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Psychedelics and hypnosis: Commonalities and therapeutic implications

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ABSTRACT

Background

Recent research on psychedelics and hypnosis demonstrates the value of both methods in the treatment of a range of psychopathologies with overlapping applications and neurophenomenological features. The potential of harnessing the power of suggestion to influence the phenomenological response to psychedelics toward more therapeutic action has remained unexplored in recent research and thereby warrants empirical attention.

Aims

Here we aim to elucidate the phenomenological and neurophysiological similarities and dissimilarities between psychedelic states and hypnosis in order to revisit how contemporary knowledge may inform their conjunct usage in psychotherapy.

Methods

We review recent advances in phenomenological and neurophysiological research on psychedelics and hypnosis and we summarize early investigations on the coupling of psychedelics and hypnosis in scientific and therapeutic contexts.

Results/Outcomes

We highlight commonalities and differences between psychedelics and hypnosis that point to the potential efficacy of combining the two in psychotherapy. We propose multiple research paths for coupling these two phenomena at different stages in the preparation, acute phase, and follow-up of psychedelic-assisted psychotherapy in order to prepare, guide, and integrate the psychedelic experience with the aim of enhancing therapeutic outcomes.

Conclusions/Interpretation

Harnessing the power of suggestion to modulate response to psychedelics could enhance their therapeutic efficacy by helping to increase the likelihood of positive responses, including mystical-type experiences.

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1. Introduction

Alterations of consciousness have aided therapeutic processes in a variety of practices from ancient shamanism to approaches used in contemporary psychotherapy (Buckley and Galanter, 1979). Psychedelic-induced states of consciousness have been used as a central feature of many religious, sacramental, and medicinal practices a variety of cultures (Schultes and Hofman, 1979). Psychedelics induce profound changes in perception, thought, affect, and self-awareness (Preller and Vollenweider, 2018) and are recognized as agents capable of eliciting deeply personal and spiritually meaningful experiences (so-called mystical-type experiences) associated with sustained beneficial effects on personality and on psychological well-being (Griffiths et al., 2008; MacLean et al., 2011; Griffiths et al., 2011; Schmid and Liechti, 2017). In the last decade, we have witnessed a surge in research exploring the impact of psychedelics, such as lysergic acid diethylamide (LSD) and psilocybin, on psychological and brain functions (Carhart-Harris et al., 2012; 2016a; De Araujo et al., 2012; Kraehenmann et al., 2015; Kometer et al., 2015; Tagliazucchi et al., 2016) and in psychotherapy (Carhart-Harris et al., 2016b; Griffiths et al., 2016; Ross et al., 2016; Johnson et al., 2014; Garcia-Romeu et al., 2015; Bogenschutz et al. 2015; for reviews, see Carhart-Harris and Goodwin 2017; Liechti, 2017). It is increasingly being recognized that research on psychedelics has the potential to inform our understanding of the neurobiology of psychiatric disorders and consciousness in general and to provide a platform upon which the therapeutic benefits of alterations in consciousness can be safely harnessed and studied.

Hypnosis began as a therapeutic discipline in the eighteenth century and is considered as the first western conception of psychotherapy: the first time a spoken interaction between a doctor and a patient was thought to have therapeutic potential (Ellenberger, 1970). Hypnosis is a mind-body intervention that consists of a set of procedures comprising the administration of verbal suggestions for alterations in affect, cognition, and perception (Elkins, 2017). The therapeutic potential of hypnosis has been documented since its origins, but it is only recently that the method has experienced a renewed interest for clinicians with accumulating evidence for its efficacy for the treatment of multiple symptoms and conditions (Patterson and Jensen 2003; Hasan et al., 2014; Elkins et al., 2013; Schaefert et al. 2014; for reviews, see Elkins, 2017; Terhune et al., 2017). Recent cognitive and neurophysiological studies have begun to elucidate the underlying bases of hypnosis and have shown that manipulation of subjective awareness with hypnotic suggestion can provide insights into brain mechanisms involved in pain, perception, attention, motor control, sense of agency, and executive control (for reviews, see Oakley and Halligan, 2013; Terhune et al., 2017). Moreover, mounting evidence points to the promise of using hypnotic suggestion to model and experimentally modulate conscious states that are otherwise challenging to control, such as pathological symptoms (Woody and Szechtman, 2011; Oakley and Halligan, 2013) or anomalous experiences (Hastings, 2006; Lynn et al., 2017; Zeev-Wolf et al., 2017).

Despite multiple phenomenological parallels, recent research on psychedelics and hypnosis has occurred largely in isolation. By contrast, earlier research highlighted overlapping characteristics between these phenomena (Barber,

1970) and the potential for joint use in psychotherapy (Levine and Ludwig, 1966). In particular, the potential of harnessing the power of suggestion to influence the response to psychedelics may have implications for both clinical and basic research. In this article, we review recent advances that suggest commonalities between these two phenomena. Against this backdrop, we revisit early investigations on the coupling of psychedelics and hypnosis in scientific and therapeutic contexts and conclude by describing potential applications of hypnosis in psychedelics-assisted psychotherapy.

2. Psychedelics

Classic psychedelics, such as LSD, mescaline, psilocybin, and N, N dimethyltryptamine (DMT) exert their hallucinatory effects primarily through activation of serotonin 2A receptor (5-HT_{2A}) (González-Maeso et al., 2007; for a comprehensive review, see Nichols, 2016). There is broad consensus that response to psychedelics depends on a confluence of factors referred to as "drug, set, and setting" (Zinberg, 1986). These include the drug dosage, the user's psychological profile, current mood state, pre-drug history, response expectancies, and social and environmental context. Psychedelics are generally regarded as non-addictive (Fantegrossi et al., 2004) and as safe when used in an adapted setting and with well-prepared participants (Johnson et al., 2008; Studerus et al., 2011; Schmid et al., 2015). Moreover, large population studies suggest that their long-term use is not associated with increased risk for mental health problems (Johansen and Krebs, 2015), but rather with reduced psychological distress and suicidality (Hendricks et al., 2015).

Neurophysiology

The neurophysiology of the psychedelic experience has been shown to be characterized by changes in the dynamics and connectivity patterns of resting state networks (RSNs; for reviews, see Dos Santos et al., 2016; Barrett and Griffiths, 2017). Psychedelics induce a global increase in cerebral metabolic rate in frontal regions of the brain (Vollenweider et al. 1997; Hermle et al., 1992). EEG and MEG research suggests that psychedelic states are characterized by a broadband desynchronization of cortical oscillations (Kometer et al., 2015; Muthukumaraswamy et al., 2013), including in several brain regions comprising well-established RSNs such as the default mode network (DMN) (Muthukumaraswamy et al., 2013; Palhano-Fontes et al., 2015; Kometer et al., 2015; Carhart-Harris et al., 2012; 2016a). Alteration of the efficiency of long-range communication between nodes of the DMN, decreased integrity, and increased desegregation of RSNs (Muthukumaraswamy et al., 2013; Kometer et al., 2015; Carhart-Harris et al., 2016a) have been proposed as the mechanisms underlying psychedelic experiences (for reviews, see Dos Santos et al., 2016; Barret and Griffiths, 2017). Despite some mixed and potentially conflicting evidence, this growing body of research reveals that classic psychedelics produce their effects by modulating cortical and subcortical regions involved in self-awareness, perception, affect processing, and executive and higher cognitive functions (Dos Santos et al., 2016; Barret and Griffiths, 2017).

Therapeutic potential

Psychedelic-assisted psychotherapy generally consists of one or more sessions during which the patient or participant ingests a predetermined dose of a psychedelic drug in a supportive environment. During the session, the therapist provides generally non-directive support for the subsequent experience of the individual. The individual may experience a range of psychological effects including extreme positive and negative emotions. Over the last decade, older clinical studies have been revisited with modern study designs, highlighting the therapeutic potential of psychedelics (for reviews, see Carhart-Harris and Goodwin, 2017; Liechti, 2017). In particular, psychedelic-assisted psychotherapy seems to hold promise in the treatment of depression (Carhart-Harris et al., 2016b), anxiety disorders (Griffiths et al., 2016; Ross et al., 2016), and nicotine and alcohol addiction (Johnson et al., 2014; Garcia-Romeu et al., 2015; Bogenschutz et al. 2015). Critically, multiple studies have reported an association between therapeutic outcome and measurable mystical-type experiences sometimes induced by the drug, suggesting that the nature and quality of one's response plays a significant role in therapeutic outcome (Johnson et al., 2014; Garcia-Romeu et al., 2015; Bogenschutz et al. 2015; Roseman et al., 2018). Despite the promising results of these preliminary studies, they suffer from methodological limitations such as small sample sizes, lack of comparison against conventional treatments, and the significant challenge of the inability to properly control for the placebo response.

3. Hypnosis

Hypnosis is a unique interpersonal method in which a therapist or experimenter uses verbal suggestion to modulate the conscious states of a patient or participant. A session typically consists of three phases: an *induction*, in which instructions and suggestions for reduced meta-awareness and absorption in the words of the experimenter are administered alongside the general suggestions to enter hypnosis (Terhune and Cardeña, 2016); a *suggestion* phase, in which one or more suggestions are given to modulate the contents of consciousness; and finally a *de-induction* phase, in which instructions and suggestions are administered in order to elicit a return to normal alertness with the potential administration of posthypnotic suggestions intended to take effect following termination of the session (e.g., Barnier and McConkey, 1999). Particularly among highly suggestible individuals, an induction is frequently accompanied by spontaneous alterations in self-related processing and perception (Pekala and Kumar, 2007). However, the evidence for the importance of hypnotic inductions in responsiveness to suggestions is mixed (Terhune and Cardeña, 2016), thereby highlighting the potential utility of applying suggestion in the absence of a formal induction procedure. In response to specific suggestions, highly suggestible individuals are capable of experiencing pronounced alterations in consciousness including hallucinations, amnesia, and cognitive deficits (Barnier et al., 2014). Responses to suggestions are typically accompanied by a lack of authorship over the response, as measured by both self-report and implicit perceptual indices (e.g., Lush et al., 2017; Polito et al., 2015), with reductions in the sense of agency being comparable in magnitude in highly suggestible individuals to phenomenological aberrations reported by patients with schizophrenia during passivity symptoms (Polito et al., 2015). Hypnosis can be conceptualized as a manifestation of the broader phenomena of suggestion and suggestibility (Halligan & Oakley, 2014) and has even been referred to a "non-deceptive placebo" (Kirsch, 1994). Response expectancies are known to be important contributing factors to responsiveness to both hypnotic suggestions and placebos (De Pascalis et al., 2002; Lynn et al., 2008). However, the available evidence indicates that a relationship between hypnosis and placebo, if one exists, is potentially complex and moderated by multiple factors (McGlashan et al., 1969; Woody et al., 1997; De Pascalis et al., 2002; De Pascalis and Scacchia 2016).

As measured by standard, and well-validated, behavioural scales (for a review, see Woody and Barnier, 2008), hypnotic suggestibility is normally distributed with approximately 10-15% of the population displaying low and high suggestibility and the remainder exhibiting moderate responsiveness (Laurence, et al., 2008). Hypnotic suggestibility exhibits trait-like stability over long periods of time (Piccione et al., 1989) and is at least partly hereditary (Morgan et al., 1970; Rominger et al., 2014). Nevertheless, hypnotic suggestibility has few known personality correlates, typically pertaining to absorption in activities, heightened responsiveness to social-emotional cues, and a propensity for self-transcendent experiences, although these effects are typically small in magnitude (Wickramasekera and Szlyk, 2003; Cardeña et al., 2009; Cardeña and Terhune, 2014; Lynn et al., 2015). Similarly, there are no known robust cognitive correlates of hypnotic suggestibility (Parris, 2017), although highly suggestible individuals seem to display heightened automaticity (Dixon and Laurence, 1992; Braffman and Kirsch, 2001), poorer working and short-term memory (Farvolden and Woody, 2004; Khodaverdi-Khani and Laurence, 2016; Terhune et al., 2011), and selectively impaired metacognition (Lush et al., 2016; Terhune and Hedman, 2017). Although hypnosis shares superficial similarity to meditation, recent research suggests that they are actually opposing metacognitive phenomena (Lush et al., 2016).

Neurophysiology.

During the past two decades, researchers have utilized neuroimaging techniques to study the neurophysiological correlates of response to hypnotic inductions and suggestions and individual differences in hypnotic suggestibility (Oakley and Halligan, 2013; Terhune et al., 2017). Although the field was traditionally occupied with the question of whether hypnosis constitutes an altered state of consciousness, contemporary research has directed attention toward more substantive questions pertaining to the correlates, characteristics, and mechanisms of response to hypnotic suggestions and individual differences in hypnotic suggestibility (Jensen et al., 2017). Accumulating data suggest that a hypnotic induction may produce a reduction in global, frontal or frontal-parietal functional connectivity, as measured by resting state EEG (for a review, see Terhune et al., 2017). Functional neuroimaging research has further shown that hypnosis seems to produce a selective reduction in activity of the anterior medial prefrontal cortex (McGeown et al., 2009; see also Deeley et al., 2012), which corresponds to the anterior node of the DMN (Greicius et al., 2009). Other research has similarly observed that the perception of being deeply hypnotized following an induction was associated with reduced functional connectivity between posterior cingulate cortex (PCC) and dorsolateral prefrontal cortex (DLPFC), decreased anterior cingulate cortex (ACC) activation, and increased connectivity between DLPFC and insula (Jiang et al., 2017). These results suggest that a hypnotic induction produces in highly suggestible individuals a reduction in self-related or metacognitive processing (Cardeña et al., 2013; Pekala and Kumar, 2007), coupled with atypical connectivity of the executive control network, which may reflect cognitive control with reduced awareness (Dienes and Perner, 2007). Most imaging studies indicate that hypnotic suggestions for altered perception engage neural systems that overlap with those of the genuine experience: for instance, suggestions for color hallucinations modulate fusiform areas including V4 (Kosslyn et al., 2000; McGeown et al., 2012) and suggestions for altered pain perception alter somatosensory areas and anterior cingulate cortex (ACC; Rainville et al., 1997; Derbyshire et al., 2004), although the neurophysiological correlates shared by responses to different hypnotic suggestions remain elusive (Oakley and Halligan, 2013; Terhune et al., 2017).

***Therapeutic potential*.**

In a clinical setting, hypnosis involves the administration of verbal suggestions and metaphors to guide individuals into dynamic, multimodal experiences with the aim of promoting emotional catharsis and desirable changes in perceptual experiences, self-image, behaviors, habits and general health as appropriate to the presenting symptom or condition (Lynn et al., 2010). Treatment strategies with hypnosis can include direct suggestion, symptom substitution, ego-strengthening and hypnoanalytic therapies (Elkins, 2017). The clinical efficacy of hypnosis is only weakly predicted by hypnotic suggestibility (Montgomery, Schnur, & David, 2011), plausibly because responsiveness to therapeutic suggestions is influenced by a range of non-hypnotic factors, such as patient motivation and response expectancies (e.g., Lynn et al., 2008). Moreover, many suggestions that are utilized in the therapeutic application of hypnosis do not require a high level of hypnotic suggestibility (Elkins, 2017). Accordingly, medium suggestible individuals are capable of responding, and potentially benefiting from, suggestions administered within clinical contexts (Lynn et al., 2010). Verbal suggestion can also be applied in the absence of hypnosis in a variety of contexts (Peerdeman et al., 2016; Amigó and Ferrández, 2015), thereby potentially removing the need for the explicit use of hypnosis *per se* (see also Terhune & Cardeña, 2016). Although the most recognized use of hypnosis is in the treatment or management of pain, such as in surgical contexts (Faymonville et al., 1995), there is reliable evidence for its efficacy in treating a range of conditions including acute and chronic pain (Patterson and Jensen 2003; Tome-Pires and Miro 2012), post-menopausal hot flashes (Elkins et al., 2013), irritable bowel syndrome (Schaefert et al. 2014), and enhancement of immunological functions (Miller and Cohen, 2001). Although less robust, promising, albeit preliminary, evidence suggests that hypnosis constitutes a potentially valuable option for treating depression (Alladin, 2007), anxiety (Hammond, 2010), nicotine addiction (Hasan et al., 2014), symptoms inherent to neurodegenerative disorders such as amyotrophic lateral sclerosis (Kleinbub et al., 2015), and dermatological problems (Shenefelt, 2000; for reviews, see Elkins, 2017; Terhune et al., 2017). Moreover, when hypnosis is used as an adjunct to non-hypnotic methods, such as cognitive behavioral therapy, therapeutic outcomes are often strongly amplified (Kirsch et al. 1995). In addition, preliminary evidence suggests that suggestibility may influence response to non-suggestion-based treatments (e.g., Nitzan et al., 2015), thus further highlighting the widespread presence and influence of suggestions in a variety of therapeutic contexts. Cumulatively, the available evidence indicates that hypnosis and suggestion-based interventions constitute safe (Bollinger, 2018) and efficacious interventions for treating a range of psychopathological and somatic symptoms.

4. Psychedelics and hypnosis

During the 1960-70s, several studies compared phenomenological parallels between psychedelics and hypnosis (Halpern, 1961; Gubel, 1962; Krippner, 1964; Barber, 1970; Grünholz, 1971) and explored the potential benefits of combining them in psychotherapy (Ludwig and Levine, 1965; Levine and Ludwig, 1966; Ludwig et al., 1969). Particularly relevant is the finding that psychedelics seem to enhance suggestibility (Sjoberg and Hollister 1965; Solursh and Rae, 1966; Middlefell, 1967; Netz and Engstam, 1968; Ulett et al., 1972; Van Nuys, 1972). Other research reported on the use of hypnosis to recreate psychedelic-like experiences (Fogel and Hoffer, 1962; Erickson, 1965; Tart, 1967; Aaronson, 1970; Baumann, 1970) or to control, guide, and deepen LSD-induced psychedelic experiences (Fogel and Hoffer, 1962; Levine, Ludwig, and Lyle, 1963; Levine and Ludwig, 1965) and to influence the subjects' experiential response to psychedelics with explicit suggestions (Levis and Mehlman, 1964). Here we revisit this seminal work and relate it to recent advances in our knowledge of these phenomena.

Hypnodelic treatment technique

Based on previous research on the potential of hypnosis in modulating the effects of LSD (Fogel and Hoffer, 1962), Ludwig and Levine hypothesised that hypnosis could be used in conjunction with LSD to enhance therapeutic outcome, an approach known as the *hypnodelic treatment technique* (Ludwig and Levine, 1965; Levine and Ludwig, 1966; Ludwig et al., 1969). They evaluated the coupling of these approaches in a randomized controlled trial in which 70 participants with drug addictions were randomly assigned to one of five treatment conditions: (i) LSD + hypnosis + psychotherapy (hypnodelic treatment), (ii) LSD + psychotherapy, (iii) LSD alone, (iv) psychotherapy, or (v) hypnosis + psychotherapy. In the hypnodelic treatment, a 45-minute induction was administered just after drug administration in order to temporally coincide the onset of the therapy with the onset of the psychedelic state. They reported that participants who received hypnodelic treatment showed greater improvement than those in the other conditions both at two weeks and two months post-treatment (Ludwig and Levine, 1965). All patients had responded positively on simple suggestibility assessments that ensured a moderate level of hypnotic suggestibility. Hypnotic suggestibility did not differ across treatment groups although it did seem to contribute to therapeutic outcomes. Ludwig and Levine proposed that the enhanced efficacy of hypnodelic treatment technique might be attributable to the mental calmness arising from hypnosis that may have better prepared patients to experience the effects of LSD, patients' enhanced acceptance of, and control over, the psychedelic experiences, greater participation in the therapeutic process, and deeper and more intense experiences afforded with this approach (Ludwig and Levine, 1965, Levine and Ludwig, 1966). A second clinical trial on alcoholism failed to report any beneficial effects with conditions i-iii (Ludwig et al., 1969), with the reason for this failure being unclear. Although preliminary and limited from a methodological perspective, this line of research points to the potential utility of coupling psychedelics and hypnosis, an approach that is likely to benefit considerably from recent advances in our understanding of both phenomena. In the following section, we review recent advances in neurophenomenological and clinical research pointing to overlapping characteristics of psychedelics and hypnosis.

Phenomenology

Levin and Ludwig (1965) reported that LSD and hypnotic experiences share overlapping phenomenology and this observation is borne out in recent research. In the context of neutral hypnosis, with the only suggestion being to go as deeply into hypnosis as possible, participants frequently report experiential responses strikingly similar to the phenomenology of psychedelic experiences, such as alterations in perception, body image, imagery, self-awareness, affect, time perception, and meaning (Cardeña, 2005; Cardeña et al., 2013). Beyond the spontaneous experiential response to an induction, it has been shown that hypnotic suggestion can be used to experimentally induce psychological states that closely resemble those experienced in response to psychoactive substances including psychedelics (Fogel and Hoffer, 1962; Baumann, 1970), narcotics (Ludwig and Lyle 1964) and MDMA (Hasting, 2006). Similarly, hypnotic suggestions can be used to elicit mystical-type experiences in highly suggestible individuals (Sacerdote 1977; Spanos and Moretti, 1988; Lynn and Evans, 2017). Lynn and Evans (2017) reported that 22% of participants (undergraduate volunteers) experienced a "complete" mystical-type experience, based on the criterion proposed by Barrett et al. (2015). In the same way as absorption predicts mystical-type experience with psychedelics, hypnotic suggestibility correlates with the propensity to experience hypnotically-suggested mystical-type experiences (Spanos and Moretti, 1988; Lynn and Evans, 2017). Although a recent investigation suggests that non-psychedelic-induced mystical-type experiences tend to be less intense and associated with lower positive existential impact than psychedelic-induced experiences (Yaden et al., 2017), it has not yet been determined whether and to what extent hypnotically-induced mystical-type experiences exert long-term beneficial effects on individuals.

LSD and mescaline, but not psilocybin, seem to enhance suggestibility to a similar extent as a hypnotic induction (Sjoberg and Hollister, 1965; Solursh and Rae, 1966; Netz and Engstam, 1968; Ulett et al., 1972; Carhart-Harris et al., 2015). The mechanisms underlying this augmentation remain unknown, but it may be due to a reduction in reality testing, metacognition, or modulation of executive functioning. Nonpharmacological factors such as expectation, preparation, intention, and physical and social environment all influence response to hypnosis and psychedelics (Kirsch, 2000; Zinberg, 1986). In addition, there is evidence for a shared psychological propensity for response to both phenomena: absorption, the individual tendency to experience episodes of intense attentional involvement (Tellegen and Atkinson, 1974), appears to be a reliable predictor of phenomenal response to psychedelics (Studerus et al., 2012) as well as hypnotic suggestibility (Cardeña and Terhune, 2014; but see Council et al., 1986; Roche and McConkey, 1990). Despite these commonalities, psychedelics and hypnosis clearly differ in their mode of induction: the former being psychopharmacological, and the latter being suggestion-based and occurring typically in an interpersonal context. The two phenomena are also temporally different: a psychedelic experience is limited in time relative to the metabolism and clearance of the drug from the body whereas a hypnotic experience can be easily terminated by the participant or therapist/experimenter at any time (although see Perry, 1977).

Neurophysiology

Neuroimaging studies have shown that both psychedelics and hypnosis affect the activity of several brain areas and networks, including prefrontal regions, cingulate cortex and the DMN (Pekala and Kumar, 2007; McGeown et al., 2009; Deeley et al 2012; Jiang et al., 2017; Vollenweider et al. 1997; Hermle et al., 1992; Carhart-Harris et al., 2012 and 2016a; Palhano-Fontes et al., 2015). Psychedelics seem to affect a larger set of brain regions and networks than hypnosis and induce broader changes specifically in frontal regions, medial temporal lobe, occipital cortex, hippocampus and amygdala (Dos Santos et al., 2016; Barrett and Griffiths, 2017). In addition, spontaneous phenomenological effects shared by the two phenomena seem to be associated with converse global functional connectivity patterns. For example, ego-dissolution under the influence of psychedelics was associated with increased connectivity (Tagliazucchi et al., 2016) whereas transcendent experiences following a hypnotic induction were associated with lower connectivity (Cardeña et al., 2013). One possibility for these discrepancies is that the relation between anomalous self-awareness and global functional connectivity adheres to an inverted-U shape with greater aberrations occurring with both lower and higher connectivity patterns. Alternatively, these differences may reflect distinct alterations in the experience of the self in these different conditions. Similarities in spontaneous experiential response to psychedelics and hypnosis may be explained in part by the modulation of the DMN and global functional connectivity. Prepulse inhibition (PPI) of the acoustic startle response, a parameter thought to reflect the early, pre-attentive stage of automatic sensory processing used to assess efficiency of the sensorimotor gating system, is disrupted in response to psilocybin (Vollenweider et al., 2007) and LSD (Schmid et al., 2015) and seems to be lower in highly suggestible individuals (Lichtenberg et al., 2008; Levin et al., 2011; Storozheva et al., 2018; but see De Pascalis and Russo, 2013). These results suggest a potentially overlapping mechanism underlying individual differences in hypnotic suggestibility and responsiveness to psychedelics, which may relate to the psychedelic enhancement of suggestibility (Carhart-Harris et al., 2015). Although the neurophysiological basis of hypnotically induced mystical-type experiences is unknown (Lynn and Evans, 2017), hypnotic suggestion often, but not always, produce a similar neurophysiological pattern as the actual phenomenon (Oakley and Halligan, 2013; Terhune et al., 2017), suggesting the viability of using hypnotic suggestion to reproduce psychedelics-occasioned mystical-type experiences (Barrett and Griffiths, 2017). Neurophenomenological parallels between hypnosis and psychedelics seem to offer a valuable platform where these two phenomena could mutually beneficiate each other.

5. Future directions

Recent research on psychedelics and hypnosis allows for revisiting their combined use in psychotherapy. Enhanced suggestibility under psychedelics and hypnosis may have implications for their use as adjuncts in psychotherapy, where suggestibility plays a significant role in therapeutic outcomes (Montgomery et al., 2011). Researchers and clinicians may already be harnessing the power of suggestion to modulate set and setting and, in turn, to influence the phenomenological response to psychedelics. Harnessing the effects of suggestion more explicitly may facilitate the development of a more precise understanding of the pharmacological and contextual factors influencing the psychedelic experience and a way to further enhance their therapeutic efficacy. In what follows, we propose several pathways concerning the conjunct use of hypnosis and psychedelics in order to prepare, guide, and integrate the psychedelic experience in order to enhance treatment efficacy.

Hypnosis-based training for participant preparation

Experience of hypnotically-suggested alterations in consciousness, including phenomenal states resembling psychedelic experiences, could be used as a preliminary training regimen to familiarize naïve participants with the experiential effects of psychedelics in a controlled setting. Such training may better prepare individuals to participate in psychedelic research or therapy and could potentially reduce pre- and/or post-treatment anxiety, and participant attrition, whilst augmenting positive response expectancies and involvement in the psychedelic experience. These complementary effects could increase the likelihood of safe and profound experiences and, concomitantly, successful therapeutic outcomes. Moreover, we expect, that similarly to absorption (Studerus et al., 2012), hypnotic suggestibility could constitute a valuable predictor of perceptual, cognitive, affective, and self-related phenomenological features of the psychedelic experience.

Hypnodelic treatment technique: using suggestion to guide psychedelic states

Ludwig and Levine reported that the conjunct use of hypnosis and psychedelics enabled them to enhance participants' experiential responses to LSD, rendering the experience more intense and malleable to control with potentially increased therapeutic efficacy (Levine and Ludwig, 1965; Ludwig and Levine, 1965). Moreover, as psychedelics seem to increase suggestibility (Sjoberg and Hollister 1965; Solursh and Rae, 1966; Netz and Engstam, 1968; Middlefell, 1967; Ulett et al., 1972; Van Nuys, 1972; Carhart-Harris et al., 2015), therapeutically coupling the two could further potentiate the impact of suggestions. Harnessing the power of suggestion to modulate response to psychedelics could exert considerable effects in enhancing their therapeutic efficacy including by guiding the psychedelic experience to increase the likelihood of positive responses, promote, or enhance, mystical-type experiences (e.g., Lynn and Evans, 2017) and avoid unwanted experiences. Moreover, posthypnotic suggestions, including suggestions for how the experience could be processed afterwards in terms of meaning, values, future life directions may further aid integration of the experience and carryover to everyday life. For these reasons, we maintain that a renewed attention should be directed to the development of a formalized suggestion-based psychedelic-assisted psychotherapy.

Hypnosis and mild dosages of psychedelics: Transversal applications

Drug dosage reduction for equivalent treatment outcome is an important goal in psychopharmacology. At present, little is known about the neurophenomenological effects (Greiner et al., 1958), and/or therapeutic potential, of psychedelics at low dosages and the dose level required to enhance suggestibility is unknown. Insofar as hypnotic suggestion may be useful in augmenting classical psychedelic experiences (Levine and Ludwig, 1965), it would be valuable to determine whether such an approach could be extended to mild dosages in order to evaluate whether suggestion can be used to similarly enhance weak psychedelic experiences.

Hypnosis for drug-free re-experiencing of psychedelic states

Several studies have shown that hypnosis can be used to induce mystical-type experiences (Sacerdote, 1977; Spanos and Moretti, 1988; Lynn et al., 2017). A potential benefit of combining psychedelics and hypnosis could be to use suggestions to reproduce such experiences in the days after psychedelics administration (e.g., Fogel and Hoffer 1962; Hasting, 2006). This approach may afford the potential for patients to re-experience the associated affective states, with greater control over the post-administration response to psychedelics-assisted therapy, thereby providing additional opportunities to harness the positive features of psychedelic experiences for therapeutic impact, with the potential to further enhance outcomes over a sustained period.

6. Conclusion

Recent clinical research on psychedelics-assisted psychotherapy and hypnosis demonstrates the value of both methods in the treatment of a range of conditions with overlapping applications and neurophenomenological features. Older research on the overlap of these two phenomena considered against the backdrop of recent advances clearly points to the potential of harnessing the power of suggestion to influence the phenomenological response to psychedelics. The coupling of psychedelics and hypnosis represents a potentially highly fertile platform for both basic research on alterations in consciousness as well as their exploitation in therapy and thereby warrants renewed empirical attention.

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