

# Traumatic Psychedelic Experiences



Abigail E. Calder, Vincent J. Diehl, and Gregor Hasler

## Contents

- 1 Introduction
- 2 What Is a Traumatic Psychedelic Experience?
- 3 Types of Traumatic Psychedelic Experiences
  - 3.1 Trauma Primarily Caused by Psychedelic Drug Effects
  - 3.2 Re-emergence of Previous Traumatic Experience
  - 3.3 Trauma Primarily Caused by External Events
- 4 Impact of Traumatic Psychedelic Experiences
  - 4.1 Trauma-Related Psychopathology
  - 4.2 Risk Factors
- 5 Preventing Traumatic Psychedelic Experiences
- 6 Recovery from Traumatic Psychedelic Experiences
  - 6.1 Guidelines for Immediate Response
  - 6.2 Treatment of Psychedelic-Induced Trauma
- 7 Conclusions and Outlook
- References

**Abstract** Psychedelic experiences involving extreme feelings of horror, helplessness, and perceived threats can be traumatizing. Traumatic psychedelic experiences are a rare, extreme, and largely preventable form of challenging experience which can arise due to frightening psychedelic drug effects, unsafe settings, and emergence of pre-existing trauma. Some people recover quickly, but others develop prolonged anxiety, sleep disturbances, derealization, or other potentially trauma-related symptoms. This chapter discusses the causes, phenomenology, and potential outcomes of

---

A. E. Calder and V. J. Diehl  
Molecular Psychiatry Laboratory, Faculty of Science and Medicine, University of Fribourg,  
Fribourg, Switzerland

G. Hasler (✉)  
Molecular Psychiatry Laboratory, Faculty of Science and Medicine, University of Fribourg,  
Fribourg, Switzerland

Center for Psychiatric Research, Fribourg Network for Mental Health, Villars-sur-Glâne,  
Switzerland  
e-mail: [gregor.hasler@unifr.ch](mailto:gregor.hasler@unifr.ch)

traumatic psychedelic experiences, as well as how to prevent them and minimize their negative impact.

**Keywords** Acute stress disorder · Adverse effects · Post-traumatic growth · Post-traumatic stress disorder · Post-trip difficulties · Trauma-related symptoms · Traumatic psychedelic experiences

## 1 Introduction

What psychedelics heal under the right conditions, they may also cause under the wrong ones. Controlled studies combining psychotherapy with classical psychedelics such as psilocybin and lysergic acid diethylamide (LSD) show efficacy in the treatment of depression, anxiety, and substance use disorders, while psychotherapy combined with MDMA (3,4-methylenedioxymethamphetamine) appears effective against post-traumatic stress disorder (PTSD) (Yao et al. 2024). In healthy people, psychedelic experiences (or “trips”) in safe and supportive environments are often highly positive and are associated with beneficial changes in mood, well-being, and life satisfaction, and people commonly report that psychedelic experiences are among the most meaningful experiences of their lives (Schmid and Liechti 2018). Psychedelics can clearly be used as powerful catalysts for positive transformation, and interest in them is only growing.

And yet, there has always been another side to psychedelics. Frightening psychedelic experiences are not unusual, and the worst of them can leave people feeling shaken for some time. Approximately 9% of people who have ever used classical psychedelics report having at some point had a distressing experience that caused functional impairment lasting at least a few days (Simonsson et al. 2023). As we will discuss, some of these cases may be explained as stress reactions to traumatic psychedelic experiences. Though some people ultimately benefit from such experiences, others report no benefits or even lasting difficulties which can in some respects resemble PTSD (Argyri et al. 2024).

In this chapter, we aim to deepen the understanding of the rare but serious phenomenon of traumatic psychedelic experiences for practitioners, integration therapists, harm reduction workers, and anyone else in contact with psychedelics or those who use them. We first discuss the evidence that some psychedelic experiences can be traumatizing and describe how this can happen. We next examine the potential aftereffects of traumatic psychedelic experiences, including trauma-related psychopathology. Finally, we discuss strategies to prevent traumatic psychedelic experiences and mitigate their negative consequences.

The existence of traumatic psychedelic experiences should not hinder the careful use of psychedelics in safe settings, and they are a relatively rare and preventable outcome of psychedelic use. We hope that this resource helps make them even rarer.

## 2 What Is a Traumatic Psychedelic Experience?

To understand traumatic psychedelic experiences, we first need an understanding of trauma. Psychological trauma encompasses characteristic symptoms triggered by exposure to a highly distressing event, or traumatic stressor (Sayed et al. 2015). The ICD-11 defines a traumatic stressor as any “extremely threatening or horrific event or series of events” (WHO 2019). The DSM-5 more specifically requires “exposure to actual or threatened death, serious injury, or sexual violence” (APA 2013). Traumatic stressors often involve feelings of profound helplessness and loss of control as a potentially catastrophic situation overwhelms someone’s coping mechanisms (Carlson and Dalenbergh 2000). The strong feelings of fear, shock, and helplessness many people experience during a traumatic event are referred to as *peritraumatic distress* (Brunet et al. 2001), and more severe peritraumatic distress during the event is associated with greater severity of negative aftereffects (Vance et al. 2018). Traumatic stressors can, but do not always, cause lasting psychological distress.

Given this understanding of traumatic events, a traumatic psychedelic experience is one felt to be extremely horrific or threatening, and which thus has the potential to cause trauma-related psychopathology (Box 1). The ICD-11 definition of traumatic stressors seems more applicable to psychedelic experiences than the more restrictive DSM-5 definition, though, notably, some accounts of horrific psychedelic experiences also involve perceived threats of death. The prevalence of traumatic psychedelic experiences is not known, but like the broader category of “challenging experiences,” it probably varies considerably by dose and context of use (see Sect. 5). Approximately 7–8% of psychedelic experiences may be classified as predominantly negative or challenging at moderate doses (Barrett et al. 2016; Holze et al. 2022), and traumatic ones must be rarer still.

### **Traumatic Psychedelic Experience**

A psychedelic experience that feels extremely horrific or threatening. Traumatic psychedelic experiences typically arise when strong mind-altering drug effects interact with an unsafe context of use. They may, but do not always, precipitate trauma-related psychopathology.

Accounts of horrific or threatening trips punctuate the psychedelic literature, and people sometimes describe them as the most difficult experiences of their entire lives (Argyri et al. 2024; Bremner et al. 2023; Gashi et al. 2021; Johnstad 2021; Ona 2018). Many involve extreme terror and helplessness, often with frightening hallucinations:

In my vision I am flying slowly and timelessly into a whirlpool that is made entirely of emaciated-looking bodies like you would see in a Nazi concentration camp, but with eyes open and staring. I am being sucked into this horror in a timeless way... (Johnstad 2021)

...life and existence started to feel like a prison that I can't get out of. It was as though I was stuck in some kind of solipsistic, psychedelic nightmare version of Groundhog's Day, that I was profoundly alone and that this nightmare called life [was] on loop eternally and that there was nothing I can do about it. I had a distinct experience of absolutely no agency. I had no control. My sense of emptiness, meaninglessness and imprisonment became overwhelming... The magnitude of the fear and the panic that I was experiencing was unlike anything that I've ever encountered. (Argyri et al. 2024)

Some people perceive a credible-seeming threat of permanent damage to their psychological or spiritual integrity:

On LSD I reached a state where I felt that I somehow had lost my capacity to feel and to love, and it occurred to me that this loss might be permanent – that I had somehow fried my brain. ... I went deeply into a state of self-contempt and full panic, fearing I was going insane. (Johnstad 2021)

I felt the presence of emotionless entities with a mechanical quality about them. They wanted to show me... how our reality is 'constructed'. There is another reality 'behind' ours, and they began to show it to me by 'deconstructing' my reality. What I saw shocked me. ... My illusions about reality were shattered. ... I thought 'Having seen what I've seen, there's no way I'll ever be able to return without going completely insane.' I was convinced that I had gone too far, and that I wouldn't be going back. (Johnstad 2021)

People undergoing potentially traumatic psychedelic experiences also sometimes fear for their lives, legitimately or not (Argyri et al. 2024; Johnstad 2021). Two psychedelic pioneers leave us descriptions of such experiences, the first from chemist Alexander Shulgin after a high dose of 5-MeO-DMT:

I was crawled up on my bed (in the fetal position) with my eyes closed, squirming around, screaming (in my head) '...You killed yourself!' I repeated this several times, very fearful of death... I came to the realization that my life would be wasted if I died there. This showed me all of my scripts being discarded and nothing good happening ever again. (Shulgin and Shulgin 1997)

Albert Hofmann also feared for his life during his famous (and unexpected) first LSD experience:

My body seemed to be without sensation, lifeless, strange. Was I dying? Was this the transition? At times I believed myself to be outside my body, and then perceived clearly, as an outside observer, the complete tragedy of my situation. I had not even taken leave of my family... (Hofmann 2013)

Here, it also becomes clear that not all potentially traumatic psychedelic experiences cause lasting damage. Albert Hofmann famously felt "a sensation of well-being and renewed life" on the morning following his LSD experience, despite fearing for his life (Hofmann 2013). However, horrific and threatening psychedelic experiences carry the potential to lastingly and negatively affect people—a potential that, as we will discuss, is sometimes realized.

Importantly, not all challenging psychedelic experiences (or "bad trips") are horrific enough to traumatize someone. A psychedelic experience that is unpleasant or difficult but relatively manageable is unlikely to cause lasting harm, and it may even be therapeutically useful. This distinction is essential because a lack of discernment could stoke exaggerated fears and negative expectations about someone's

prognosis after a difficult experience, possibly leading to harm from “nocebo” effects or unnecessary interventions (Colloca and Miller 2011). Though what counts as “extremely horrific or threatening” is somewhat subjective, it is important to keep in mind that we are discussing the extreme end of the spectrum of challenging psychedelic experiences.

### 3 Types of Traumatic Psychedelic Experiences

We differentiate three major types of traumatic psychedelic experiences which arise for different reasons: (1) trauma primarily caused by psychedelic drug effects, (2) re-traumatization due to emergence of previous trauma, and (3) trauma primarily caused by external events. Though the boundaries between these are fluid, they are prevented in different ways and may have somewhat different consequences.

#### 3.1 *Trauma Primarily Caused by Psychedelic Drug Effects*

Psychedelics have several possible effects which can become extremely frightening, typically in a setting that is not well equipped to stop them from escalating. Psychedelics are capable of amplifying emotions to an extreme degree, including fear and distress (Barrett et al. 2016). Their effects on perception, cognition, emotion, and self-concept can also be notoriously overpowering at high enough doses. If a mounting loss of control over one’s mental state seems frightening, attempts to regain control and reduce anxiety can do the exact opposite, creating a vicious cycle in which fear escalates to an nearly unimaginable degree (Wolff et al. 2020). Unchecked anxiety can contaminate pseudo-hallucinations, thoughts, feelings, and other aspects of the experience and make them increasingly disturbing, perhaps due to the brain’s enhanced between-network connectivity under psychedelics (Dai et al. 2023). This can be highly immersive and convincing, particularly when the experience lasts for a (subjectively) long period of time.

Particularly in a highly fearful state, strange or extreme alterations in consciousness may be interpreted as serious threats to life or sanity, particularly by the unprepared. The breakdown of one’s sense of self, or “ego dissolution,” is a typical example, but many bizarre psychedelic effects might give the impression of losing or “breaking” one’s mind. Additionally, strong time dilation can exacerbate distress by making people feel as though horrifying experiences will last forever (Argyri et al. 2024; Wittmann 2015). Sometimes the experience of extreme psychological suffering alone is enough to make someone fear for their sanity, particularly if they have been exposed to descriptions—exaggerated or not—of negative aftereffects from “bad trips.” There can also be an existential element to such experiences which makes them feel deeply psychologically or spiritually harmful. One interviewee in a

study of recreational users expressed this powerfully: “*I have done something... deeply irreparable to my existence*” (Argyri et al. 2024).

Finally, psychedelics can enhance the perceived meaning and authority of experiences, sometimes referred to as their “noetic quality” (Hartogssohn 2018). Whatever threat is perceived, it may feel incontrovertibly real. Horrific “insights” about oneself, other people, or the world may seem to have an uncanny authority which does not always dissipate with the acute drug effects and can be psychologically damaging. After psilocybin-assisted therapy for depression, one patient describes such an “insight” which led to a crisis of faith and identity marked by suicidality and requiring therapeutic intervention:

I felt as though I had discovered a sick truth of life: That no matter how hard you try to climb to better things, you will never succeed; and if you don’t work, things will spiral into deeper and darker depression. The only way out is death. (Evans 2024)

### 3.2 *Re-emergence of Previous Traumatic Experience*

In addition to creating trauma where none existed before, psychedelic experiences can sometimes reactivate previous traumatic experiences. Both MDMA and classic psychedelics can enhance the re-experiencing of autobiographical memories, and this includes memories of traumatic events (Healy 2021). During retrieval, memories become destabilized enough that their content, emotional impact, and associations may be modified (Osorio-Gomez et al. 2023). In the right setting, this is an opportunity: The resurfacing and subsequent processing of traumatic memories is an important mechanism of psychedelic therapy, and some therapeutic schools strongly emphasize using a “corrective experience” to modify the traumatic memories underlying maladaptive patterns (Hill et al. 2012; Keri 2022; Passie et al. 2022). Many individuals benefit from this process in MDMA-assisted therapy (Mitchell et al. 2023), psilocybin-assisted therapy (Malone et al. 2018; Watts et al. 2017), and ayahuasca ceremonies (Weiss et al. 2023).

But when something evokes memories related to past trauma, there is also a possibility that it may exacerbate trauma-related symptoms, a phenomenon known as re-traumatization (Duckworth and Follette 2012). Re-traumatization has been observed during conventional talking therapy, mindfulness-based treatments, and debriefing interventions after traumatic events (Britton et al. 2021; Mayou et al. 2000). Psychedelics may weaken or enable avoidance mechanisms protecting people from traumatic memories, but even maladaptive avoidance mechanisms arose for a reason, and losing them at an inappropriate place and time can lead to re-traumatization if the person was not ready or well supported (Buchborn et al. 2023; Passie et al. 2022). In a study of lasting difficulties after psychedelic experiences in the general population, 6% of participants reported harm from resurfaced traumatic memories (Evans et al. 2023). External factors, such as discomfort with people present during the experience, may increase the risk of re-traumatization (Rundel 2022).

Though re-traumatization may be most likely when people lack support during and after their experience, two cases have been reported in controlled trials of MDMA-assisted therapy for PTSD ( $N = \text{ca. } 170$  MDMA-treated patients) (Mitchell et al. 2021, 2023; Mithoefer et al. 2019). After a frightening MDMA session involving encounters with traumatic memories, one patient described it poignantly:

...there was just this... deep knowledge that something had been left wide open and completely unresolved. It was like hell was inside of me, and it was only halfway out, and it got stuck. I don't think [the therapists] assessed the dangerousness of the territory they were leading me into. I had a strong and terrifying feeling that I was hopelessly dependent on them and feared that this would not be resolved, leaving me unable to survive. (Ross and Nickles 2022)

She later described an increase in PTSD symptoms that lasted for months, including recurring nightmares and suicidality.

Our research group recently completed a survey study investigating the processing of traumatic or difficult memories during experiences with classic psychedelics and MDMA in real-world settings (Diehl et al. 2024). We expected that some participants would experience the so-called “helioscope effect” (Hasler 2022b), in which they feel a sense of security during confrontation with a difficult or traumatic memory which allows it to be positively reprocessed. This was the case in 54% of our sample of 359 respondents. Interestingly, however, 14.2% of participants endorsed feeling significantly burdened by difficult memories or were less able to withstand their intensity than normal, and 12.7% endorsed avoiding negative memories more than usual during the experience. Significant difficulties with memories and emotions during their psychedelic experiences predicted self-reported negative long-term changes in participants’ lives, such as a negatively altered philosophy of life, decreased optimism, and reduced expression of positive emotions (e.g., love, joy, appreciation). These effects were amplified when the participant did not feel safe and the experience did not align with their expectations, suggesting inadequate preparation. Additionally, a recreational or spiritual intention was associated with more of these negative effects than an introspective intention.

### ***3.3 Trauma Primarily Caused by External Events***

Finally, psychedelics can sometimes amplify the negative impact of an unsafe or uncomfortable environment. In some cases, this involves a minor accident or uncomfortable situation which derails an otherwise benign psychedelic experience, for example, being left alone in a vulnerable state (Bremner et al. 2023). Sometimes these incidents are related to a substance’s illicit status, e.g., encounters with police. In research studies, serious thought should be given to minimizing the possibility of paranoid thoughts about being experimented on or “trapped” at the study site for this very reason (Johnson et al. 2008).

However, the most pertinent cases in this category arise when an event that could be traumatic anyway takes place during a psychedelic experience. The strong mind-

altering effects of psychedelics can impair someone's ability to understand and react to emergencies, abusive behavior, or other dangerous situations, conceivably amplifying peritraumatic distress and fear for one's safety. Unfortunately, stories of physical or sexual abuse by facilitators or others present during psychedelic sessions are also not uncommon in some settings (see also chapter by Marc Aixalà in this volume (Aixalà 2024)). This may be a particularly damaging form of trauma: previous studies suggest that while only 2% of people develop PTSD after accidents and natural disasters, the rates are much higher after malicious attacks and particularly high (up to 19%) after sexual assaults (Kessler et al. 2017; Steger and Park 2012).

Abuse by a therapist or facilitator is particularly malicious because it leaves victims at risk for a triple failure of their environment. First, they are violated in a vulnerable state, often while hoping for healing. Second, the perpetrator was a person with authority who was supposed to be especially trustworthy and kind. Third, the abuse is sometimes excused by others in the surrounding community, even those who should most clearly understand why it was wrong. When all three come together, people often report that this last betrayal, that of their community, was the most damaging (Aixalà 2022).

## 4 Impact of Traumatic Psychedelic Experiences

### 4.1 *Trauma-Related Psychopathology*

Traumatic experiences of any kind can cause characteristic symptoms which vary from mild to severe and develop over time. Trauma-related psychopathology is characterized by five clusters of symptoms triggered by a traumatic event: re-experiencing the event, avoidance of reminders of the event, hyperarousal, negative changes in mood and cognition, and dissociative symptoms (APA 2013). In the short term, these symptoms characterize acute stress disorder (ASD), which arises within a few days in 14–36% of trauma-exposed adults (Geoffrion et al. 2022). In the long term, traumatic events can precipitate depression, anxiety, adjustment disorder, or, in the most severe cases, PTSD, which affects about 4% of trauma survivors (APA 2013; Kessler et al. 2017; Sayed et al. 2015).

For our purposes, we define trauma-related psychopathology as any symptoms of ASD or PTSD from the abovementioned five clusters which appear to have been triggered by a traumatic psychedelic experience, even when criteria for a disorder are not met. We chose this intentionally broad definition because it allows us to discuss a large spectrum of potential problems people may encounter after traumatic psychedelic experiences, including but not limited to severe syndromes like PTSD.

Survey studies of lasting difficulties after psychedelic experiences, mostly in recreational users, suggest that some challenging experiences may trigger trauma-related psychopathology. Firstly, 74% of post-trip difficulties follow “very” or “extremely” challenging psychedelic experiences, suggesting that they are related



to the nature of the experience and not mere drug exposure (Evans et al. 2023). Up to 67% of people experiencing post-trip difficulties also report no pre-existing mental health problems, suggesting that the psychedelic experience did not always simply exacerbate a pre-existing condition (Evans et al. 2023). Finally, there is substantial overlap between symptoms triggered by distressing psychedelic experiences and trauma-related psychopathology. Table 1 presents a detailed comparison of post-trip difficulties from four studies with trauma-related symptoms from the DSM-5 and ICD-11. We discuss this comparison below.

In studies of post-trip difficulties, re-experiencing has taken the form of intrusive and distressing memories of the psychedelic experience, nightmares related to it, and distress at reminders of it (Argyri et al. 2024; Bremler et al. 2023). Symptoms of hyperarousal have included sleep disturbances, difficulty concentrating or thinking clearly, hypervigilance, and irritability (Bremler et al. 2023; Carbonaro et al. 2016; Evans et al. 2023; Simonsson et al. 2023). Avoidance of reminders of the experience has not been specifically assessed, though one survey found that 5% of people reported fear of specific events or objects triggered by a psychedelic trip without specifying further (Evans et al. 2023). Finally, though no studies have specifically assessed ASD or PTSD, one formal diagnosis of psychedelic-induced PTSD was captured in a study of “bad trips” on psilocybin ( $N = 1993$ ) (Carbonaro et al. 2016).

Negative changes in mood and cognition are also well represented in the literature on post-psychedelic difficulties. Studies consistently identify anxiety as one of the most common and severe symptoms, affecting up to 81% of people with post-trip difficulties (Bouso et al. 2022; Bremler et al. 2023; Carbonaro et al. 2016; Evans et al. 2023; Robinson et al. 2024b; Simonsson et al. 2023). Depressive symptoms, feelings of isolation from others, and persistent guilt or shame are also relatively common. Negative changes in beliefs or expectations about oneself, the world, or other people can be frequent in trauma survivors, and after traumatic psychedelic experiences, these have included specific fears of going insane, feeling unsafe in the world or in one’s own mind, and fear of social ostracism (Argyri et al. 2024; Evans et al. 2023).

Derealization and depersonalization are also associated with trauma exposure and affect 15–16% of people with post-trip difficulties, making them some of the most common symptoms (Evans et al. 2023; Simonsson et al. 2023) (see also chapter by Michal on Psychedelic-Related Depersonalization and Derealization in this volume). Derealization denotes a feeling of being detached from the world or feeling as if the world is unreal or dreamlike; depersonalization denotes a pronounced feeling of detachment from one’s own behavior, thoughts, memories, and identity (APA 2013). Both are thought to be a protective mechanism against the impact of severe trauma (Lanius et al. 2012; Murphy 2023). Persistent dissociative symptoms are associated with greater severity of trauma-related pathology (Lanius et al. 2012). Similarly, one study of post-trip difficulties reported a 47% prevalence rate for derealization in a subgroup of subjects with relatively severe symptoms (Bremler et al. 2023).

How frequent are these symptoms? After a challenging psychedelic experience, up to 24% of people may develop symptoms lasting longer than a week (Carbonaro et al. 2016), and up to 4.5% of people may feel functionally impaired for longer than

**Table 1** Trauma-related symptoms from the DSM-5 and ICD-11 descriptions of PTSD and their comparison to similar symptoms reported in four studies of lasting difficulties following challenging psychedelic experiences, primarily in recreational users. Note that people may have trauma-related symptoms which do not fulfill criteria for PTSD. All studies used a pre-defined list of symptoms except for Evans et al. (2023). Carbonaro et al. (2016) and Simonsson et al. (2023) recorded only symptoms triggered by a challenging experience, while Evans et al. (2023) and Bremner et al. (2023) included any psychedelic experience. \*Finding is from a smaller sample of relatively severe cases

Trauma-related symptoms		Studies of post-psychedelic difficulties			
ICD-11	DSM-5	Carbonaro et al. (2016) (N = 1993)	Evans et al. (2023) (N = 608)	Bremner et al. (2023) (N = 32)	Simonsson et al. (2023) (N = 613)
<i>Exposure to traumatic stressor</i>					
Exposure to an event or situation of an extremely threatening or horrific nature	Exposure to actual or threatened death, serious injury, or sexual violence	Single worst "bad trip": 100%	Triggering experience rated as "extremely challenging": 47%; "very challenging": 28%	Triggering experience was "negative or frightening": 73%*	Experienced a challenging, difficult, or distressing experience: 41%
<i>Re-experiencing</i>					
Intrusive memories or images	Intrusive distressing memories		Intrusive thoughts: 7%		Re-experience of stressful event in the past: 16%
			Resurfaced trauma: 6%		
Repetitive dreams or nightmares	Distressing dreams		Sleep problems and nightmares: 9%		
Flashbacks <sup>a</sup>	Flashbacks of the event		Flashbacks, feeling of repeating experience: 7%	Flashbacks of psychedelic experience: 67%*	
Strong or overwhelming emotions during re-experiencing	Distress at reminders of event				
Strong physical sensations during re-experiencing	Physiological reaction to reminders of event				

<i>Avoidance</i> Avoidance of thoughts and memories related to event	Avoidance of memories, thoughts, feelings associated with event				
	Avoidance of external reminders of event			Fear of specific events or objects: 5%	
	<i>Hypervigilance</i>				
	Irritable behavior, angry outbursts			Anger, frustration, irritability: 6%	Bothered by little things: 18%
	Reckless or self-destructive behavior				
Hypervigilance, feeling of being under threat	Hypervigilance			Hyperarousal, hypersensitivity, hypervigilance: 5%	
	Exaggerated startle response				
	Problems with concentration			Difficulty thinking clearly: 9%; difficulty concentrating, focusing: 2%	Difficulty thinking or making decisions: 24%
	Sleep disturbances			Sleep problems and nightmares: 9%	Difficulty sleeping: 28%
<i>Negative moods and cognitions</i>					
	Inability to remember event				
Exaggerated negative beliefs or expectations				Diminished or disempowered self: 9%	
				Fear of going mad/insane: 6%	
				Fear of permanent damage to brain or self: 6%	
				Feeling unsafe: 6%	
				Fear of death: 6%	

(continued)

Table 1 (continued)

Trauma-related symptoms		Studies of post-psychedelic difficulties			
ICD-11	DSM-5	Carbonaro et al. (2016) (N = 1993)	Evans et al. (2023) (N = 608)	Bremner et al. (2023) (N = 32)	Simonsson et al. (2023) (N = 613)
General dysphoria (anxiety, panic, anger, shame, sadness, humiliation, guilt)	Distorted cognitions about cause or consequences of event				
	Negative emotional state (fear, horror, anger, guilt, or shame)	Anxiety: 16%; fear: 13%; paranoia: 9%	Anxiety, fear, worry: 26%; panic attacks: 9%; challenging emotions: 7%; shame, guilt: 7%	Anxiety: 81%; panic: 63%; psychological distress: 53%; paranoia: 16%	Feeling anxious: 36%
	Diminished interest in activities	Depression: 12%	Depression: 12%	Depression: 47%	Trouble enjoying things: 14%
Social withdrawal	Inability to experience positive emotions		Low mood, bad mood, sadness, anhedonia: 8%	Complete loss of pleasure: 41%	
	Detachment, estrangement from others		Sense of disconnection from others/society: 13%	Feelings of isolation, stigmatization: 60%*	Feeling distant or cut off from people: 20%
<i>Dissociative symptoms</i>					
Dissociative symptoms	Depersonalization		Depersonalization, dissociation: 16%		
	Derealization		Derealization: 15%	Derealization: 47%*	Feeling disconnected from everything: 24%
<i>Other relevant features</i>					
<i>Symptom duration</i>		>1 week: 24%	>1 week: 76%	>72h: 100%	>1 week: 4.5%
			>1 month: 66%		>1 month: 3.4%
		>1 year: 10%	>1 year: 32%		>1 year: 1.1%

<i>Functional impairment</i>				Difficulty performing in career, studying 6%		Somewhat impaired: 16%
						Moderately impaired: 8.2%
						Severely impaired: 4.6%
<i>Suicidality, self-harm</i>			Increased suicidality: 0.3%	Thoughts of suicide or self-harm: 6%	Suicidal thinking, planning, or behavior: 31%	Thoughts of hurting oneself: 4.6%
					Self-harm: 3%	Attempts to harm oneself: 1.5%
<i>Sought professional help</i>			7.6%			2.6%

<sup>a</sup>Note that psychedelic “flashbacks” are distinct from post-traumatic flashbacks. See also chapter on Flashbacks and Hallucinogen Persisting Perceptual Disorder (HPPD) by Žuljević & Majić in this volume

a week (Simonsson et al. 2023). It is unclear whether these numbers differ for traumatic psychedelic experiences. In general, traumatic stressors not involving interpersonal malice (e.g., accidents, natural disasters) tend to have a relatively favorable outcome, with only about 16% of victims developing ASD and 2% developing PTSD (Geoffrion et al. 2022; Kessler et al. 2017). One could speculate that rates of psychopathology after traumatic psychedelic experiences not involving interpersonal malice may resemble those seen after non-fatal accidents or natural disasters. However, unique characteristics of psychedelic-induced trauma could conceivably affect the rate of trauma-related symptoms, including the unusual nature of the experience or physiological drug effects like psychedelics' purported impact on neuroplasticity (Calder and Hasler 2023).

Overall, the literature suggests an overlap between many typical symptoms arising after extremely challenging psychedelic trips and trauma-related psychopathology. Importantly, studies thus far have not differentiated traumatic experiences from challenging experiences, most people with some trauma-related symptoms never meet criteria for PTSD, and not all post-trip difficulties are triggered by trauma. Nevertheless, recognizing some post-trip difficulties as potential trauma reactions is reasonable when an extremely distressing psychedelic experience apparently triggers symptoms with a known relationship to traumatic stress.

## 4.2 Risk Factors

Susceptibility to trauma-related symptoms depends on the severity of the traumatic experience, as well as characteristics of the individual and the context they were in. Trauma-related psychopathology is more likely when the perceived threat during a traumatic event was more severe, when the negative emotional response was more intense, and when the victim experienced peritraumatic dissociation (Ozer et al. 2003). Likewise, more intensely negative psychedelic experiences are associated with more and longer-lasting post-trip difficulties (Evans et al. 2023). Relatedly, severe dissociation during challenging experiences in psychedelic therapy is a sign that the therapeutic benefit of that session is probably limited, and rescue medication may be needed to reduce the risk of traumatic memory formation (see chapter by Koslowski and Gasser in this volume (Koslowski and Gasser 2024)).

Some individuals may be more prone to trauma-related symptoms, including those with a previous history of trauma, psychiatric problems, and lower developmental maturity (Carlson and Dalenberg 2000). The context of psychedelic use may also greatly impact prognosis. The relatively low prevalence of lasting symptoms after challenging experiences in controlled settings may reflect the ability of those settings to de-escalate frightening psychedelic experiences, but also the presence of social support immediately following the experience (see Sect. 5 below). Additionally, controlled settings usually attempt to screen out participants with an elevated risk of adverse reactions.

Finally, the severity and expression of trauma-related symptoms can vary based on the meaning attributed to a traumatic event and the sociocultural context surrounding it (Marsella 2010). This has interesting implications for the impact of traumatic psychedelic experiences, which take place in a wide variety of cultural (and subcultural) contexts that affect how they are interpreted (Dupuis 2022). For example, someone who interprets a frightening psychedelic experience as a demonic attack may have a different prognosis than someone who interprets a similar experience through a materialistic lens. In dealing with traumatic psychedelic experiences, the impact of the meaning given to the experience should always be considered.

## 5 Preventing Traumatic Psychedelic Experiences

Prevention involves both stopping a psychedelic experience from becoming traumatic in the first place and increasing resilience to trauma-related psychopathology. The risk of traumatic psychedelic experiences can be minimized similarly to that of challenging experiences more broadly. The safest settings reduce risk in five broad ways: (1) controlling substance purity and dose, (2) screening volunteers and practitioners for suitability, (3) thorough preparation for the experience, (4) providing a safe and supportive environment during the experience, and (5) ensuring support after the experience if needed. Here, we focus specifically on minimizing the risk of traumatic psychedelic experiences by considering findings on resilience to high-stress situations.

Research on primary prevention of PTSD shows that a combination of psychoeducation and skills-based training can reduce the incidence of trauma-related psychopathology after high-stress situations (Miao et al. 2018). Individuals with a strong social support network and flexible active coping skills are also more resilient to traumatic stressors (Horn et al. 2016; Matheson et al. 2020). Applied to psychedelic experiences, people may be more resilient to stress if they have contact with supportive friends and family, are well-informed about what to expect, and learn active coping skills for navigating the experience (McAlpine et al. 2024). Relatedly, a representative study of psychedelics users found that first psychedelic experiences were both more challenging and more likely to cause lasting negative effects than later ones, conceivably due to inexperience with navigating the altered state (Goldy et al. 2024).

Psychoeducation before a psychedelic experience should ensure realistic expectations about drug effects and about the physical and social environment in which the experience will take place. This requires some finesse: Discussions of potential adverse effects should inform people about what to expect and empower them to cope with difficult feelings, yet avoid stoking overly negative expectations which could lead to “nocebo” effects (Colloca and Miller 2011). Highly unusual or disorienting effects, such as ego dissolution or time dilation, deserve particular attention because they are easier for unprepared people to misinterpret in a

threatening way. It is equally important to identify and correct any exaggerated perceptions of risk that could cause anxiety during the experience, for example, exaggerated fears of LSD-induced psychosis.

Psychoeducation is most effective when combined with skills-based trainings for coping with potential stressors (Miao et al. 2018). Navigating psychedelic experiences is a skill that can be learned, at least to some degree. Relevant coping skills reduce susceptibility to trauma by increasing one's ability to control stressful situations, in line with a robust body of research showing that the risk of PTSD is greater in people who felt less able to control the traumatic event (Carlson and Dalenberg 2000; Horn et al. 2016). In particular, the use of active coping strategies, in which people use their own resources to manage a stressor or their perception of it, is associated with reduced risk for PTSD (Carroll 2020; Thompson et al. 2018). Research in people with high exposure to traumatic stressors suggests that pre-trauma interventions teaching relaxation, mindfulness, and situation-specific active coping skills can reduce susceptibility to traumatic stress (Antony et al. 2020; Horn et al. 2016).

Relaxation techniques may be particularly important in psychedelic experiences. Deep breathing, progressive muscle relaxation, and similar exercises can be taught during preparatory sessions and may even be associated with antidepressant efficacy in psychedelic therapy (Calder et al. 2024). Increasing relaxation before and during psychedelic trips allows individuals to reduce nervousness or anxiety on their own, potentially strengthening feelings of mastery and security early on in the experience. Mindfulness and similar meditation techniques, which train the ability to focus awareness on the present moment, can also improve resilience to highly stressful events (Chopko et al. 2018; Christopher et al. 2015). In psychedelic experiences, there is some evidence that experienced meditators are at reduced risk of anxiety and other adverse psychological effects (Azmoodeh et al. 2023; Smigielski et al. 2019).

Relaxation and mindfulness can also be combined with guided imagery and mental rehearsal of a future stressful scenario, which has been shown to reduce anxiety, distress, heart rate reactivity, and other predictors of PTSD (Arble et al. 2017; Arnetz et al. 2008; Shipley and Baranski 2002). Mental rehearsal can easily be tailored to psychedelic experiences, for example, by rehearsing one's reaction to anxiety or specific difficult personal topics that may arise. It may also be used to teach other active coping skills for use in psychedelic experiences, including various ways for interacting with aspects of the experience, but also the ability to "let go" and accept a temporary loss of control. Here lies an interesting paradox: Though psychedelic experiences are notoriously uncontrollable to some degree, one's ability to "let go" and accept the lack of control actually exerts control over the experience by removing feelings of resistance or fear that could otherwise become intensified by the substance (Wolff et al. 2020).

Asking for help when needed is also an active coping skill. In controlled settings, empathetic and competent facilitators who have established a solid basis of trust are an important safety factor (Aicher et al. 2024). Facilitators ensure the physical safety of the setting, guide people through coping with overwhelming drug effects, and use various other techniques to reduce distress (Koslowski and Gasser 2024). They can



also counteract worries for one's safety before they become potentially traumatizing. For example, fears of never emerging from the altered state are not uncommon with psychedelics (Calder and Hasler 2024). Facilitators can often successfully interrupt this worry, and the importance of such reassurance can be inferred from reports of traumatic psychedelic experiences in which a fear of being trapped in the altered state ran unchecked (Argyri et al. 2024).

Finally, potentially traumatic psychedelic experiences appear more likely with increasing dose (Simonsson et al. 2023). Higher doses are more overwhelming and tend to cause stronger anxiety and other negative drug effects (Holze et al. 2021). It is advisable that inexperienced individuals begin with moderate doses, e.g., no more than 100 µg LSD or 20 mg psilocybin. High doses with the goal of inducing complete ego dissolution or a mystical experience are not necessary for therapeutic benefit, and both psycholytic and psychedelic therapies have successfully used moderate starting doses with a possibility for increasing the dose if needed (Calder et al. 2024; Passie et al. 2022). Additionally, people who successfully cope with a moderate stressor may become more resilient to later stressors (Horn et al. 2016), suggesting that a high-dose psychedelic experience could be more manageable in someone who has already practiced handling lower doses.

## **6 Recovery from Traumatic Psychedelic Experiences**

### ***6.1 Guidelines for Immediate Response***

Once a potentially traumatic psychedelic experience has occurred, the immediate priorities are ensuring safety and social support. It is also important not to overreact: Most adults recover from traumatic events without professional intervention (Kessler et al. 2017; Steger and Park 2012), and there is no known immediate intervention that generally prevents PTSD (Qi et al. 2016). Some early interventions (e.g., psychological debriefing) may be worse than doing nothing at all, potentially because they undermine innate coping skills or prolong perceptions of threat (Mayou et al. 2000; Rose et al. 2002; Sayed et al. 2015).

For recovery to begin, the perception of threat must end as soon as possible (Sayed et al. 2015). After traumatic psychedelic experiences, some people continue to feel threatened and hypervigilant even after frightening drug effects subside (Argyri et al. 2024; Sayed et al. 2015). Hyperarousal may respond to relaxation techniques, which can help the nervous system to a normal state (Matheson et al. 2020). It is also important to counteract any exaggerated fears about permanent damage, psychosis, or other severe adverse effects, some of which stem from stigma or lack of information. Relaxation techniques and evidence-based information are relatively accessible and can be used in most settings, including harm reduction sites or emergency departments.

Social support is also critical, and it is most effective when it matches an individual's perceived needs (Horn et al. 2016; Matheson et al. 2020; Wang et al.

2021). Support after traumatic psychedelic experiences may be most helpful when it allows people to share and make sense of their experience while feeling validated and accepted, and when it connects people to others who have gone through something similar (Robinson et al. 2024a, b). By contrast, interactions with people who either stoke exaggerated fears about adverse effects or have rigid, overly positive views of psychedelics are unlikely to be helpful and may contribute to feelings of isolation. Peer and family support may be particularly helpful for regulating anxiety after psychedelic experiences (Robinson et al. 2024a, b).

Facilitators are an important source of support if a potentially traumatic psychedelic experience takes place in a supervised setting, and counseling from an existing care team may be more beneficial than external interventions (Koslowski and Gasser 2024). A meta-analysis of psychological interventions immediately following traumatic births found that low-intensity counseling from midwives or doctors reduced the rate of subsequent PTSD symptoms, while high-intensity interventions delivered by external therapists showed mixed results (Taylor Miller et al. 2021). These findings could be taken to suggest that the best course of action immediately after traumatic psychedelic experiences is the standard practice of conducting integration sessions, avoiding drastic external interventions until specifically indicated. Even psychedelic experiences which could endanger someone's psychological integrity may instead be worked with therapeutically when skilled facilitators are at hand. Importantly, facilitators themselves also need a strong support network, including intervention and supervision (Aicher et al. 2024).

Finally, guidelines for ending a potentially traumatic psychedelic experience often recommend rescue medication as a last resort (Johnson et al. 2008; Koslowski and Gasser 2024). The most common are benzodiazepines and atypical antipsychotics (e.g., olanzapine), and the 5-HT<sub>2A</sub>R antagonist ketanserin may also safely reduce psychedelic effects (Becker et al. 2023). Rescue medication is a sensible measure in principle, given that longer-lasting distress during a psychedelic experience is associated with more severe negative aftereffects (Carbonaro et al. 2016). However, the efficacy of any specific medication for preventing negative outcomes is unclear. Concerningly, administering benzodiazepines immediately after a traumatic event may increase the risk of PTSD by interfering with extinction learning (Campos et al. 2022; Qi et al. 2016), though it is not clear whether this would apply to ending a traumatic psychedelic experience with benzodiazepines. Ketanserin may be an alternative, but its slow onset time (up to 2.5 h) is a disadvantage (Becker et al. 2023). Due to this lack of clarity, documenting outcomes after administration of different rescue medications is vital for improving clinical practice.

## 6.2 *Treatment of Psychedelic-Induced Trauma*

After trauma exposure not involving malicious intent, approximately 40% of diagnosed PTSD cases remit within 3 months without any treatment, and 53% remit within 1 year (Santiago et al. 2013). Spontaneous remission is also common in less

severe cases of trauma-related pathology, including adjustment disorder (Kazlauskas et al. 2022). After challenging psychedelic experiences, 58–76% of people with psychological symptoms at 1 week recover within 1 year (Carbonaro et al. 2016; Simonsson et al. 2023). For those who do need help, existing trauma interventions may be beneficial, and there is also interest in developing psychedelic-specific interventions.

Interventions based on cognitive behavioral therapy (CBT) and exposure therapy may be the most effective for treating trauma-related symptoms (Watts et al. 2013). There is also some evidence in favor of eye movement desensitization and reprocessing (EMDR) (Astill Wright et al. 2021; Miao et al. 2018). Meditation may be an effective adjunct treatment for PTSD in some people (Hilton et al. 2017). However, the efficacy of therapeutic interventions for symptoms of traumatic stress can vary based on trauma type (Qi et al. 2016), and more research is needed to determine which interventions are the most effective for psychedelic-induced trauma.

Some psychedelic-specific interventions have begun to appear, drawing both from established trauma interventions and from various “psychedelic integration” techniques (Aixalà 2022; Bathje et al. 2022; Hasler 2022a). These include various techniques for cognitive and emotional processing, contemplative practices, grounding exercises, and other methods whose effectiveness may vary according to the specific symptoms involved (Argyri et al. 2024; Robinson et al. 2024a, b). Though their effectiveness has not been studied, these techniques place a strong emphasis on meaning-making which is worth discussing. Possibly influenced by psychedelics’ strong meaning-enhancing properties (Hartogsohn 2018), integration of challenging psychedelic experiences emphasizes finding meaning in the experience, theorizing that understanding why it happened can resolve symptoms and reveal important lessons (Aixalà 2022). The ability to find meaning in adverse experiences, though not typically a direct target of trauma interventions, is associated with resilience to traumatic stress (Horn et al. 2016).

Studies of meaning-making as a coping mechanism after challenging psychedelic experiences reveal common themes with accounts of post-traumatic growth, including greater self-knowledge, recognition of previously untapped personal strengths, gratitude for everyday life in contrast with the traumatic event, empathy for the suffering of others, and strengthened social relationships (Gashi et al. 2021; Tedeschi and Calhoun 2004a, b). Many people find ways to use a traumatic event as a catalyst for positive change (Jayawickreme and Blackie 2014; Tedeschi and Calhoun 2004a, b), and between 67% and 90% of people report positive long-term consequences or valuable lessons from challenging psychedelic experiences, even when they also caused persisting difficulties (Carbonaro et al. 2016; Johnstad 2021; Ona 2018). Importantly, the existence of post-traumatic growth does not imply that traumatic psychedelic experiences are desirable or that people should be rushed to find the good in a horrific experience (Tedeschi and Calhoun 2004a, b). However, in navigating the difficult aftermath of a traumatic psychedelic experience, some will undoubtedly find the possibility of growth encouraging.

Finally, the existence of traumatic psychedelic experiences may have interesting implications for MDMA-assisted therapy, which appears to be effective for treating PTSD caused by a variety of traumatic stressors (Mitchell et al. 2021). MDMA tends to inhibit fear responses and cause milder alterations in consciousness than classic psychedelics, and it is also associated with fewer post-trip difficulties (Evans et al. 2023; Hasler 2022b). Relatedly, around 7% of people with post-trip difficulties report that further psychedelic experiences helped them recover from a bad one that caused lasting symptoms (Robinson et al. 2024a, b). In general, a history of traumatic psychedelic experiences may be a relative contraindication for psychedelic therapy due to the risk of re-traumatization via re-entering an altered state. However, it is not an absolute contraindication when extremely careful preparation of the individual and their environment can ensure that the therapy is conducted safely, and controlled re-exposure to an altered state may even be helpful as a form of exposure therapy. Future research may explore whether the careful use of MDMA-assisted therapy is effective for psychedelic-induced trauma symptoms.

## 7 Conclusions and Outlook

People who use psychedelics may seek healing, spirituality, introspection, or even pleasure—and many find it. But a minority instead encounter a horrific experience they never asked for, whether due to frightening drug effects, re-traumatization, or external events negatively impacting the experience. Excessive dose, lack of preparation for the experience, and unsafe settings make these potentially traumatic psychedelic experiences more likely. While many people recover on their own, others may struggle with trauma-related symptoms for months or even years. Addressing these cases as traumatic events gives us a plausible framework for understanding, preventing, and investigating them further.

The existing trauma literature suggests ways to protect against traumatic psychedelic experiences and support people afterward. The risk may be minimized by using moderate doses, ensuring a social support system, providing detailed psychoeducation about psychedelics' effects, and practicing relaxation, mindfulness, and other active coping skills before undergoing an experience. After a potentially traumatic psychedelic experience, people should encounter compassionate support from friends, family, clinicians, and peers, as well as evidence-based information about their prognosis (i.e., that a full recovery is likely). Relaxation techniques can aid recovery by reducing threat perception and nervous system arousal, and potentially harmful interventions (e.g., debriefing) should be avoided. When trauma-related symptoms persist, people may benefit from CBT, exposure therapy, and other evidence-based trauma therapies, and what helps may vary by specific symptoms. There is also evidence that finding meaning in the traumatic experience may greatly benefit those inclined to do so.

Though findings on psychological trauma and challenging psychedelic experiences provide a start, there is a need to study the prevalence, prevention, and

treatment of psychedelic-induced trauma more precisely. The prevalence of traumatic psychedelic experiences in different settings, as well the frequency and duration of traumatic stress symptoms, could be investigated using psychedelic-specific adverse effects questionnaires like the Swiss Psychedelic Side Effects Inventory (Calder and Hasler 2024), as well as questionnaires specific to trauma symptoms. Systematic study of preparedness for psychedelic experiences, as well as research on the safety and efficacy of rescue medication, is needed for improving prevention of traumatic psychedelic experiences. Finally, research on effective treatments for trauma symptoms after psychedelic experiences is needed to determine which treatments are effective in this population, including CBT, exposure therapy, EMDR, psychedelic integration techniques, or even MDMA-assisted therapy.

Alongside psychedelics' clear therapeutic potential, a genuine understanding of these substances requires confronting the existence of traumatic psychedelic experiences. They appear to be both relatively rare and highly preventable, and their existence is not a reason to prohibit the use of psychedelics in safe and supportive contexts. Instead, improving education and research on traumatic psychedelic experiences can help make them even rarer than they already are.

## References

- Aicher H, Duffour C, Liechti ME, Zullino D, Gasser P (2024) Treatment recommendations Psychedelic-assisted therapy (PAT). *Swiss Arch Neurol Psychiatr Psychother* 175:1488043038
- Aixalà M (2022) Psychedelic integration: psychotherapy for non-ordinary states of consciousness. Synergetic Press, Santa Fe
- Aixalà M (2024) Deepening psychedelic integration: exploring complex settings, understanding user's struggles, and implementing safe interventions. *Curr Top Behav Neurosci*. [https://doi.org/10.1007/7854\\_2024\\_532](https://doi.org/10.1007/7854_2024_532)
- Antony J, Brar R, Khan PA, Ghassemi M, Nincic V, Sharpe JP, Straus SE, Tricco AC (2020) Interventions for the prevention and management of occupational stress injury in first responders: a rapid overview of reviews. *Syst Rev* 9(1):121. <https://doi.org/10.1186/s13643-020-01367-w>
- APA (2013) Diagnostic and statistical manual of mental disorders : DSM-5™, 5th edn. American Psychiatric Association
- Arble E, Lumley MA, Pole N, Blessman J, Arnetz BB (2017) Refinement and preliminary testing of an imagery-based program to improve coping and performance and prevent trauma among urban police officers. *J Police Crim Psychol* 32(1):1–10. <https://doi.org/10.1007/s11896-016-9191-z>
- Argyri EK, Evans J, Luke D, Michael P, Michelle K, Rohani-Shukla C, Suseelan S, Prideaux E, McAlpine R, Murphy-Beiner A, Robinson O (2024) Navigating Groundlessness: An interview study on dealing with ontological shock and existential distress following psychedelic experiences. Available at SSRN 4817368
- Arnetz BB, Nevedal DC, Lumley MA, Backman L, Lublin A (2008) Trauma resilience training for police: psychophysiological and performance effects. *J Police Crim Psychol* 24(1):1–9. <https://doi.org/10.1007/s11896-008-9030-y>

- Astill Wright L, Horstmann L, Holmes EA, Bisson JI (2021) Consolidation/reconsolidation therapies for the prevention and treatment of PTSD and re-experiencing: a systematic review and meta-analysis. *Transl Psychiatry* 11(1):453. <https://doi.org/10.1038/s41398-021-01570-w>
- Azmooideh K, Thomas E, Kamboj SK (2023) Meditation trips: a thematic analysis of the combined naturalistic use of psychedelics with meditation practices. *Exp Clin Psychopharmacol* 31(3): 756–767. <https://doi.org/10.1037/pha0000617>
- Barrett FS, Bradstreet MP, Leoutsakos JS, Johnson MW, Griffiths RR (2016) The challenging experience questionnaire: characterization of challenging experiences with psilocybin mushrooms. *J Psychopharmacol* 30(12):1279–1295. <https://doi.org/10.1177/0269881116678781>
- Bathje GJ, Majeski E, Kudowor M (2022) Psychedelic integration: an analysis of the concept and its practice. *Front Psychol* 13:824077. <https://doi.org/10.3389/fpsyg.2022.824077>
- Becker AM, Klaiber A, Holze F, Istampoulouoglou I, Duthaler U, Varghese N, Eckert A, Liechti ME (2023) Ketanserin reverses the acute response to LSD in a randomized, double-blind, placebo-controlled, crossover study in healthy participants. *Int J Neuropsychopharmacol* 26(2):97–106. <https://doi.org/10.1093/ijnp/pyac075>
- Bouso JC, Andion O, Sarris JJ, Scheidegger M, Tofoli LF, Opaleye ES, Schubert V, Perkins D (2022) Adverse effects of ayahuasca: results from the global Ayahuasca survey. *PLOS Glob Public Health* 2(11):e0000438. <https://doi.org/10.1371/journal.pgph.0000438>
- Bremner R, Katati N, Shergill P, Erritzoe D, Carhart-Harris RL (2023) Case analysis of long-term negative psychological responses to psychedelics. *Sci Rep* 13(1):15998. <https://doi.org/10.1038/s41598-023-41145-x>
- Britton WB, Lindahl JR, Cooper DJ, Canby NK, Palitsky R (2021) Defining and measuring meditation-related adverse effects in mindfulness-based programs. *Clin Psychol Sci* 9(6): 1185–1204. <https://doi.org/10.1177/2167702621996340>
- Brunet A, Weiss DS, Metzler TJ, Best SR, Neylan TC, Rogers C, Fagan J, Marmar CR (2001) The Peritraumatic Distress Inventory: a proposed measure of PTSD criterion A2. *Am J Psychiatry* 158(9):1480–1485. <https://doi.org/10.1176/appi.ajp.158.9.1480>
- Buchborn T, Kettner HS, Kartner L, Meinhardt MW (2023) The ego in psychedelic drug action - ego defenses, ego boundaries, and the therapeutic role of regression. *Front Neurosci* 17: 1232459. <https://doi.org/10.3389/fnins.2023.1232459>
- Calder AE, Hasler G (2023) Towards an understanding of psychedelic-induced neuroplasticity. *Neuropsychopharmacology* 48(1):104–112. <https://doi.org/10.1038/s41386-022-01389-z>
- Calder AE, Hasler G (2024) Validation of the Swiss Psychedelic Side Effects Inventory: Standardized assessment of adverse effects in studies of psychedelics and MDMA. *J Affect Disord* 365: 258–264. <https://doi.org/10.1016/j.jad.2024.08.091>
- Calder AE, Rausch B, Liechti ME, Holze F, Hasler G (2024) Naturalistic psychedelic therapy: the role of relaxation and subjective drug effects in antidepressant response. *J Psychopharmacol* 38(10):873–886. <https://doi.org/10.1177/02698811241278873>
- Campos B, Passos RBF, Coutinho ESF, Vieira NCP, Leal KB, Mendlowicz MV, Figueira I, Luz MP, Marques-Portela C, Vilete LMP, Berger W (2022) To BDZ or not to BDZ? That is the question! Is there reliable scientific evidence for or against using benzodiazepines in the aftermath of potentially traumatic events for the prevention of PTSD? A systematic review and meta-analysis. *J Psychopharmacol* 36(4):449–459. <https://doi.org/10.1177/0269881122108046>
- Carbonaro TM, Bradstreet MP, Barrett FS, MacLean KA, Jesse R, Johnson MW, Griffiths RR (2016) Survey study of challenging experiences after ingesting psilocybin mushrooms: acute and enduring positive and negative consequences. *J Psychopharmacol* 30(12):1268–1278. <https://doi.org/10.1177/0269881116662634>
- Carlson EB, Dalen C (2000) A conceptual framework for the impact of traumatic experiences. *Trauma Violence Abuse* 1(1):4–28
- Carroll L (2020) Active coping. In: *Encyclopedia of Behavioral Medicine*. Springer, Cham, p 25
- Chopko BA, Papazoglou K, Schwartz RC (2018) Mindfulness-based psychotherapy approaches for first responders: from research to clinical practice. *Am J Psychother* 71(2):55–64. <https://doi.org/10.1176/appi.psychotherapy.20180015>

- Christopher MS, Goerling RJ, Rogers BS, Hunsinger M, Baron G, Bergman AL, Zava DT (2015) A pilot study evaluating the effectiveness of a mindfulness-based intervention on cortisol awakening response and health outcomes among law enforcement officers. *J Police Crim Psychol* 31(1):15–28. <https://doi.org/10.1007/s11896-015-9161-x>
- Colloca L, Miller FG (2011) The nocebo effect and its relevance for clinical practice. *Psychosom Med* 73(7):598–603. <https://doi.org/10.1097/PSY.0b013e3182294a50>
- Dai R, Larkin TE, Huang Z, Tarnal V, Picton P, Vlisides PE, Janke E, McKinney A, Hudetz AG, Harris RE, Mashour GA (2023) Classical and non-classical psychedelic drugs induce common network changes in human cortex. *NeuroImage* 273:120097. <https://doi.org/10.1016/j.neuroimage.2023.120097>
- Diehl V, Calder A, Hasler G (2024) Evaluating the helioscope effect: factor analysis and validation of a novel instrument for psychedelic experiences. *American College of Neuropsychopharmacology*, Phoenix
- Duckworth MP, Follette VM (2012) *Retraumatization: assessment, treatment, and prevention*. Routledge/Taylor & Francis Group
- Dupuis D (2022, Oct) The socialization of hallucinations: cultural priors, social interactions, and contextual factors in the use of psychedelics. *Transcult Psychiatry* 59(5):625–637. <https://doi.org/10.1177/13634615211036388>
- Evans J (2024) Did Compass minimize adverse experiences in its psilocybin trial? <https://www.ecstaticintegration.org/p/did-compass-minimize-adverse-experiences>
- Evans J, Robinson OC, Argyri EK, Suseelan S, Murphy-Beiner A, McAlpine R, Luke D, Michelle K, Prideaux E (2023) Extended difficulties following the use of psychedelic drugs: a mixed methods study. *PLoS One* 18(10):e0293349. <https://doi.org/10.1371/journal.pone.0293349>
- Gashi L, Sandberg S, Pedersen W (2021) Making “bad trips” good: how users of psychedelics narratively transform challenging trips into valuable experiences. *Int J Drug Policy* 87:102997. <https://doi.org/10.1016/j.drugpo.2020.102997>
- Geoffrion S, Goncalves J, Robichaud I, Sader J, Giguere CE, Fortin M, Lamothe J, Bernard P, Guay S (2022) Systematic review and meta-analysis on acute stress disorder: rates following different types of traumatic events. *Trauma Violence Abuse* 23(1):213–223. <https://doi.org/10.1177/1524838020933844>
- Goldy SP, Du BA, Rohde JS, Nayak SM, Strickland JC, Ehrenkranz R, Levine M, Barrett FS, Yaden DB (2024) Psychedelic risks and benefits: a cross-sectional survey study. *J Psychopharmacol*:2698811241292951. <https://doi.org/10.1177/02698811241292951>
- Hartogsohn I (2018) The meaning-enhancing properties of psychedelics and their mediator role in psychedelic therapy, spirituality, and creativity. *Front Neurosci* 12:129. <https://doi.org/10.3389/fnins.2018.00129>
- Hasler G (2022a) Higher Self – Psychedelika in der Psychotherapie. Klett-Cotta Verlag, Stuttgart. [English translation (2025): *Higher Self: Psychedelics in Psychotherapy*. Sentient Publications, Boulder, CO, USA.]
- Hasler G (2022b) Toward the “helioscope” hypothesis of psychedelic therapy. *Eur Neuropsychopharmacol* 57:118–119. <https://doi.org/10.1016/j.euroneuro.2022.02.006>
- Healy CJ (2021) The acute effects of classic psychedelics on memory in humans. *Psychopharmacology* 238(3):639–653. <https://doi.org/10.1007/s00213-020-05756-w>
- Hill CE, Castonguay LG, Farber BA, Knox S, Stiles WB, Anderson T, Angus LE, Barber JP, Beck JG, Bohart AC, Caspar F, Constantino MJ, Elliott R, Friedlander ML, Goldfried MR, Greenberg LS, Grosse Holtforth M, Hayes AM, Hayes JA, Heatherington L, Ladany N, Levy KN, Messer SB, Muran JC, Newman MG, Safran JD, Sharpless BA (2012) Corrective experiences in psychotherapy: definitions, processes, consequences, and research directions. In: *Transformation in psychotherapy: corrective experiences across cognitive behavioral, humanistic, and psychodynamic approaches*. American Psychological Association, pp 355–370



- Hilton L, Maher AR, Colaiaco B, Apaydin E, Sorbero ME, Booth M, Shanman RM, Hempel S (2017) Meditation for posttraumatic stress: systematic review and meta-analysis. *Psychol Trauma* 9(4):453–460. <https://doi.org/10.1037/tra0000180>
- Hofmann A (2013) *LSD: My Problem Child*. Oxford University Press, USA
- Holze F, Vizeli P, Ley L, Muller F, Dolder P, Stocker M, Duthaler U, Varghese N, Eckert A, Borgwardt S, Liechti ME (2021) Acute dose-dependent effects of lysergic acid diethylamide in a double-blind placebo-controlled study in healthy subjects. *Neuropsychopharmacology* 46(3): 537–544. <https://doi.org/10.1038/s41386-020-00883-6>
- Holze F, Caluori TV, Vizeli P, Liechti ME (2022) Safety pharmacology of acute LSD administration in healthy subjects. *Psychopharmacology* 239(6):1893–1905. <https://doi.org/10.1007/s00213-021-05978-6>
- Horn SR, Charney DS, Feder A (2016) Understanding resilience: new approaches for preventing and treating PTSD. *Exp Neurol* 284(Pt B):119–132. <https://doi.org/10.1016/j.expneurol.2016.07.002>
- Jayawickreme E, Blackie LER (2014) Post-traumatic growth as positive personality change: evidence, controversies and future directions. *Eur J Personal* 28(4):312–331. <https://doi.org/10.1002/per.1963>
- Johnson M, Richards W, Griffiths R (2008) Human hallucinogen research: guidelines for safety. *J Psychopharmacol* 22(6):603–620. <https://doi.org/10.1177/0269881108093587>
- Johnstad PG (2021) Day trip to hell: a mixed methods study of challenging psychedelic experiences. *J Psychedelic Stud* 5(2):114–127. <https://doi.org/10.1556/2054.2021.00155>
- Kazlauskas E, Elklit A, Truskauskaitė I (2022) A longitudinal course of ICD-11 adjustment disorder symptom profiles: a 12-month follow-up study. *Psychopathology* 55(6):373–381. <https://doi.org/10.1159/000525630>
- Keri S (2022) Trauma and remembering: from neuronal circuits to molecules. *Life (Basel)* 12(11): 1707. <https://doi.org/10.3390/life12111707>
- Kessler RC, Aguilar-Gaxiola S, Alonso J, Benjet C, Bromet EJ, Cardoso G, Degenhardt L, de Girolamo G, Dinolova RV, Ferry F, Florescu S, Gureje O, Haro JM, Huang Y, Karam EG, Kawakami N, Lee S, Lepine JP, Levinson D, Navarro-Mateu F, Pennell BE, Piazza M, Posada-Villa J, Scott KM, Stein DJ, Ten Have M, Torres Y, Viana MC, Petukhova MV, Sampson NA, Zaslavsky AM, Koenen KC (2017) Trauma and PTSD in the WHO world mental health surveys. *Eur J Psychotraumatol* 8(5):1353383. <https://doi.org/10.1080/20008198.2017.1353383>
- Koslowski M, Gasser P (2024) Guiding through challenging psychedelic experiences and “bad trips”. In: Majic T (ed) *Psychedelic harm reduction*. Springer, Berlin, Heidelberg
- Lanius RA, Brand B, Vermetten E, Frewen PA, Spiegel D (2012) The dissociative subtype of posttraumatic stress disorder: rationale, clinical and neurobiological evidence, and implications. *Depress Anxiety* 29(8):701–708. <https://doi.org/10.1002/da.21889>
- Malone TC, Mennenga SE, Guss J, Podrebarac SK, Owens LT, Bossis AP, Belser AB, Agin-Liebes G, Bogenschutz MP, Ross S (2018) Individual experiences in four cancer patients following psilocybin-assisted psychotherapy. *Front Pharmacol* 9:256. <https://doi.org/10.3389/fphar.2018.00256>
- Marsella AJ (2010) Ethnocultural aspects of PTSD: an overview of concepts, issues, and treatments. *Traumatology* 16(4):17–26. <https://doi.org/10.1177/1534765610388062>
- Matheson K, Asokumar A, Anisman H (2020) Resilience: safety in the aftermath of traumatic stressor experiences. *Front Behav Neurosci* 14:596919. <https://doi.org/10.3389/fnbeh.2020.596919>
- Mayou RA, Ehlers A, Hobbs M (2000) Psychological debriefing for road traffic accident victims. Three-year follow-up of a randomised controlled trial. *Br J Psychiatry* 176(6):589–593. <https://doi.org/10.1192/bjp.176.6.589>
- McAlpine RG, Blackburne G, Kamboj SK (2024) Development and psychometric validation of a novel scale for measuring ‘psychedelic preparedness’. *Sci Rep* 14(1):3280. <https://doi.org/10.1038/s41598-024-53829-z>



- Miao XR, Chen QB, Wei K, Tao KM, Lu ZJ (2018) Posttraumatic stress disorder: from diagnosis to prevention. *Mil Med Res* 5(1):32. <https://doi.org/10.1186/s40779-018-0179-0>
- Mitchell JM, Bogenschutz M, Lilienstein A, Harrison C, Kleiman S, Parker-Guilbert K, Ot'alora GM, Garas W, Paleos C, Gorman I, Nicholas C, Mithoefer M, Carlin S, Poulter B, Mithoefer A, Quevedo S, Wells G, Klaire SS, van der Kolk B, Tzarfaty K, Amiaz R, Worthy R, Shannon S, Woolley JD, Marta C, Gelfand Y, Hapke E, Amar S, Wallach Y, Brown R, Hamilton S, Wang JB, Coker A, Matthews R, de Boer A, Yazar-Klosinski B, Emerson A, Doblin R (2021) MDMA-assisted therapy for severe PTSD: a randomized, double-blind, placebo-controlled phase 3 study. *Nat Med* 27(6):1025–1033. <https://doi.org/10.1038/s41591-021-01336-3>
- Mitchell JM, Ot'alora GM, van der Kolk B, Shannon S, Bogenschutz M, Gelfand Y, Paleos C, Nicholas CR, Quevedo S, Balliett B, Hamilton S, Mithoefer M, Kleiman S, Parker-Guilbert K, Tzarfaty K, Harrison C, de Boer A, Doblin R, Yazar-Klosinski B, Group MSC (2023) MDMA-assisted therapy for moderate to severe PTSD: a randomized, placebo-controlled phase 3 trial. *Nat Med* 29(10):2473–2480. <https://doi.org/10.1038/s41591-023-02565-4>
- Mithoefer MC, Feduccia AA, Jerome L, Mithoefer A, Wagner M, Walsh Z, Hamilton S, Yazar-Klosinski B, Emerson A, Doblin R (2019) MDMA-assisted psychotherapy for treatment of PTSD: study design and rationale for phase 3 trials based on pooled analysis of six phase 2 randomized controlled trials. *Psychopharmacology* 236(9):2735–2745. <https://doi.org/10.1007/s00213-019-05249-5>
- Murphy RJ (2023) Depersonalization/derealization disorder and neural correlates of trauma-related pathology: a critical review. *Innov Clin Neurosci* 20(1–3):53–59. <https://www.ncbi.nlm.nih.gov/pubmed/37122581>
- Ona G (2018) Inside bad trips: exploring extra-pharmacological factors. *J Psychedelic Stud* 2(1): 53–60. <https://doi.org/10.1556/2054.2018.001>
- Osorio-Gomez D, Miranda MI, Guzman-Ramos K, Bermudez-Rattoni F (2023) Transforming experiences: neurobiology of memory updating/editing. *Front Syst Neurosci* 17:1103770. <https://doi.org/10.3389/fnsys.2023.1103770>
- Ozer EJ, Best SR, Lipsey TL, Weiss DS (2003) Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychol Bull* 129(1):52–73. <https://doi.org/10.1037/0033-2909.129.1.52>
- Passie T, Guss J, Krahenmann R (2022) Lower-dose psycholytic therapy – a neglected approach. *Front Psych* 13:1020505. <https://doi.org/10.3389/fpsy.2022.1020505>
- Qi W, Gevonden M, Shalev A (2016) Prevention of post-traumatic stress disorder after trauma: current evidence and future directions. *Curr Psychiatry Rep* 18(2):20. <https://doi.org/10.1007/s11920-015-0655-0>
- Robinson OC, Evans J, Luke D, McAlpine R, Sahely A, Fisher A, Sundeman S, Ketzitidou Argyri E, Murphy-Beiner A, Michelle K, Prideaux E (2024a) Coming back together: a qualitative survey study of coping and support strategies used by people to cope with extended difficulties after the use of psychedelic drugs. *Front Psychol* 15:1369715. <https://doi.org/10.3389/fpsyg.2024.1369715>
- Robinson OC, Evans J, McAlpine RG, Argyri EK, Luke D (2024b) An investigation into the varieties of extended difficulties following psychedelic drug use: duration, severity and helpful coping strategies. *J Psychedelic Stud*. <https://doi.org/10.1556/2054.2024.00420>
- Rose S, Bisson J, Churchill R, Wessely S (2002) Psychological debriefing for preventing post traumatic stress disorder (PTSD). *Cochrane Database Syst Rev* 1:CD000560. <https://doi.org/10.1002/14651858.CD000560>
- Ross LK, Nickles D (2022) Cover story podcast: Open-heart surgery. *The Cut*. <https://www.thecut.com/2022/03/cover-story-podcast-open-heart-surgery.html>
- Rundel M (2022) Psychedelic psychoanalysis: transformations of the self. *Psychoanal Dialogues* 32(5):469–483
- Santiago PN, Ursano RJ, Gray CL, Pynoos RS, Spiegel D, Lewis-Fernandez R, Friedman MJ, Fullerton CS (2013) A systematic review of PTSD prevalence and trajectories in DSM-5 defined trauma exposed populations: intentional and non-intentional traumatic events. *PLoS One* 8(4): e59236. <https://doi.org/10.1371/journal.pone.0059236>

- Sayed S, Iacoviello BM, Charney DS (2015) Risk factors for the development of psychopathology following trauma. *Curr Psychiatry Rep* 17(8):612. <https://doi.org/10.1007/s11920-015-0612-y>
- Schmid Y, Liechti ME (2018) Long-lasting subjective effects of LSD in normal subjects. *Psychopharmacology* 235(2):535–545. <https://doi.org/10.1007/s00213-017-4733-3>
- Shipley P, Baranski JV (2002) Police officer performance under stress: a pilot study on the effects of visuo-motor behavior rehearsal. *Int J Stress Manag* 9(2):71–80
- Shulgin AT, Shulgin A (1997) *TiHKAL: The Continuation*. Transform Press, Berkeley
- Simonsson O, Hendricks PS, Chambers R, Osika W, Goldberg SB (2023) Prevalence and associations of challenging, difficult or distressing experiences using classic psychedelics. *J Affect Disord* 326:105–110. <https://doi.org/10.1016/j.jad.2023.01.073>
- Smigielski L, Kometer M, Scheidegger M, Krahenmann R, Huber T, Vollenweider FX (2019) Characterization and prediction of acute and sustained response to psychedelic psilocybin in a mindfulness group retreat. *Sci Rep* 9(1):14914. <https://doi.org/10.1038/s41598-019-50612-3>
- Steger MF, Park CL (2012) The creation of meaning following trauma: meaning making and trajectories of distress and recovery. In: *Trauma therapy in context: the science and craft of evidence-based practice*, pp 171–191. <https://doi.org/10.1037/13746-008>
- Taylor Miller PG, Sinclair M, Gillen P, McCullough JEM, Miller PW, Farrell DP, Slater PF, Shapiro E, Klaus P (2021) Early psychological interventions for prevention and treatment of post-traumatic stress disorder (PTSD) and post-traumatic stress symptoms in post-partum women: a systematic review and meta-analysis. *PLoS One* 16(11):e0258170. <https://doi.org/10.1371/journal.pone.0258170>
- Tedeschi RG, Calhoun LG (2004a) Posttraumatic growth: a new perspective on psychotraumatology. *Psychiatr Times* 21(4):58–60
- Tedeschi RG, Calhoun LG (2004b) Posttraumatic Growth: Conceptual Foundations and Empirical Evidence. *Psychol Inq* 15(1):1–18. [https://doi.org/10.1207/s15327965pli1501\\_01](https://doi.org/10.1207/s15327965pli1501_01)
- Thompson NJ, Fiorillo D, Rothbaum BO, Ressler KJ, Michopoulos V (2018) Coping strategies as mediators in relation to resilience and posttraumatic stress disorder. *J Affect Disord* 225:153–159. <https://doi.org/10.1016/j.jad.2017.08.049>
- Vance MC, Kovachy B, Dong M, Bui E (2018) Peritraumatic distress: a review and synthesis of 15 years of research. *J Clin Psychol* 74(9):1457–1484. <https://doi.org/10.1002/jclp.22612>
- Wang Y, Chung MC, Wang N, Yu X, Kenardy J (2021) Social support and posttraumatic stress disorder: a meta-analysis of longitudinal studies. *Clin Psychol Rev* 85:101998. <https://doi.org/10.1016/j.cpr.2021.101998>
- Watts BV, Schnurr PP, Mayo L, Young-Xu Y, Weeks WB, Friedman MJ (2013) Meta-analysis of the efficacy of treatments for posttraumatic stress disorder. *J Clin Psychiatry* 74(6):e541–e550. <https://doi.org/10.4088/JCP.12r08225>
- Watts R, Day C, Krzanowski J, Nutt D, Carhart-Harris R (2017) Patients' accounts of increased "connectedness" and "acceptance" after psilocybin for treatment-resistant depression. *J Humanist Psychol* 57(5):520–564. <https://doi.org/10.1177/0022167817709585>
- Weiss B, Wingert A, Erritzoe D, Campbell WK (2023) Prevalence and therapeutic impact of adverse life event reexperiencing under ceremonial ayahuasca. *Sci Rep* 13(1):9438. <https://doi.org/10.1038/s41598-023-36184-3>
- WHO (2019) *International Classification of Diseases, Eleventh Revision (ICD-11)*. <https://icd.who.int/browse11>
- Wittmann M (2015) Modulations of the experience of self and time. *Conscious Cogn* 38:172–181. <https://doi.org/10.1016/j.concog.2015.06.008>
- Wolff M, Evens R, Mertens LJ, Koslowski M, Betzler F, Grunder G, Jungaberle H (2020) Learning to let go: a cognitive-behavioral model of how psychedelic therapy promotes acceptance. *Front Psych* 11:5. <https://doi.org/10.3389/fpsy.2020.00005>
- Yao Y, Guo D, Lu TS, Liu FL, Huang SH, Diao MQ, Li SX, Zhang XJ, Kosten TR, Shi J, Bao YP, Lu L, Han Y (2024) Efficacy and safety of psychedelics for the treatment of mental disorders: a systematic review and meta-analysis. *Psychiatry Res* 335:115886. <https://doi.org/10.1016/j.psychres.2024.115886>