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Motives for the use of serotonergic psychedelics: A systematic review

Lukas A. Basedow[1] | **Sören Kuitunen-Paul**[2]

[1]MIND Foundation, Berlin, Germany

[2]Department of Clinical Psychology and Psychotherapy, Technische Universität Chemnitz, Chemnitz, Germany

Correspondence
Sören Kuitunen-Paul, Department of Clinical Psychology and Psychotherapy, Technische Universität Chemnitz, Wilhelm-Raabe-Str. 43, 09120 Chemnitz, Germany.
Email: skui@hrz.tu-chemnitz.de

Abstract

Issues: Serotonergic psychedelics (SP) are psychoactive substances that produce unique sets of subjective effects, such as hallucinatory experiences. This systematic review is the first to summarise which motives for SP use have been assessed in medical, psychological, sociological and ethnological research across different types of SPs and across cultural backgrounds. Findings on use motives can be especially important in the context of harm reduction.

Approach: We searched academic databases (Medline, Web of Science and Embase) and included publications if they were peer-reviewed and written in English, German, Spanish or Dutch. We analysed which type of motives were reported, comparing motives from quantitative and qualitative reports, and investigating associations between motives and year of publication, specific SPs and specific participant populations.

Key Findings: Our search in November 2020 resulted in 30,257 unique articles of which 37 were included in the analysis. Across all studies, the most common motive for SP use was the desire to expand awareness (78% of included studies), followed by coping (67%) and enhancement (57%) motives. There were no statistically significant associations between reported motive and type of report (quantitative vs. qualitative), year of publication (range: 1967–2020), type of SP and participant population.

Implications: If SP-related harms are to be reduced, harm-reduction services could focus on providing non-pharmacological ways of fulfilling an expansion motive. Additionally, future studies should aim to assess specific motives for specific SPs.

Conclusions: SPs are most commonly used to expand (self-)knowledge, promote spiritual development or for curiosity, notably across different SP user populations including patients.

KEYWORDS
drug use, hallucinogens, motivation, reason, spiritual

1 | INTRODUCTION

Psychoactive substances have been used for millennia for a plethora of different reasons ('motives') that stimulate future use of a substance. The classical motivational model of alcohol use by Cox and Klinger [1] proposed a framework in which motives are informed via instrumental learning processes induced by the experienced effects of previous use on the basis of more distal variables, including temperament and availability of the substance. Users are thought to react towards a cognitive representation of anticipated substance use effects, and will decide to use or not use the substance. Therefore, we conceptualise use motives as cognitive and self-reported tendencies to be motivated towards consumption by a certain rewarding anticipated effect, that is answers on why, with what goal, or for what reason substances are used. Use motives are thought to be learned and reinforced through habitual substance use in order to produce rewarding effects [2]. In comparison to distal factors, such as temperament traits [3], use motives are better predictors of future use regarding several substances, including alcohol, cannabis and, to a smaller degree, tobacco [2, 4, 5]. Importantly, motives develop and may change over time, leading to differences in motives between occasional users, recreational users and chronic users with a substance use disorder [6].

Since different substances have different pharmacological effects, and elicit different subjective experiences, use motives might differ between different types of substances. The first studies on alcohol use established a four-factor model of general drug use motivation, including social, conformity, coping and enhancement motives [7]. The social factor relates to a desire for more successful or fun social behaviour, while the conformity motive reflects a need to be accepted and giving in to external pressure. Substance use for coping reasons is a reflection of the desire to reduce negative states and enhancement can be generally described as a desire to make existing states more fun or interesting. This four-factor model was expanded by a fifth factor labelled expansion motives, based on research with users of cannabis [8, 9]. This expansion motive reflects a desire to gain (self-)knowledge or to acutely alter sensory perception. Typical descriptive items related to these five factors based on Simons *et al.* [8] are displayed in Table S1 (Supporting Information).

As expected, research shows that the most frequently reported motives differ between substances [4]. While some overlap exists, generally alcohol use is most often motivated by social reasons, cannabis use is most often related to an enhancement motive [10, 11] and tobacco use to coping [4]. In recreational methylenedioxymethamphetamine (MDMA) users, the most important motive is enhancement [12, 13] while coping [14] and expansion [12] are also frequently reported. Similarly, methamphetamine use is also related coping and enhancement motives [15, 16]. On the other hand, opioids and benzodiazepines have a very strong focus on coping motives [17–20] and synthetic cathinones are most often used for enhancement reasons [21].

For another class of substances, serotonergic psychedelics (SP), no summarising reviews investigating the major motives related to their use have been conducted. SPs comprise a category of substances with the unifying property of being serotonin (5-HT) 2a receptor agonists and the potential of inducing hallucinatory and mystical experiences [22–24]. The class of SPs is often subdivided according to chemical and pharmacological properties into: tryptamines, for example psilocybin, dimethyltryptamine (DMT); ergolines, for example lysergic acid diethylamide (LSD); and phenethylamines, for example mescaline [25]. Across all three categories, a large variety of different substances exists, especially considering the large-scale production and distribution of novel psychoactive substances, many of which are part of the SP family [26, 27].

The public perception of SP use in Western societies has changed substantially in recent years [28], leading to increased research interest in the religious and spiritual roots of SP use as well as modern use motives specifically for SPs. While first rising to fame as therapeutic, mystical and recreational drugs in the 1950s and 1960s [29–31], the use of SPs was the target of several prevention campaigns from the late 1960s onward [32]. In the past decade, SPs have gained increasing attention as psychotherapeutic adjuncts [29, 33]. Coinciding with this change in public profile towards a more benevolent assessment is an increase in use of these substances [34, 35]. Both current changes raise the need for a comprehensive assessment of motivational drivers for SP use that could be used to adequately address an increasing number of SP users with and without mental problems. Independent of reported motive, SP use might result in unexpected negative consequences, such as flashbacks or overwhelming challenging experiences [36, 37]. An understanding of the motives underlying SP use can support work that aims to reduce such harms [38], for example by providing SP users with non-pharmacological methods to fulfil their given motives.

One difficulty in assessing substance use motives is related to methodology. On one hand, standardised instruments exist that aim to capture the five standard use motives in a valid manner in form of structured questionnaires [6, 39, 40]. On the other hand, much research conducted with substance users is qualitative of nature [41, 42], which often entails using forms of assessment

providing more opportunities for subjects to speak freely. Structured assessments provide a particular and specific quantitative framework for participants in which they will situate their answers [43], which is related to problems like response bias [44]. Qualitative assessments, however, provide less stringent anchors [45] potentially leading to different answers and therefore potential differences in reported use motives.

This review aims to summarise findings regarding the use motives for SPs and to investigate possible differences to other types of substances. Additionally, we are interested in exploring the potential differences in reported motives between quantitative questionnaires, and qualitative ones allowing for answers to open-ended questions with more diverse answers. Moreover, we aim to explore how year of publication, the type of sample population and specific substances of the SP class relate to differences in reported use motives. We expect qualitative questionnaires to reproduce the types of use motives at a different frequency than quantitative questionnaires.

2 | METHODS

2.1 | Search strategy

This review is reported according to the PRISMA statement [46]. We performed electronic searches in Medline, Web of Science and Embase, from the respective database inception to 5 November 2020. The search was conducted using an algorithm connecting a selection of SPs and terms associated with use motives (see Table S3) in an iterative manner. References were retrieved through the electronic searches and by manual searches through the reference lists of review articles. This review and the accompanying search were not previously registered.

Studies were included if they: (i) were in English, German, Spanish or Dutch language; (ii) included at least one assessment of at least one human; and (iii) assessed explicit motivations or reasons for the use of an SP. Articles were initially screened for inclusion by language, journal and title, followed by abstract. Only if the screening of the abstract indicated that the article might fit our inclusion criteria did we assess the full text for eligibility. PRISMA checklist and PRISMA flowchart are provided in Table S1 and Figure S1 respectively.

2.2 | Data extraction

All search results were screened independently by two researchers (LAB, SKP). Then, LAB recorded authors' names, year of publication, investigated SP, and whether the authors used a qualitative or quantitative approach from all selected articles. Results regarding SP use motives were extracted and assigned by LAB into the five dimensions of use motives: Conformity, Coping, Enhancement, Expansion and Social. For examples of qualitative answers being sorted into the five dimensions, see Table S4. The presence of each motive in a study was coded with 1 for 'motive present' or 0 for 'motive absent'.

2.3 | Data storage

All data underlying the results are available as part of the Supporting Information, see Appendix S1.

2.4 | Statistical analysis

To determine if quantitative and qualitative studies resulted in different proportions of reported motives, we calculated odds ratios, with a ratio of 1.68 considered small, 3.47 medium sized and 6.71 large [47]. We used binary logistic regressions to calculate the influence of year of publication on the presence of the various use motives. Year of publication was entered as a continuous predictor and the presence of each use motive as a binary outcome. Additionally, we aimed to use χ^2 tests to determine differences in proportions of reported use motives across types of SP users (patients, ritualised use, prisoners) and types of specific SPs (LSD, tryptamines, mescaline). However, the small number of resulting studies made this statistical analysis unsuitable. Level of significance was set at alpha <0.05. Effect sizes were classified according to Cohen [48] into small effects ($|\eta^2| \geq 0.01$), medium effects ($|\eta^2| \geq 0.06$) and large effects ($|\eta^2| \geq 0.14$).

3 | RESULTS

Our search resulted in 30,257 screened articles, from which 113 were still considered relevant after abstract screening and assessed for eligibility, with 37 finally being included in the review [49–85], see Table 1 and Figure S1. Results from each step of the search procedure are shown in Figure S1. Half of the included studies ($n = 20$, 54%) investigated use motives across multiple types of SPs without specifying the SP in question. The remaining studies investigated only one substance, that is ayahuasca ($n = 7$, 19%), LSD ($n = 5$, 14%) or psilocybin, DMT, mescaline, 4-HO-MET and 5-MeO-DMT (each $n = 1$, 3%).

The most frequently reported motives for use of SPs, irrespective of report type and substance, were

TABLE 1 Overview over all included studies

Study	Participants (% of male participants in study)	Substance
Studies with quantitative reports of SP use motives (n = 17 studies with n = 11,452 participants)		
Shearn and Fitzgibbons [78]	*n* = 167 (50%) adolescent psychiatric patients	Multiple
Nail *et al.* [75]	*n* = 997 (100%) patients of a US Navy rehabilitation centre	Multiple
Howard and Zibert [62]	*n* = 292 (90%) adolescent offenders	Multiple
Boys *et al.* [51]	*n* = 364 (56%) poly-substance users	LSD
Móró *et al.* [74]	*n* = 589 (58%) users of multiple drugs	Multiple
Lyvers and Meester [73]	*n* = 337 (69%) users of SPs	Multiple
Hallock *et al.* [59]	*n* = 398 (35%) college students	Psilocybin
di Lorenzo *et al.* [56]	*n* = 54 (65%) cluster headache patients	Multiple
Soussan *et al.* [80]	*n* = 619 (84%) NPS users	Multiple
Sutherland *et al.* [81]	*n* = 419 (73%) Australian NPS users	Multiple
Wolff and Passie [84]	*n* = 40 (40%) ayahuasca users	Ayahuasca
Davis *et al.* [54]	*n* = 515 (80%) users of 5-MeO-DMT	5-MeO-DMT
Hutten *et al.* [63]	*n* = 1116 (85%) experienced microdosers	Multiple
Kettner *et al.* [68]	*n* = 1967 (79%) users of SPs	Multiple
Lea *et al.* [72]	*n* = 525 (74%) users of SPs	Multiple
Kaasik and Kreegipuu [62]	*n* = 30 (50%) Estonian ayahuasca users	Ayahuasca
Benschop *et al.* [49]	*n* = 3023 (68%) NPS users	Multiple
Studies with qualitative reports of SP use motives (n = 20 studies with n > 1372 participants)		
Bowers *et al.* [50]	*n* = 3 (100%) psychiatric patients	Multiple
Frosch *et al.* [58]	*n* = 34 (100%) patients hospitalised after LSD use	LSD
Dobkin [57]	'This paper is the result of an anthropological pilot study of a Peruvian coastal village, which was undertaken during the summer of 1967. Valleseco, situated on a rich agricultural plain, has a population of 1123 and is predominantly an agricultural community'.	Mescaline
Cheek *et al.* [53]	*n* = 32 (47%) regular LSD users	LSD
Hendin [61]	*n* = 4 (100%) LSD users	LSD
Desmarchelier *et al.* [55]	*n* = 2 (100%) Ese'eja shamans	Ayahuasca
Prepeliczay [76]	*n* = 26 (50%) German LSD users	Multiple
Winkelman [83]	*n* = 16 (69%) participants in an ayahuasca retreat	Ayahuasca
Kjellgren et al. [69]	*n* = 23 (92%) 4-HO-MET users	4-HO-MET
Reynaud-Maurupt *et al.* [77]	*n* = 30 (60%) French users of hallucinogenic plants	Multiple
Cakic *et al.* [52]	*n* = 121 (86%) DMT users	DMT
Kjellgren and Soussan [70]	*n* = 25 (44%) ayahuasca users	Ayahuasca
Harris and Gurrel [60]	*n* = 81 (57%) ayahuasca users	Ayahuasca
Winkler and Csémy [85]	*n* = 22 (77%) Czech health-care professionals who had conducted self-experiments with LSD	LSD
Johnstadt [64]	*n* = 16 (100%) users of SPs in spiritual contexts	Multiple
Kavenská and Simonová [67]	*n* = 77 (61%) participants of ayahuasca rituals	Ayahuasca
Soussan and Kjellgren [79]	*n* = 619 (84%) NPS users	Multiple
Kajanová and Mrhálek [66]	*n* = 11 (N/A) members of the Czech trance scene	Multiple

(Continues)

TABLE 1 (Continued)

Study	Participants (% of male participants in study)	Substance
Lea *et al.* [71]	$n = 200$ (N/A) online discussion threads	Multiple
Webb *et al.* [82]	$n = 30$ (67%) experienced microdosers	Multiple

4-HO-MET, 4-hydroxy-methyl-ethyltryptamine; 5-Meo-DMT, 5-methoxy-dimethyltryptamine; DMT, dimethyltryptamine; LSD, lysergic acid diethylamide; N/A, not applicable; NPS, new psychoactive substances; SP, serotonergic psychedelics.

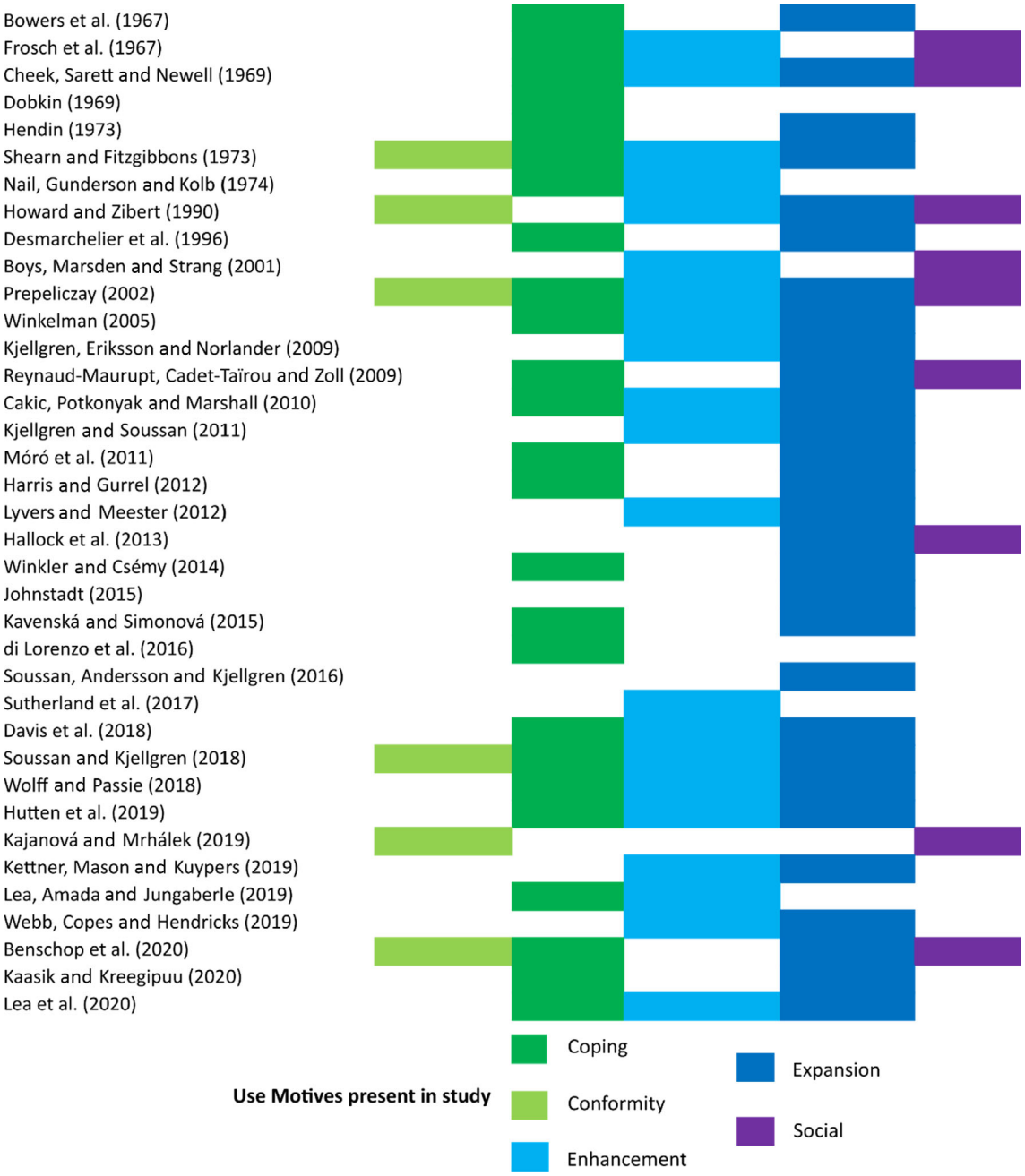

FIGURE 1 Distribution of use motives in the included studies in chronological order of publication date.

expansion motives (78%), see Figure 1. Coping motives were the second most frequent motives with 68% of articles reporting at least one such motive. Enhancement motives were reported in 57% of articles and social motives in 24%. Conformity motives were reported least frequently (16%).

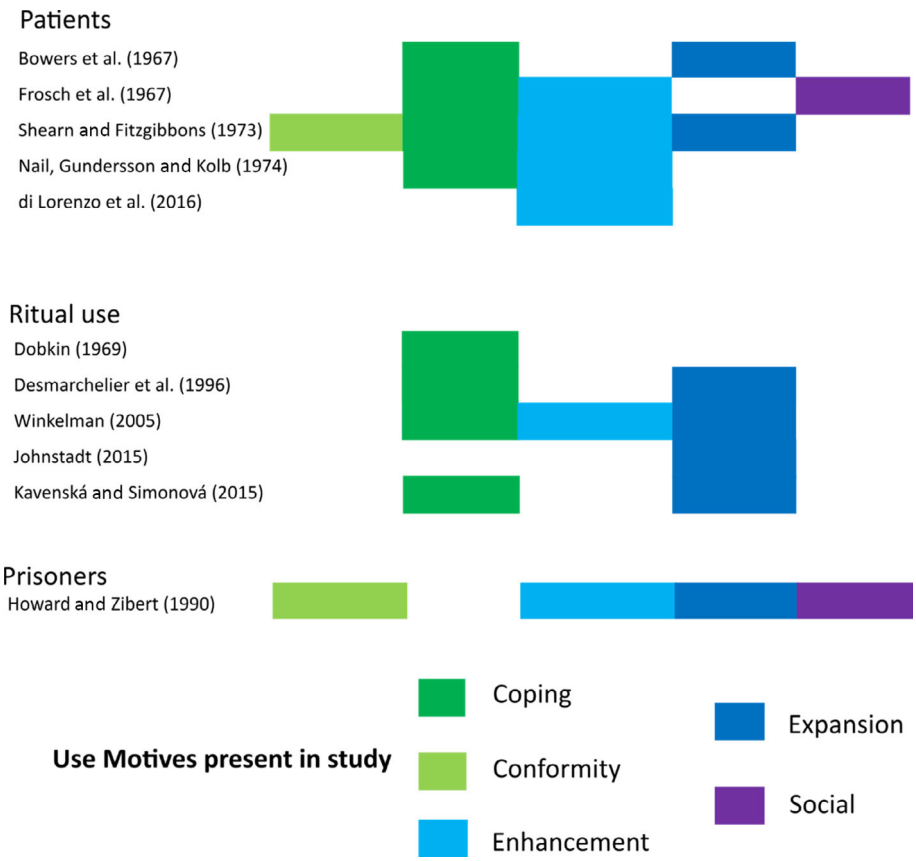

FIGURE 2 Use motives for serotonergic psychedelics in specific participant populations ($n = 17$) in chronological order of publication date.

Figure 2 displays the various use motives reported in studies investigating specific populations instead of including users with an unspecified background. Notably, social and conformity use motives were not reported in studies with ritualised use contexts, and the one study investigating a prison population did not report coping motives.

Figure 3 shows use motives reported in studies focussing on a specific SP ($n = 11$) as compared to studies, including multiple SPs. Interestingly, none of the studies focusing on a specific SP reported a conformity use reason.

3.1 | Sensitivity analysis: Type of report, year of publication

A qualitative approach was employed by more than half of the studies ($n = 20$, 54%) [50, 52, 53, 55, 57, 58, 60, 61, 64, 66, 67, 69–71, 76, 77, 79, 82, 83, 85] with $n > 1372$ participants overall (see Table 1). Of those studies, the majority (60%) focussed on motives related to a specific substance while 40% asked for use motives across different types of SPs. Qualitative reports were published at a median year of publication = 2010, with $n = 6$ (30%) being published before the year 2000.

Quantitative methods were applied by $n = 17$ (46%) studies [49, 51, 54, 56, 59, 62, 63, 65, 68, 72–75, 78, 80, 81, 84]. Although these studies were less frequent than studies with qualitative assessments, they covered a considerably larger amount of participants with $n = 11{,}452$. The majority of these studies (71%) asked for use motives across different types of SPs. Their median year of publication was 2016, with 18% ($n = 3$ studies) of quantitative reports being published before the year 2000. Given these differences in study details between qualitative and quantitative reports, we compared the likelihood (odds ratio) for a study to produce a certain SP use motive depending on the report type. As shown in Table 2, all odds ratios were not significant (all $P > 0.05$), although the odds ratios for coping and enhancement motives reached the threshold to be considered a small odds ratio.

The median year of publication was 2009, with 24% ($n = 9$) of studies being published before the year 2000. Year of publication was not significantly related to the presence of any of the five use-motives (all $P > 0.05$). However, effect sizes indicated small to medium negative associations with coping ($B = -0.007$, $SE_B = 0.004$,

$P = 0.105$, $\eta^2 = 0.073$), expansion ($B = -0.005$, $SE_B = 0.004$, $P = 0.226$, $\eta^2 = 0.042$) and social ($B = -0.004$, $SE_B = 0.004$, $P = 0.275$, $\eta^2 = 0.034$) as compared to irrelevant associations with conformity ($B = 0.001$, $SE_B = 0.003$, $= 0.878$, $\eta^2 = 0.001$) and enhancement ($B = -0.001$, $SE_B = 0.005$, $P = 0.868$, $\eta^2 = 0.001$).

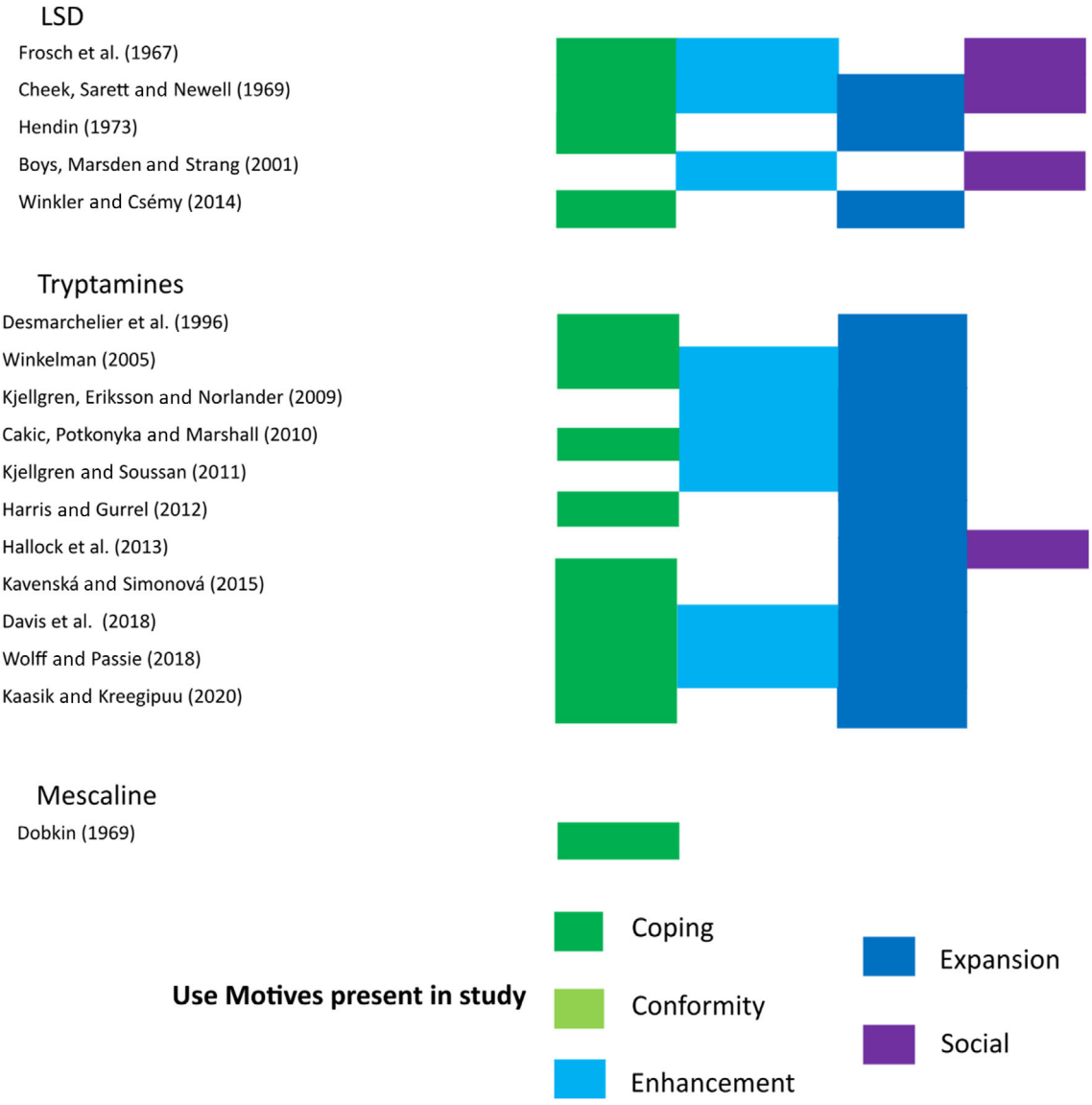

FIGURE 3 Use motives for specific serotonergic psychedelics ($n = 17$) in chronological order of publication date. LSD, lysergic acid diethylamide.

TABLE 2 Comparison of report type, study population and substance by use motive

	Percentage of studies reporting motive, *n* (%)				
	Report type, $n = 37$			Test statistics	
Use motive	**Total ($n = 37$)**	**Quantitative ($n = 17$)**	**Qualitative ($n = 20$)**	**OR [95% CI]**	***P***
Conformity	6 (16%)	3 (18%)	3 (15%)	1.21 [0.21; 6.99]	0.828
Coping	25 (68%)	10 (59%	15 (75%)	2.10 [0.52; 8.51]	0.299
Enhancement	21 (57%)	11 (65%)	10 (50%)	1.83 [0.49; 6.90]	0.370
Expansion	29 (78%)	13 (76%)	16 (80%)	1.23 [0.26; 5.99]	0.795
Social	9 (24%)	4 (24%)	5 (25%)	1.10 [0.24; 4.90]	0.917

CI, confidence interval; OR, odds ratio.

3.2 | Additional motives from qualitative reports

As qualitative reports offer participants the opportunity to discuss their motives for SP use more extensively, two larger themes emerged that were not suitable for categorisation in the five classical use motive domains.

3.2.1 | Theme 1

SP use as a form of identity. In several cases, the use of SPs was presented by participants as a measure to uphold and build an identity. For example [66]: '*The change in drug types that are consumed has (according to the subculture's members) led to its "spirit" disappearing. For this community, the term "spirit" means expressing the unique atmosphere at the party: harmony, an emphasis on spiritual values, and values connected to psychedelic drugs*'. Here, the use of SPs is related to specific values the participants hold and use of these substances is something one does when belonging to the group in question (in this study: members of the rave culture). Similarly, the use of LSD has been described as being an expression of '*their "otherness" and cultural identity*' [76].

3.2.2 | Theme 2

PUse to gain or explore spiritual or magical powers. Several participants across studies reported the wish to gain extraordinary powers resulting from SP use. One study [69] cites a participant wishing to travel through time: '*One reported aim was the hope of being transported in time in order to facilitate the acquisition of information from the past or even the future*'. Another [77] reports on users aiming to interact with hidden parts of the world: '*In the second case, the "plants" are taken in order to help the user see invisible creatures around us or gain access to hidden knowledge, particularly concerning the creation and maintenance of the living world*'. The most extreme example of this might be presented in Winkelman [83], which contains a report of an SP user aiming to achieve godhood: '*His motivation for this experience was to "become an evolved god. On ayahuasca I feel like I am a god. Ayahuasca gives me the opportunity to act like God, experience heaven on earth. Ayahuasca is training to be a god."*'

In addition to these two larger themes represented across different studies, additional unique motivations were reported in single studies. These were related to use as an expression of intuitive thinking [67] ('*The decision to travel and use ayahuasca was often spontaneous or intuitive, accompanied by a sense of "I need to go there" suppressing rational thinking*'.) and using as preparation for therapeutic applications [85] ('*Four of the participants were motivated by their interest in working with the substance therapeutically*'.).

4 | DISCUSSION

In this systematic review, we investigated which use motives for the substance class of SPs are reported for different user populations. The most prominent motive for the use of SPs across all 37 studies was expansion. Nonetheless, over half of the studies also reported coping and enhancement reasons, while social and conformity reasons were rarely involved in the use of SPs. Opposed to our expectation quantitative and qualitative approaches were not related to different proportions of reported use motives. Furthermore, SP use motives did not differ between users of different substances, by year of publication or between different participant populations.

It seems that a strong public presence of SPs as agents with properties related to coping [86] has not led to a strong presence of this motive in user reports. In contrast, the motive that was most often reported was expansion. The expansion motive was added to the classic four-factor structure [7], based on and replicated in studies with alcohol-users [87], to explain motives that seemed to be reported frequently and exclusively in users of cannabis [8, 9]. It relates to processes of subjectively increasing self-knowledge and creativity, as well as changes in awareness and perception. Adding this motive to the use motive structure was likely due to cannabis' psychedelic properties [8]. Therefore, it is fitting that a large proportion of SP users reports expansion motives, since the motive was created specifically to capture psychedelic subjective effects. Interestingly, cannabis use, for which the motive was specifically created, is linked to enhancement more strongly than to the expansion motive [4].

Additionally, we showed that reported motives do not differ between questionnaire types, indicating that the five factor use motives apply well to the lived experience of SP users. However, we did observe a small, but non-significant, difference for coping motives, in the sense that qualitative reports more frequently led to the report of coping motives compared to quantitative reports (75% vs. 59% respectively). Coping motives describe substance use as a form of emotion regulation, specifically the regulation (and reduction) of negative affective states [4, 7]. One reason might be the wording of structured coping questions. These are often focused on general negative affect instead of describing specific negative states. This general description might lead people not to identify with the item in question and therefore respond with disagreement. On the other

hand, in qualitative reports, participants have the opportunity to explain how they use SPs to cope with specific ailments or emotional states. What they frequently do not have is the opportunity to add individual motives to the questionnaire-specific set of motives. This might result in non-reporting and underreporting of motives which were not covered by the applied questionnaire as previously shown for certain cannabis use motive measures [6], for example using because of substance-specific craving. Another explanation of this potential finding is a reduction of social desirability bias in qualitative interviews. While in standard survey research social desirability is an issue [44], in qualitative interviews the interviewer might have built enough trust with the interviewee, which in turn could lead to more honest answers.

We observed no differences in terms of the year of publication, the investigated SPs or participant populations. This observation, in combination with the above finding related to different questionnaire types, supports the conclusion that the motives for SP use are remarkably similar across contexts. The motive of expansion being the most common holds up across substances, contexts and time. This finding supports the classification of SPs as a homogeneous class of substances, even though singular members of this group might differ in terms of pharmacology or subjective effects [26, 27]. The distinction of SPs as a coherent class is further supported by previous research showing that other substances, such as cannabis and MDMA are more often associated with the motive of enhancement instead of expansion [10–13].

4.1 | Limitations

The main limitation of our analysis was the application of the five-factor model of substance use motivation to qualitative reports. This top-down analysis strongly constrains the interpretation and information that can be extracted from open-ended answers. Thus, our constraint reduced the information that we extracted from the studies, including qualitative assessments. Additionally, this method relies on sorting open-ended answers into pre-determined categories, which requires subjective interpretation. It is not clear that this process is valid, in the sense that other authors would have extracted the same motivational factor from the same answers. Furthermore, we reported several use motives that could not be captured by the five-factor model. Future studies should take into consideration, that SP users might report unique motivations (such as a desire to develop magical powers) that will not applicable to other substances. Especially, using an SP as a preparation for providing SP-assisted therapy might increasingly occur with contemporary training protocols encouraging such use [88]. Additionally, we did not perform a risk of bias rating as is recommended for systematic reviews and meta-analyses [46]. However, since our study did not systematically assess mean scores of quantitative studies and included qualitative studies without quantitative outcomes, we did not consider common methods of assessment, like the Cochrane Bias tools [89, 90] or the tools of the National Heart, Lung, and Blood Institute [91] appropriate to comprehensively assess risk of bias across studies. Further, since we analysed the occurrence of use motives based on studies and not participants, we were prohibited from controlling for additional sample characteristics, such as age or gender. As SP use is generally more frequent in males and peaks around the age of 35 (in both genders) [92], we would expect a wider range of reported motives the male population aged 30–35 years. We also did not control for regular use of other psychoactive substances or co-occurring mental disorders. We would expect that users with co-occurring mental disorders might report a higher frequency of coping motives related to self-medication. Finally, our review only assessed trait motives for SP use, even though an assessment of use motives through ecological momentary assessment is becoming more popular and widespread [93]. However, to our knowledge, no studies so far have assessed SP use motives by the means of ecological momentary assessment.

5 | IMPLICATIONS

In research contexts, future studies might not see a need to assess SP use motives qualitatively, given that common motives are reflected by quantitative instruments already. Nonetheless, including the opportunity to add individual motives and rate these as well would help to understand individual or rare use motives. Indeed, two studies we included were performed with the same population asking for quantitative [79] and qualitative [80] ratings separately. However, to our knowledge, no comprehensive instrument exists that combines quantitative and qualitative questions. A further recommendation regarding future research is related to the type of explored SPs. Only around 30% of included studies reported motives for specific SPs, while the majority investigated use motives across substances. Future projects would benefit from exploring differences between use motives for different SPs in more detail, since this was not possible in our study based on our small sample of included studies. Investigating the specific motivation underlying SP use might be an important topic in prevention and harm-reduction services. If the main motivation for SP use is expansion and there is an aim to prevent SP use, one goal could be the spread of non-pharmacological practices that

satisfy an expansion motive. Specifically, a more widespread enculturation of non-pharmacological ways of mind-alteration, such as meditation [94] or breathwork [95, 96] could result in lower rates of SP use as the motive of expansion has been satisfied in other ways. In the context of psychopathology, SP use could be understood as a way of searching for insights and stimulation, possibly induced by feelings of depression, deprivation or comparably strong novelty seeking. This is in line with current research on SP-assisted psychotherapy, in so far that a main target for this approach are affective disorders [33] and which might elicit effects by providing patients with novel insights related to their therapeutic process [97–99].

6 | CONCLUSION

Previous studies on SP use motives showed that typical drug use motives were reported by different groups of users when assessed with non-standardised instruments. Not surprisingly, these motives were subsequently found using standardised self-report instruments. Most often, SPs were used to expand (self-)knowledge, promote spiritual development or for curiosity. Notably, this finding was valid across different SP user populations, including psychiatric patients.

AUTHOR CONTRIBUTIONS

Lukas A. Basedow: Conceptualisation, data curation, formal analysis, investigation, methodology, project administration, validation, visualisation, writing—original draft and writing—review and editing. Sören Kuitunen-Paul: Conceptualisation, methodology, project administration, supervision, validation and writing—review and editing.

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CONFLICT OF INTEREST

LAB is a member and volunteer for the MIND—European Foundation for Psychedelic Science that promotes evidence-based, safe and legal applications of the psychedelic experience. SKP declares to have no conflict of interest relating to the topics in this work.

ETHICS STATEMENT

An individual ethics approval is not deemed necessary for a review. For details on ethics, plese refer to the specific primary studies.

ORCID

Lukas A. Basedow https://orcid.org/0000-0003-4866-8686

Sören Kuitunen-Paul https://orcid.org/0000-0001-8224-6490

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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