noteworthy that all the studies that found some negative consequences from drug use (Huxster et al., 2006; McGuire et al., 1994; Morgan, 1999; Schifano et al., 1998) included participants in their early 20s, whereas the studies that found an absence of negative consequences or some positive consequences usually had more mature participants (Carhart-Harris et al., 2016; Griffiths et al., 2016; Griffiths et al., 2006; Grob et al., 2011; Hoshi et al., 2007; Ross et al., 2016; Schmid & Liechti, 2017). This is despite the fact that older drug users are likely to have used drugs for a longer time. Unsurprisingly, studies of frequent users also discovered more problems from use than studies of infrequent users. In sum, one simple way to frame this set of apparently disparate clinical findings on the consequences of psychedelics use is to say that, whereas moderate and careful use from therapeutic and spiritual motivations appears to have positive consequences, thoughtless and over-frequent use from hedonistic and escapist motivations appears to have negative consequences.

### *Quantitative surveys*

This section discusses two types of studies of psychedelics use based on online surveys. The

first type of study recruited a sample of participants online. An overview of these studies and some characteristics of their participant samples and findings is presented in Table 2. Carhart-Harris and Nutt (2010) recruited 626 psychedelics users, 85% male and with a mean age of 26 years, into a study of user-perceived consequences of such use. Their participants reported positive effects from psychedelics on long-term wellbeing and health, and indicated that their use of psychedelics was associated with less serious negative health effects than use of alcohol. Lyvers and Meester (2012) recruited 337 drug users, 66% male and with a mean age of 29 years, into a study of mystical experience, finding that classical psychedelics, but not MDMA or non-psychedelic drugs, were associated with such experience. Carbonaro et al. (2016) recruited 1993 psilocybin users, 78% male and with a mean age of 30 years, into a study of challenging experiences (“bad trips”). Respondents reported that their worst bad trip was one of the most difficult experiences of their lives, but 84% nevertheless endorsed having benefitted from the experience. Forstmann and Sagioglou (2017) recruited 1487 participants, 38% male and with a mean age of 36 years, with 27% having experience with classical psychedelics, into a study of nature relatedness and ecological behaviour. They found that psychedelics use predicted pro-environmental behaviour. Finally, Nour et al. (2017) recruited 893 participants, 64% male and with a median age of 28 years, with 83% having experience with psychedelics, into a study of personality, finding that psychedelics use predicted liberal political views, openness and nature relatedness.

Education levels were high in all studies that reported this metric, with 51% to 68% reporting that they had a university degree. None of the studies offered information about usage frequency or setting. With the exception of Forstmann and Sagioglou (2017), all studies relied on recruitment via internet fora devoted to information exchange and discussions about the use of psychoactive drugs and especially psychedelics.

Forstmann and Sagioglou (2017) instead recruited participants via Amazon Mechanical Turk, through which participants received a modest financial compensation.

Compared with the previously discussed clinical research studies, we see that all these surveys recruited participants aged from their mid-20s upwards. This is a user segment where psychedelics use was previously found to have mostly positive consequences, and the tendency continues here. The high percentage of university education among these user samples reinforces the impression that this is a well-functioning segment of the user population. All surveys recruited participants via the internet, which probably excluded at least the bottom tier of problem users from participation. If psychedelic drug use sometimes leads to an enduring state of psychosis or schizophrenia, or even to violent criminality, those consequences of using psychedelics will be rendered largely invisible to research based on internet recruitment. Furthermore, most of the surveys recruited from internet fora populated by people who are enthusiastic about psychedelics and therefore predisposed to endorse their benefits. This point of critique probably applies to any study of psychedelics users based on voluntary participation: since classical psychedelics are not reinforcing substances (Nichols, 2016), continued use over time is probably motivated by an appreciation of their effect, and any current user of psychedelics is therefore likely to be enthusiastic about psychedelics and predisposed to endorse the positive consequences of their use. This means that user enthusiasm is a likely confounding factor affecting the findings of any study drawing upon a sample of current users.

The second type of survey study was based on larger samples representative of the general population. Johansen and Krebs (2015) analysed a sample of 135,095 respondents in the United States drawn from the 2008–2011 National Survey on Drug Use and Health (NSDUH), 14% of whom reported lifetime psychedelic use. The completion rate in the survey was 78%. Adjusting for a range of sociodemographic, psychological,



and drug use control variables, they found no relation in these data between psychedelics use and any undesirable mental health outcomes. Hendricks et al. (2015), drawing upon the 2008–2012 data from the same NSDUH database, analysed a sample of more than 190,000 respondents. Some 14% reported lifetime psychedelic use, and the completion rate in the survey was 75%. They found that classical psychedelics use was associated with a lower rate of suicidality (odds ratio 0.64 for suicide attempt last year), whereas MDMA use was not associated with suicidality.

While the completion rates of these studies seem convincing, there may be systematic tendencies in non-participation that serve to skew findings. The NSDUH is based on interviews in private households, and while there is every reason to believe that it is a professional and sophisticated endeavour, such studies are, nevertheless, subject to methodological challenges. The bottom tier of drug users with problematic usage patterns may not live in households recognisable in official records at all, and will therefore be invisible to population studies based on household recruitment. Whether such a segment of the psychedelic user population actually exists is not clear, but if it does, it will not influence findings in this type of study. These studies therefore probably either exclude, or are unable to obtain reliable data from, the least well-functioning segment of the user population.

A more subtle point of critique is that the set of actual psychedelics users today is not representative of the set of potential psychedelics users in a world where psychedelics are legal. Prohibition entails that individuals who already operate outside the law, or who for other reasons feel that they have little to lose by breaking the law, are over-represented among current users. Such individuals are at risk for a number of negative health outcomes including schizophrenia (Munkner et al., 2013). Studies of the consequences of psychedelics use based on usage under prohibition regimes are therefore

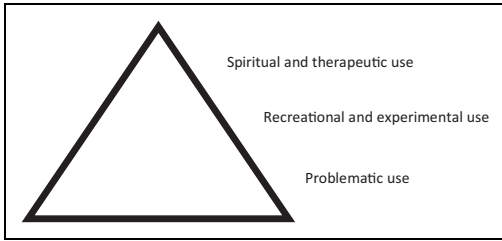
blindsided by the over-representation of low-functioning individuals in the user population.

## Discussion

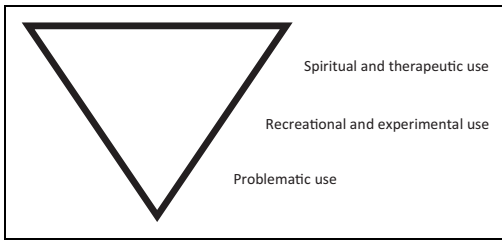
A general conclusion of this article is that it is difficult to generalise about the consequences of psychedelics use. Some studies have obtained evidence of positive consequences and others of negative consequences, but there have not been many attempts to understand these disparate findings in a broader context. The basic premise for this article has been that the population of psychedelics users is heterogeneous in terms of usage patterns, and that the consequences of one pattern of use may be quite different from those of another pattern. It has sought to demonstrate that different types of studies tend to recruit from different segments of the overall user population, and that this probably affects their findings.

We have evidence indicating that some people use psychedelics quite frequently with hedonistic and escapist motivations, and that such use may be damaging to one's cognitive abilities and mental health. We also have evidence indicating that some people use psychedelics in moderation for therapeutic or spiritual reasons, and that such use may be beneficial. What we do not know is the relative size of these segments of the user populations. If the segment of problem users is large compared to the segment of therapeutic and spiritual users, it would probably be true to say that psychedelics use has mainly negative consequences. On the other hand, if the segment of problem users is small compared to the segment of therapeutic and spiritual users, it would probably be true to say that psychedelics use has mainly positive consequences.

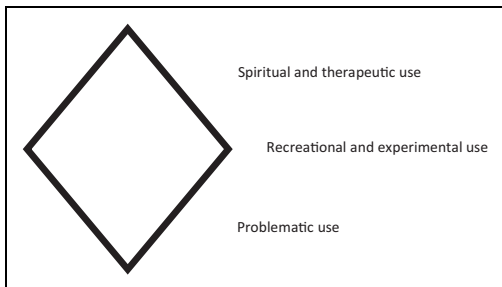
Statements about the consequences of psychedelics use often seem to have their basis in implicit assumptions about the relative size of various segments of the user population. These assumptions may be based on the relative visibility of different user segments to various professions. Therapists in addiction treatment



**Figure 1.** Pessimistic model of the psychedelics usage pattern distribution.



**Figure 2.** Optimistic model of the psychedelics usage pattern distribution.



**Figure 3.** Recreational model of the psychedelics usage pattern distribution.

clinics, for instance, will for the most part encounter problem users, and may be inclined to believe that the problem user segment is dominant among psychedelics users. Researchers on spiritual and therapeutic psychedelics use, by contrast, may encounter many well-functioning users and will perhaps be inclined to believe that this is the dominant user segment. Figures 1 and 2 illustrate these two opposite models of the psychedelics user population, with Figure 3 representing an in-between

position that sees recreational users as the dominant segment. In these figures, the size of the area corresponding to a usage pattern represents the size of this population subset. For simplicity, these models work from the assumption that the distribution of usage patterns and subsequent consequences of use are similar for different psychedelic drugs; in reality, each drug may require its own model.

In the world according to Figure 1, most psychedelics users are problem users. They may start out with romantic ideals of psychedelics as spiritual and therapeutic tools, but these are for the most part delusions used to justify escapist intoxication. The median psychedelics user follows a pattern of heavy recreational use that is not socially or psychologically sustainable over time, and, if maintained, will almost invariably result in significant problems. At the top of the pyramid is a small group of vocal psychedelics supporters who are in no way representative of the general population of users, but who tend to participate avidly in certain types of psychedelics research. At the bottom is a large group of dysfunctional welfare clients, psychotics, and criminals.

In the world according to Figure 2, there is a large “silent majority” of psychedelics users who enjoy many benefits from use. Because psychedelics are generally illegal and users want to stay out of trouble, this dominant user segment for the most part remains invisible to society. The only exceptions are when they participate – anonymously – in psychedelics research, and, quite rarely, when they are caught by the police, in which case they let the legal process move as quietly as possible in order to protect their careers and family. There is only a small group of excessive users who develop personal problems from use, but, unfortunately, such problem users are very visible as they end up in treatment, police custody, and sometimes the news because of their uncontrolled behaviour. For the most part, these problem users had difficult childhoods and would be at risk of social and psychological dysfunction regardless of their psychedelics/polydrug use.

Finally, in the world according to Figure 3, the median psychedelics user follows a moderate pattern of recreational use that probably has neither especially positive nor negative consequences for their lives. A vocal minority claims that there are spiritual and therapeutic benefits from psychedelics use, but these benefits are probably overstated. At the other end of the scale, a small group of problem users is highly visible because of their general dysfunction.

These theoretical models all assume a user population that has an orderly structure with one dominant usage pattern, and reality may of course be more muddled. Their conceptual purity, unrealistic as it may be, nevertheless makes them useful cognitive tools for analysing the psychedelics user population. If we first consider the qualitative and clinical studies reviewed earlier, we can make the obvious but important observation that all these studies are compatible with each of the three models. The studies identify possible or probable consequences of various psychedelic usage patterns, but offer little insight into how widespread such usage patterns are. Their validity for the general user population is therefore unclear. Interpreted through the pessimistic model 1, the finding by Schifano et al. (1998) regarding the psychopathology of MDMA users recruited from an addiction clinic suggests that MDMA use will often result in psychological complications for the median user. Interpreted through model 2 or 3, on the other hand, the finding suggests only that heavy polydrug use involving MDMA in party settings may lead to such complications, and especially for users with pre-existing psychological vulnerabilities. A study of MDMA users recruited from an addiction clinic is, from this point of view, comparable to a study of alcoholics recruited from an addiction clinic: there is no doubt that some alcohol users end up as alcoholics, which has serious consequences for health and wellbeing, but it is also clear that such problem users are a minority. Similarly, the finding by Griffiths et al. (2006) that carefully planned psilocybin use may occasion mystical experience indicates,

from a model 2 viewpoint, that most people may obtain such experiences if they use psychedelics in a proper way. From a viewpoint based on model 1 or 3, however, such experiences are either restricted to a small group of “elite” users, or they should be understood as an exaggerated attempt by psychedelics enthusiasts to legitimise their use.

All the surveys of psychedelics use reviewed in this article found that such use has generally positive consequences, but these findings are also compatible with each of the three models. Interpreted through the optimistic model 2, the participants in these studies are broadly representative of the general user population, and their reports generally reflect the truth of how psychedelics have affected their lives. Seen through the lens of model 1 or 3, however, this group of participants is simply a vocal minority of well-educated and resourceful psychedelics users who are investing time and energy in the fight for their right to get high. From this perspective, the predominance of positive reports cannot be trusted, because they are essentially strategic communications in an ongoing political struggle. Model 1 adherents would add that those who suffer the most negative consequences of psychedelics use are not represented in the participant sample because they are barely able to function in their daily lives, and therefore are in no position to participate in surveys.

The theoretical models can also help us understand the debate around the use of control variables in population studies. By controlling for non-psychedelic drug use, pre-existing conditions, and a range of socioeconomic variables, Johansen and Krebs (2015) found no evidence that psychedelics use was an independent risk factor for mental health problems. This seems to imply that the pessimistic model 1 of the psychedelic user population is incorrect, since psychedelics use in and of itself apparently does not lead to problems. However, Nesvåg, et al. (2015) objected that the application (especially) of non-psychedelic drug use as a control variable is a case of over-adjustment.

They calculated unadjusted risk estimates and found that psychedelics use was, according to this analysis, associated with mental health problems. This seems to imply that models 2 and 3 are incorrect, since there is a higher prevalence of psychological problems among the psychedelic user population than among the general population.

Whether or not it is appropriate to apply control variables for non-psychedelic drug use and pre-existing conditions appears to depend in large part on the underlying model of the psychedelics user population. From a model 1 perspective, most psychedelics use will end up as problematic abuse, and it would be unsurprising if such abuse were also associated with the abuse of non-psychedelic drugs. If psychedelic drug use commonly leads to the use of other illicit drugs, it would be mistaken to control for non-psychedelic drug use in an analysis of the consequences of psychedelic drug use. From a model 2 perspective, on the other hand, psychedelics use is unlikely to lead to the use of non-psychedelic drugs like heroin or cocaine, but the opposite might take place as the users of such drugs sometimes experiment with psychedelics as part of their hedonistic or escapist pursuits. Since the use of heroin and cocaine is likely to incur addictions and other health problems, polydrug use that includes psychedelics must be treated separately from “clean” psychedelics use. Furthermore, it may also be the case that pre-existing psychological conditions and (often concomitant) non-psychedelic drug use might lead to psychedelic drug use in a context of therapy. Contrary to the model 1 perspective, which sees non-psychedelic drug use as a common consequence of psychedelic drug use, this model 2 perspective understands psychedelic drug use as a form of therapy both for habitual non-psychedelic drug use and for the underlying psychological problems that in large part are the cause of such drug use. In order to identify the independent effects of psychedelic drug use, it is therefore appropriate to apply statistical control for non-psychedelic drug use, or one risks blaming the medicine for the disease.

## **Conclusion**

This article has sought to demonstrate that we currently have little knowledge about how psychedelics are used in naturalistic settings in Western societies. We recognise that there is a range of different patterns of use, some of which clearly have better long-term outcomes than others, but we have not obtained much insight into how widespread these patterns are. Our ignorance in this regard is based on the methodological complications that arise from the fact that psychedelics use is generally illegal in the Western world, shrouding use in secrecy and silence, as well as the possibility that some patterns of psychedelics use may be damaging to users, thereby rendering this user segment cognitively dysfunctional and generally unavailable for recruitment. Our attempts to peek behind these epistemological veils, although successful in some ways, have not afforded us with general insight into the whole range of psychedelics users: as demonstrated in my review, recruitment strategies for psychedelics users tend to favour certain user segments over others. This has resulted in a broad range of assessments of the mental health consequences of psychedelics use, as different usage patterns seem to incur different consequences and different research methodologies therefore obtain divergent perspectives on the long-term outcomes of use.

With a reliable empirical model of the psychedelics user population, it might be possible to contextualise the range of divergent findings and understand how they reveal different pieces of the larger puzzle. In the absence of such an empirical model, it will be helpful to explicate our beliefs about how new findings about psychedelics use are to be understood within the context of the broader user population. This will protect us from the fallacy of assessing the validity of new findings on the basis of an implicit model of the user population which assumes that this population is structured in the same way as our participant sample. As I have sought to demonstrate in this article, it is

unlikely that any study of psychedelics users, no matter how cleverly designed, will obtain findings that are directly applicable to the full range of the user population. What may be feasible, however, is to design studies that will map different segments of the user population, and eventually reach a point where we can estimate their numerical size. Juxtaposed with studies of other user segments, this will afford us with a first empirical model of the psychedelics user population, which in turn will enable us to state with some confidence what the overall long-term mental health consequences of psychedelics use for the median user are.

While the actual psychedelics user population is unlikely to be as neatly organised as the theoretical models imply, the models serve to explicate assumptions about the user population and thereby to clarify positions in this debate. An empirical model would sort out these disagreements in a more definitive manner, but until such a model is available, the theoretical models can help us contextualise individual findings about psychedelics use in a way that is at least explicit and clear. At present, the range of disparate findings on the consequences of psychedelics use and the debates surrounding these findings often seem to be based on implicit models of the user population, and it is not surprising that disagreement based on unstated differences in worldview tend to become muddled. Explicating one's interpretation of the user population would allow for more clarity and perhaps enable a more meaningful dialogue.

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### ORCID iD

Petter Grahl Johnstad  <https://orcid.org/0000-0002-2528-3356>

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