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Not New, but Nearly Forgotten: Hypnodelic Therapy as Treatment for Addiction

Literature Review

Hypnosis and psychedelics have long been used as adjuncts to psychotherapy for the treatment of various psychiatric disorders such as addiction. However, only a few patients respond to either hypnotherapy or psychedelic-assisted psychotherapy. Therefore, combining them (= “hypnodelic” therapy) might be beneficial for therapeutic outcomes. This review provides an outline of studies in which hypnosis and LSD were combined with psychotherapy in patients with drug addiction. Hypnodelic therapy has been found to produce significantly greater improvement in depression and anxiety of narcotic drug patients compared to other combinations of these treatment techniques. Additionally, hypnodelic therapy is suggested to produce the greatest alteration of consciousness. Possible mechanisms of action will be discussed. It is concluded that hypnodelic therapy deserves renewed scientific interest because it represents a promising treatment technique for patients with drug addiction.

Keywords: addiction; hypnodelic therapy; LSD; hypnosis; consciousness

INTRODUCTION

A century ago, it was recognized that patients with drug addiction are in desperate need of improved treatment. The efficacy of psychiatric treatments during that time (e.g., individual and group psychotherapy) was considered insufficient. Patients demonstrated a lack of motivation and their attendance at therapy sessions was unreliable. In fact, high discharge rates against-medical-advice were common (Ludwig & Levine, 1967, p.130).

Moreover, the large number of patients to be treated and the unsuccessful results of follow-up studies investigating the discharged patients, highlights the need for more effective treatment techniques (p.131).

Drug addiction or dependency develops after repeated substance use and includes several behavioural, cognitive as well as psychophysiological phenomena. A strong desire for the drug and loss of control lead to persistent use without acknowledging the harmful effects and neglect of other interests (World Health Organization, 2004). Neurologically, addiction is characterised by abnormal functioning of the default mode network (DMN) and disturbed interaction between the DMN and other large-scale networks (Zhang & Volkow, 2019). The high comorbidity of substance use disorders (SUD) and posttraumatic stress disorder (PTSD) ranging from 30 to 59 percent (Stewart et al., 2000) suggests that exposure to traumatic events can contribute to drug addiction. According to the self-medication hypothesis by Chilcoat and Breslau (1998), individuals

with PTSD believe that the substance use will relieve them from their symptoms. These PTSD-related symptoms might, in turn, represent a trigger of relapse (Norman et al., 2007).

Recovery from addiction is a multi-dimensional process. The motivation to change, self-efficacy, and social support are only some of the mechanisms promoting recovery (Bogenschutz & Pomy, 2012). Achieving altered states of consciousness might represent a basic human motive. As many addiction patients use these substances destructively to achieve altered states of consciousness (McPeake et al., 1991), treatments should offer alternative and less harmful means for this purpose. A failure to address this need of patients could negatively impact their motivation to change as well as increase craving and subsequently contribute to relapse. According to the “stage” model of addictions by Prochaska, DiClemente, and Norcross (1992), there are five stages of change. Precontemplation and contemplation require mainly cognitive processes. Following the preparation, action and maintenance are acquired by changing behavioural processes (Prochaska et al., 1992). Hence, it is important that treatments for addiction address cognitive, behavioural, and psychological processes that are involved in the recovery process.

Studies on psychedelic compounds such as lysergic acid diethylamide (LSD) demonstrate their clinical potential for patients with drug addiction by mobilizing biological and psychological processes (Bogenschutz & Pomy, 2012). LSD has been found to be effective for the treatment of alcoholism and opioid addiction (Krebs & Johansen, 2012; Ludwig & Levine, 1965). Psychedelic induced mystical experiences can trigger sudden and lasting behavioural

changes. Some studies indicate that this new state of consciousness or spiritual awakening might be a predictor of abstinence. Hallucinogens may also be able to increase motivation as well as self-efficacy and reduce craving (Bogenschutz & Pommy, 2012). Considering that reaching an alternate state of consciousness is part of the addictive process and most treatments lack alternatives to address this need of patients potentially increasing the risk of relapse (McPeake et al., 1991), psychedelics demonstrate great therapeutic potential in this field.

In the 1960s, it quickly became clear that this new approach of psychedelic treatment demanded for further research with bigger sample sizes but also techniques, such as hypnosis, that would enhance its therapeutic efficacy. Ludwig and Levine (1967) believed that it is important to control the LSD experience. More specifically, the aim is to channel the therapeutic potential of the psychedelic experience in order to maximize the probability of its therapeutic success. Notably, the perception altering qualities (e.g., temporal perception) of the drug were not held solely responsible for its therapeutic success and, thus, might only exert an indirect influence on the latter (Ludwig & Levine, 1967).

Various studies suggest the use of hypnosis to be potentially advantageous in modifying and structuring psychedelic experiences (Lemercier & Terhune, 2018; Oakley & Halligan, 2009; Gubel, 1962). The hallucinogenic and hypnotic experiences demonstrate some similarities such as an increase in introspection and experiences of depersonalizations (Gubel, 1962). Additionally, hypnotic suggestion has been found to be a powerful cognitive tool of hypnosis that can be

used to explore certain phenomena which are relevant to cognitive and clinical neuroscience (Oakley & Halligan, 2009). For instance, hypnotic suggestion can be used to study the responses to psychedelic drugs in a controlled fashion which might enhance their therapeutic efficacy (Lemercier & Terhune, 2018). Therefore, the combination of LSD and hypnosis seems promising not only in a psychotherapeutic setting but also with regards to fundamental research of human consciousness.

The term ‘hypnodelic’ is a blend of ‘hypnotic’ and ‘psychedelic’ which describes the states of consciousness evoked by the corresponding methods (i.e., hypnosis and acute psychedelic drug administration). Hypnodelic therapy is defined as the combination of psychedelic drugs, hypnosis, and psychotherapy. This review focusses on LSD as a psychedelic drug because the original studies from Ludwig and Levine (1965-1967) exclusively applied this drug probably due to its powerful anecdotes (Wesson, 2011) and remarkable potency (Johnson, 2018). Throughout this review, the term hypnodelic therapy will, therefore, refer to the combination of LSD, hypnosis, and psychotherapy.

Although psychedelics and hypnosis show multiple phenomenological parallels, the literature is scarce and most research on these topics has been carried out in isolation (Lemercier & Terhune, 2018). Both hypnosis and psychedelics remain controversial subjects. The “war on drugs” and the associated highly negative reputation of psychedelic substances displayed by the media as well as the criminalization led to the prohibition of many psychedelic substances during the mid-1960s. This, in turn, limits the availability

of scientific studies and literature on these treatments drastically (Dyck, 2005).

This review consists of three main parts. Namely, hypnotherapy, psychedelic therapy, and finally, hypnodelic therapy. The current review begins by examining hypnotherapy (the combination of hypnosis and psychotherapy), its use in the past, and its reported efficacy. It will then go on to the past findings regarding the adjunct use of LSD in a psychotherapeutic setting and its efficacy. By discussing the current state of research in terms of hypnosis and LSD as adjunct to psychotherapy individually, it should become apparent whether the combination of those treatment techniques has an additive value or not. In case of the latter, it is possible that both treatment techniques cancel each other's effectiveness out, are independent of one another or show a disadvantageous effect that would need further research and is beyond the scope of this review. The third part draws upon the entire review by evaluating studies of hypnodelic therapy, tying up the various theoretical and empirical strands. A discussion with limitations and implications of the findings for the psychotherapeutic treatment of drug addiction follows. Moreover, areas for further research are identified. Finally, the conclusion gives a concise summary and critique of the reviewed findings.

This review will examine the studies investigating the efficacy of treatment techniques involving LSD, hypnosis, and psychotherapy. In particular, it seeks to address the following question: Can hypnosis increase the efficacy of LSD utilization in psychotherapy for patients with drug addiction? On the one hand, critically reviewing past

research may be the first step towards an approved treatment technique with potentially high therapeutic efficacy. On the other hand, the conclusion might offer new insights into each of the treatment techniques individually and whether their combination could be beneficial for therapeutic outcomes.

Hypnotherapy

In general, hypnosis is described as a state of consciousness that involves not only focused attention but also reduced peripheral awareness achieved by the power of suggestion (American Society of Clinical Hypnosis). Suggestions can be defined as a request to experience an imaginary situation pretending for it to be real (Lynn et al., 2015). Clinical hypnosis is a mind-body intervention (Lemercier & Terhune, 2018) that is able to change physiological along with psychological functions of a patient in different ways. For instance, mental imagery and suggestions may complement the impact of presented ideas on the mind. Additionally, unconscious exploration during hypnosis can assist the understanding of motivations, experiences, and emotions (American Society of Clinical Hypnosis). Overall, hypnosis implements improvements in affect, cognition, and perception (Lemercier & Terhune, 2018) related to various psychopathologies such as depression and eating disorders (Alladin, 2010; Barabasz, 2007)

A standard session of clinical hypnosis normally consists of three phases of suggestions. Firstly, the induction is initiated by using suggestions for an enhanced absorption of the spoken words and

reduced metacognition. Further suggestions are given in the second phase to modulate the contents of consciousness. Finally, the deduction phase applies suggestions to restore normal alertness. Posthypnotic suggestions can be applied if recommended (Barnier & McConkey, 2014). Typically, patients feel a lack of authorship over the response to suggestions. This finding has been measured by self-reports as well as implicit perceptual indices. Hypnotic suggestibility is measured by well-validated behavioural scales and has been found to be normally distributed, stable over long periods of time, and to be at least somewhat hereditary (Piccione et al., 1989; Morgan et al., 1970).

In a clinical setting, hypnosis aims at stimulating emotional catharsis as well as beneficial changes in self-image, perceptions, behaviour (e.g., habits), and general health. Individual differences in certain factors such as the responses to hypnotic suggestibility are likely to affect the desired results. However, the association between the efficacy of hypnosis and hypnotic suggestibility was found to be weak due to a variety of non-hypnotic factors, such as the motivation and expectancies of the patient. Therefore, the responsiveness to hypnotic suggestions is not exclusively influenced by hypnotic factors (Montgomery et al., 2011; Lynn et al., 2008). Considering that suggestibility does not seem to influence the therapeutic outcome, hypnotherapy can be applied to a large group of patients.

Responses to hypnotic suggestions have certain neurophysiological correlates which are impaired in patients with drug addiction. Chronic alcohol addicts demonstrate a disruption of the dopamine receptor activity as well as cognitive functions in the

anterior medial prefrontal cortex (amPFC; Trantham-Davidson et al., 2014) In general, the mPFC contributes to the Theory of Mind (ToM, i.e., being able to consider the beliefs and intentions of others; Geng et al., 2017). Impairments of this function have been found in cocaine-dependent users but not in drug-naives (Sanvicente-Vieira et al., 2017). The amPFC is also part of the Default-Mode Network (DMN) involved in attention as well as functions of the ego such as reality testing (Carhart-Harris et al., 2015). This so-called resting state is characterised by low frequency oscillations and displays abnormal functional connectivity in heroin addicts. This abnormal functioning, in turn, results in a diminished cognitive control that may explain the hypersensitivity to drug related cues (Ma et al., 2011). Several experimental studies have investigated the activity of the DMN and found that it was reduced during hypnosis. More specifically, activity in the anterior parts of the DMN in highly suggestible people might reflect non-goal-directed cognitive activity or a so-called “state of readiness” in order to respond to subsequent suggestions (McGeown et al., 2009). Additionally, the global functional connectivity between the insula and dorsolateral prefrontal cortex (DLPFC) is higher under hypnotic suggestions and indicates reduced metacognition (Cardeña et al., 2013). The insula shows increased dopamine levels during drug intoxication and the DLPFC is more active in response to salient drug cues (Jasinska et al., 2014). However, the association between metacognitive beliefs and addictive behaviours is in need of further research (Spada et al., 2015). Remarkably, hypnosis has been found to influence brain plasticity positively (Halsband et al., 2009). This, in turn, can contribute to the reversion of a previously established

sensitisation to cocaine (Chen et al., 2008). Altogether, these neurophysiological effects following hypnosis might explain its therapeutic potential for patients with drug addiction on a neurophysiological basis.

Hypnosis is generally considered safe and an effective adjunct to psychotherapy. A systematic review of meta-analyses of randomized controlled trials studying medical hypnosis found no significantly higher rates of adverse effects resulting from hypnosis compared to control groups (Häuser et al., 2016). Hypnosis has been applied to an assortment of physical conditions (e.g., chronic pain and post-menopausal hot flashes) and likewise psychological conditions (e.g., anxiety and depression), but has also been proven to be particularly successful in the treatment of addictions such as nicotine, alcohol, and barbiturates (Hartman, 1972; Katz, 1980). Critically, success rates of conventional programs (i.e., short-range programs) for patients with drug addiction have been around two percent, whereas programs employing hypnosis noted success rates between 60 and 70 percent (Hartman, 1972). Thus, hypnosis is considered a relatively safe and efficacious intervention to amplify therapeutic outcomes for patients seeking treatment with psychopathological and somatic symptoms (Bollinger, 2018; Lemerrier & Terhune, 2018). Interestingly, not only hypnosis but also LSD has been shown to be an effective adjunct to psychotherapy.

Psychedelic Therapy

Lysergic acid diethylamide (LSD) – also known as “yellow sunshine” or “acid” – has been popular among recreational users since its discovery because of the mind-altering effects and visual hallucinations it can induce. The most potent hallucinogenic drug (Nichols, 2004) is semisynthetic as it is derived from an ergot (Passie et al., 2008). LSD mainly targets the serotonin $2A$ receptors (5-HT $2A$) and, hence, belongs to the classic psychedelics (González-Maeso et al., 2007). In contrast, all addictive drugs such as amphetamines, cocaine and opiates increase extracellular levels of dopamine in the mesoaccumbens pathway which produces dependence or addictive symptoms. Thus, serotonergic hallucinogens are considered non-addictive as they lack the sufficient pharmacological properties to initiate or maintain dependence (Ross, 2012). LSD is not neurotoxic and generally well tolerated (Passie et al., 2008). Universally, LSD produces an array of effects that last from eight to 12 hours (Johnson, 2018). Dependent on the route of administration (e.g., using blotter paper or eyedrops), it takes 40 to 90 minutes for the drug to produce its psychoactive effects. The experience itself is mainly described by users as feeling a sense of openness, heightened emotional sensitivity, vivid colour perception, an altered sense of time and borders “bleeding into each other”.

The subjective effects of psychedelics could be beneficial for therapeutic outcomes. Non-linear thought patterns and honest self-analysis which is still compassionate are common during psychedelic experiences (Johnson, 2018). LSD allows its consumers to see old ideas

in a new light and accept these more readily (Ludwig & Levine, 1965, p.432). Additionally, LSD strengthens the relationship between patient and therapist which is very important for the therapeutic outcome as the patient needs to feel safe in order to fully give into the psychedelic experience. The altered perception of time under the influence of LSD makes it easier for the patient to understand connections between his or her present feelings and behaviours as well as traumatic incidents of the past (p.433). LSD is also known for its ability to produce a mental state in which meaning and significance of both thoughts and feelings are enhanced (p. 432). These deeply personal and spiritually meaningful experiences are defined as “mystical-type experiences” which have been associated with continuous positive effects on psychological well-being as well as personality. Mystical-type experiences also influence the nature and quality of the patients’ response which in turn significantly determines the therapeutic outcome (Bogenschutz et al., 2015). Noteworthy, mystical-type experiences share certain characteristics with other mystical experiences that are non-drug-related. These include, for instance, the transcendence of time and space, a sense of sacredness and unity, and persisting positive changes in attitudes as well as behaviour towards oneself, others, and life overall. When the acute effects of the drug subside, the “psychedelic afterglow” starts to exert its effects on the patient. During this period of approximately two weeks to a month, the effectiveness of psychotherapeutic interventions has been shown to be enhanced although longer-lasting effects remain controversial (Majic et al., 2015).

Psychedelics can mobilize psychological processes which could promote recovery from drug addiction if administered in a therapeutic setting. Psychedelic induced personality changes or disruption of conditioned responses could reduce craving. The personality dimensions Agreeableness, Conscientiousness, and Extraversion have been found to be associated with self-efficacy. This belief in one's own ability to successfully execute behaviour (i.e., abstinence) to achieve an outcome (i.e., recovery) is a significant predictor of treatment outcome. Thus, psychedelic induced personality changes might not only reduce cravings but also increase self-efficacy. A psychedelic induced mystical experience might help patients to be more accepting of change and new ideas (Bogenschutz & Pommy, 2012). Psychedelics such as MDMA can also be used for exposure therapy in patients with PTSD as they enable them to revisit the traumatic experience in an emotionally engaged state (Mithoefer et al., 2011) and subsequently reduce the risk of relapse. Motivation to change is another mechanism that promotes recovery from drug addiction. Psychedelics may increase motivation to change through self-efficacy, consciousness raising especially with regards to the negative consequences, or a change in perspective resulting in an enhanced desire to change (Bogenschutz & Pommy, 2012).

Psychedelics can mobilize several biological processes which could promote recovery from drug addiction if administered in a therapeutic setting. Psychedelics may reduce craving by improving mood, normalizing stress, or diminishing anxiety and attentional bias. Addiction patients have impaired inhibitory processes and impulse control. These processes are also associated with serotonin (or a lack

thereof). Hence, substances that increase serotonergic activity in the central nervous system (CNS) could reduce craving and relapse (Wise & Robble, 2020; Bogenschutz & Pommy, 2012). Psychedelics do not only influence mood and impulse control but also alter the activity of neuronal networks (Carhart-Harris et al., 2016).

Abnormal functioning of the DMN is associated with psychopathology and represents a promising target for the treatment of addiction. Hyperactivity and hyperconnectivity of the DMN were found in schizophrenic and depressive patients (Whitfield-Gabrieli & Ford, 2012). Alterations of the DMN have been associated with various aspects of drug addiction. More specifically, aberrant functioning of the DMN as well as disturbed interaction between the DMN and other large-scale networks correlate with increased craving and relapse. They are believed to be at least partially responsible for negative emotions, rumination, and impaired self-awareness in patients with drug addiction (Zhang & Volkow, 2019). Successful behavioural interventions such as cognitive behavioural therapy (CBT) or mindfulness training can reduce drug use by focusing on self-referential processing and influencing DMN activity accordingly (Thayer & Feldstein Ewing, 2016). Thus, the DMN may be a potential biomarker for addiction risk and promising target for therapeutic interventions (Zhang & Volkow, 2019).

Psychedelic states can induce alterations of DMN activity and connectivity. A desynchronization of cortical oscillations across brain regions can be observed during psychedelic states (Muthukumaraswamy et al., 2013). The long-distance communication within the DMN seems to be altered with respect to efficiency and

decreased integrity is observed (Carhart-Harris et al., 2016). Both observations might underlie the therapeutic potential of psychedelics through the stimulation of serotonin receptors (Muthukumaraswamy et al., 2013). The so-called “ego death” or “ego dissolution” is characterized by the disintegration of the perceived “self” (identity) that is miscellaneous from others and the environment (Liechti, 2017). These feelings of ego dissolution are hypothesized to arise from the decoupling of DMN and medial temporal lobe (MTL) regions (Lebedev et al., 2015). Different dimensions of ego dissolution are associated with region-dependent alterations of glutamate levels. More specifically, glutamate levels increased in the mPFC and decreased in the hippocampus of participants who received psilocybin compared to controls. Alterations of glutamate in the mPFC predicted negatively experienced ego dissolution. In contrast, a positively experienced ego dissolution was predicted by alterations of glutamate in the hippocampus (Mason et al., 2020).

The therapeutic potential (i.e., antidepressant and anxiolytic effects) of classic psychedelics such as LSD and Dimethyltryptamine (DMT) is believed to be at least partially generated through the process of enhanced neuronal plasticity. Psychedelics have been found to promote structural neuroplasticity such as neurogenesis, spinogenesis, and synaptogenesis. Additionally, psychedelics induce functional neuroplasticity by increasing the frequency and amplitude of spontaneous excitatory postsynaptic currents (EPSCs) especially in prefrontal cortical neurons. Psychiatric disorders may be considered disorders of neuroplasticity. Impaired neurogenesis is hypothesized to contribute to the pathophysiology of depression as patients with MDD

demonstrate smaller hippocampal volumes. Additionally, there is a noticeable overlap between neuroplasticity and the molecular as well as cellular mechanisms activated by classical antidepressants (Pittenger & Duman, 2004). These increase adult neurogenesis in the hippocampus and block the effects of stress on neurogenesis (Duman, 2004). Different types of neuroplasticity are linked with certain serotonergic proteins. For instance, the 5-HT_{2A} is associated with dendritic and spine morphology as well as synaptic plasticity (Kraus et al., 2017).

Serotonergic hallucinogens are also known to increase brain derived neurotrophic factor (BDNF) transmission. Animal studies have associated this with decreased alcohol self-administration and diminished cocaine-seeking behaviour in the dorsal striatum and medial PFC respectively. The increase in BDNF transmission could mediate glutamate-dependent neuroplastic adaption that normalizes functional connectivity in the prefrontal-limbic circuitry and exert an anti-addictive effect (Ross, 2012).

Non-pharmacological aspects can influence the psychedelic experience and affect safety concerns accordingly. The intention, expectation, and preparation of the patient are considered the “set” while the physical and social environment is called the “setting”. Depending on those two factors, the same drug can elicit very different emotions. For instance, LSD can relieve anxiety, promote joy and cognitive enhancement, but also induce feelings of fear and suspiciousness (Hartogsohn, 2016). If the patient encounters anticipatory anxiety and does not feel safe in his or her environment, a so-called “bad trip” can occur. These negative experiences are mainly

characterized by paranoia and fear of death or going insane and might occur in the same trip as the desirable effects (Johnson, 2018). Notably, during a clinical self-experimentation with LSD, none of the 22 subjects reported any long-term negative effects of the LSD experience. Although the dosages were not controlled for, approximately 90 percent of them described long-term positive effects on different domains such as self-awareness (Winkler & Csémy, 2014). Therefore, psychedelics are considered relatively safe when patients are well-prepared (set) and being used in a supportive environment (setting).

Various studies investigated the effects of LSD in psychedelic-assisted psychotherapy with promising results in the treatment of anxiety disorders (i.e., 77.8% of participants experienced a reduction of anxiety), obsessive-compulsive disorder (OCD), and addictions such as alcohol (Gasser et al., 2015; Zghoul & Blier, 2003; Abramson, 1967;). Therefore, psychedelics might be able to meet an unfulfilled need in the treatment of psychiatric disorders acting as “psychotherapeutic catalysts” (Gubel, 1962). More specifically, a meta-analysis found consistent and significant improvement in 59% of the LSD-treated alcohol addict patients compared to 38% in the control group with a total of 325 subjects across six studies (Bogenschutz & Johnson, 2016). Recently, it seems more important to design an optimal trial for demonstrating efficacy instead of trying to define the “right” patient population (Carhart-Harris & Goodwin, 2017).

So far, it has been reviewed how hypnosis and LSD, each on their own, have the potential to improve therapeutic outcomes.

Therefore, the combination of these two treatment techniques might harbour additional benefits in a clinical setting.

Hypnodelic Therapy

Despite its critics, hypnodelic therapy appeared to be a more potent treatment technique than conventional forms of therapy when research with LSD was still permissible (Ludwig & Levine, 1967). Ludwig and Levine (1967), the founders of the hypnodelic therapy, were eager to test their hypothesis that hypnosis could be used to modify the LSD experience in therapeutically beneficial ways. For a start, they conducted a pilot study including 12 patients with drug addiction which showed promising results. Most of the patients experienced distinct symptom relief, a new outlook on life, and the conviction of remaining abstinent (Ludwig & Levine, 1967).

Thereupon, Ludwig and Levine undertook the first controlled study investigating hypnodelic therapy. For this, 70 patients with drug addiction were randomly assigned to five treatment conditions: hypnodelic therapy (LSD, hypnosis, and psychotherapy), LSD and psychotherapy (psychedelic), psychopharmacological treatment (LSD alone), hypnotherapy (hypnosis and psychotherapy), and psychotherapy (Ludwig & Levine, 1967). Each patient received a single, standardized preparatory session lasting two and a half to three hours. The session consisted of the following two parts. First, a psychiatric information-gathering interview was conducted including chief complaints, past history, self-description, drug history, psychosexual

history, and treatment expectations. Forthwith, the patient was familiarized with hypnosis by the means of a high eye fixation induction technique. Standardized hypnotic challenges were intended to measure the suggestibility of the patient (Ludwig & Levine, 1965).

Hypnodelic Procedure

The authors designed a self-administered questionnaire called the Psychiatric Evaluation Profile (PEP) which consists of 208 items selected on an a priori “clinical” basis (Ludwig & Levine, 1965, p.418). The level of psychopathology exhibited by an individual at a given time was assessed on 11 scales. Eight scales measured psychopathology (e.g., Anxiety, Depression, Paranoid Ideation, Psychotic Ideation, Obsessive-Compulsiveness, and Sociopathy), whereas the remaining scales evaluated Self-Concept, Coping Attitudes, and Interpersonal relations (p.419-420). Overall, the test-retest reliability of the PEP was found to be acceptable (.67 to .87). The questionnaire was administered to all patients before therapy (baseline), two-week post-therapy, and two-month post-therapy (Ludwig & Levine, 1967).

A few days after the preparatory session, the treatment session took place. For all conditions, an “insight-interpretive” psychotherapeutic orientation was used. The patients were given a moderate to high dose of LSD (2-3 mcg/kg) orally without knowing what drug they would receive (Levine & Ludwig, 1965). Subsequently, they were told to relax as much as possible and hypnotic induction was administered. As a result of the time gap between the

administration and drug action of LSD, the effects of hypnosis (deep trance) and LSD were brought together in a very smooth manner. After this onset, the concentration of the patient declines and hypnotic induction becomes extremely difficult (Ludwig & Levine, 1967, p.134). The hypnotic relaxation enables the patient to better give in to the subsequent LSD experience and build as well as maintain a close relationship with the therapist. Eventually, the patient is instructed to share his or her feelings and the major problems previously identified are discussed (e.g., traumatic experiences). The demand characteristics of the hypnosis enable the therapist to structure, guide, and modify the psychedelic experience while discussing the problems of the patient. Finally, the therapist summarizes the important aspects and gives posthypnotic suggestions (e.g., make a greater effort in accepting responsibility). Next, the patient is awakened from his or her trance and brought to another room where he or she spends the night. In case the patient desires to write about the experiences, pencil and paper are provided (p. 135).

The intergroup analysis showed that the hypnodelic therapy consistently produced greater improvement than any of the other four treatment conditions at both the two-week and two-month post-therapy intervals. The factor scores of the Psychiatric Evaluation Profile (PEP) for each of the five treatment conditions are displayed in Figure 1. This finding was most significant for the Self-Concept and Coping Attitudes scales two-weeks after the treatment (Ludwig & Levine, 1965). These two aspects are of relevance for addiction treatments. The “self-concept” is part of the ego-functions displayed by the DMN and impaired in patients with drug addiction.

Furthermore, addictions might develop as individuals are faced with stressful situations and fail to adapt emotional coping strategies (Rougement-Bücking & Grivel, 2014). In line with previous observations, the degree of suggestibility did not significantly correlate with the therapeutic results. However, a positive association was found between the intensity of an appropriate emotional abreaction (i.e., catharsis) and the reported benefit following therapy. Side effects and complications following the treatment techniques were less frequent than expected across conditions. If present, they included physical (e.g., insomnia, headaches, nausea, dizziness, and diarrhoea) as well as psychological (e.g., anxiety, agitation, and depression) symptoms. Nonetheless, they were described as manageable with routine hospital procedures such as sleeping medication for patients experiencing insomnia after the session (Ludwig & Levine, 1967).

The specific psychotherapeutic orientation that is used during the hypnodelic treatment technique may not be relevant as long as it is internally consistent and provides the patients with a framework that helps them understand their problems. Ludwig and Levine (1965 & 1967) used an insight-interpretive orientation with a psychoanalytic framework. However, there is no single theoretical orientation that fits the needs of every patient (Piper et al., 2002). The kind of psychotherapeutic orientation that is used also depends on the schooling and preference of the therapist. Nevertheless, the authors believe that the particular theoretical orientation is less important for therapeutic success than the general need of the patients to be provided with a framework that allows them to understand their

problems (Ludwig & Levine, 1967). Therefore, Ludwig and Levine (1965) believe that practically any theoretical orientation such as Jungian, Cognitivism, and Behaviourism would prove equally effective if the framework fits the current state of knowledge and is internally consistent.

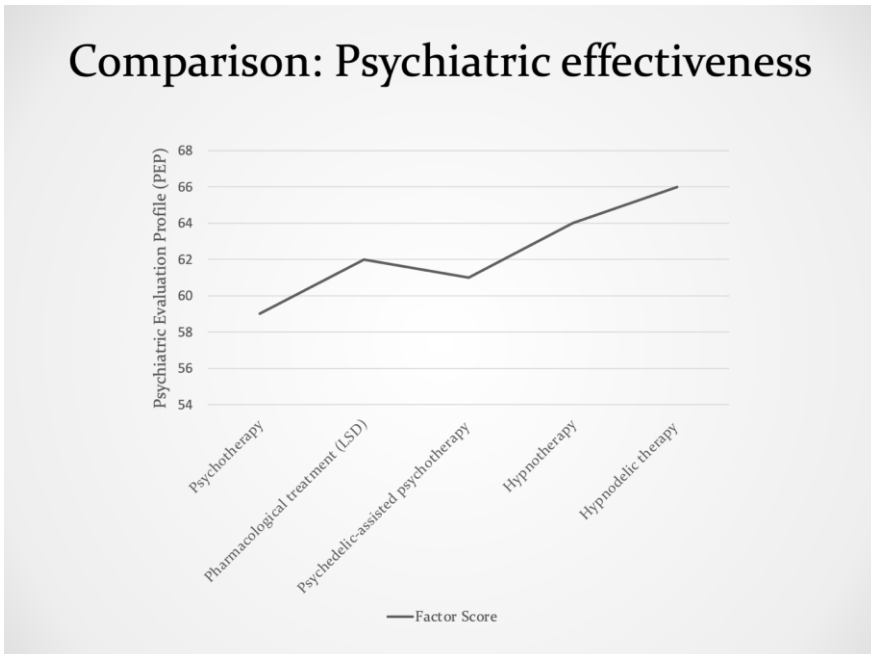


Figure 1. Comparison of the different treatment techniques employed by Levine and Ludwig (1965) and their effects on measurements of drug addiction. The Factor Score of the Psychiatric Evaluation Profile (PEP) is indicated on the y-axis for each of the following treatments: psychotherapy, pharmacological treatment (i.e., LSD), psychedelic-assisted psychotherapy (i.e., LSD and psychotherapy), hypnotherapy (i.e., hypnosis and psychotherapy), and hypnodelic therapy (i.e., hypnosis, LSD, and psychotherapy). Higher Factor Scores indicate less addiction (Ludwig & Levine, 1965).

Hypnodelic therapy shares some similarities with other “ultrabrief healing techniques” such as incubation and shamanistic

practices. These include, for instance, a sense of urge prior to therapy, emotional catharsis, suggestions, and explanations for the presented problems. These common denominators might represent the basis of any therapy to result in positive outcomes or “healing“. Chiefly, what is believed to be a crucial prerequisite for therapeutic change in these healing practices is a disruption of normal consciousness and its underlying neural processes by altering the self-experience resulting in so-called “altered states of consciousness“ (Ludwig & Levine, 1967; Millière, 2018).

Commonalities of hypnotic and psychedelic states

The psychological states induced by hypnotic suggestion demonstrate close resemblance to psychedelic states. The propensity to encounter mystical-type experiences correlates with hypnotic suggestibility (Spanos & Moretti, 1988). Although not all psychedelic drugs seem to enhance suggestibility, LSD does so to a similar extent as hypnotic induction (Carhart-Harris et al., 2015). The phenomenal response to psychedelics can not only be predicted by suggestibility but also by absorption. This individual tendency for experiencing intense attentional involvement occurs temporarily (Tellegen & Atkinson, 1974). Therefore, hypnosis and psychedelics have several phenomenological commonalities.

Despite their surprising similarities, psychedelics and hypnosis also demonstrate some differences. Psychedelics involve psychopharmacological processes and hypnosis occurs in an interpersonal context using suggestion techniques. Moreover, the

psychedelic experience is limited and time dependent on pharmacokinetic as well as pharmacodynamic processes (e.g., rate of metabolism and excretion of the drug). In contrast, hypnotic states can be maintained for as long as the patient and therapist intend to until termination is actively induced (Lemercier & Terhune, 2018).

There seems to be a converse association between the shared spontaneous phenomenological effects of the two phenomena (i.e., hypnodelic and psychedelic states) and global functional connectivity patterns. High connectivity seems to be associated with psychedelic induced ego-dissolution (Tagliazucchi et al., 2016). This ego-dissolution is correlated with loss of self-control, thought disorder, anxiety, and arousal (Studerus et al., 2011). In contrast, low connectivity seems to be associated with self-transcendent experiences induced by hypnosis (Cardeña et al., 2013). The magnitude of these transcendent experiences following hypnotic induction is typically small especially compared to the very intense ego-dissolution induced by psychedelics (Lemercier & Terhune, 2018). Moreover, an fMRI study found asymmetry of the frontal lobe connectivity during hypnosis (Lipari et al., 2012). These discrepancies in global functional connectivity and anomalous self-awareness following hypnotic induction and psychedelic administration may be explained by an inverted-U shape as shown in Figure 2. Therefore, the psychedelic enhancement of suggestibility may be due to an overlapping mechanism responsible for the individual differences in responsiveness to psychedelics and hypnotic suggestibility (Lemercier & Terhune, 2018).

Neurophysiology of Psychedelics and Hypnosis

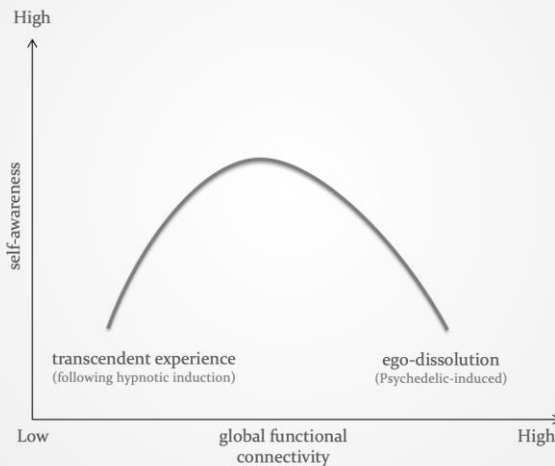


Figure 2. The graph displays a possible explanation for the discrepancies between spontaneous phenomenological effects of hypnosis and psychedelics (i.e., transcendent experiences and ego-dissolution) and their associated global functional connectivity patterns as proposed by C.E. Lemerrier and D.B. Terhune (2018). Transcendent experiences seem to be associated with low global functional connectivity, whereas ego-dissolution seems to be associated with high global functional connectivity. Both phenomena represent aberrations of self-awareness.

Altered States of Consciousness during Hypnosis and acute LSD administration

Hypnosis and psychedelics might produce different altered states of consciousness (ASC). These alterations of consciousness may contribute to explaining the additive value of combining LSD and hypnosis in terms of neuropsychological processes. Another study by

the authors Levine and Ludwig (1965) investigated whether hypnodelic therapy results in more alterations of consciousness in patients with drug addiction compared to the other treatment conditions described previously. It seems important for the patient to keep the eyes closed in order to cut off the primary channel of perceptual feedback (i.e., vision) which in turn increases the alterations in consciousness (Ludwig & Levine, 1967). To study the differences between these conditions, they used the Linton-Langs Questionnaire consisting of 73 items on seven scales on three points of time (pre-treatment, under hypnosis, and two-hours after the start of the session) to examine changes in the states of consciousness (Levine & Ludwig, 1965, p.124). The scale analysis showed that the hypnodelic therapy produced, by far, the greatest alteration in consciousness. Subjects in this condition reported a greater loss of control and body image change than subjects in the other four conditions. Furthermore, a different distortion of time sense, altered thinking, and somatic change were expressed in these subjects compared to three of the four remaining conditions. Surprisingly, the psychedelic condition, the psychopharmacological condition, and the hypnotherapy condition did not differ significantly from one another. However, these conditions can still be differentiated from the psychotherapy condition and the baseline measurements (PEP results before therapy; p.135). These findings support Gubel's claim that hypnosis and the subjective experiences of LSD are similar to each other. Altogether, the alterations of consciousness among these five conditions are visualized in Figure 3 and can be described in the following descending order: Hypnodelic therapy > (Psychedelic

therapy, Psychopharmacological treatment, Hypnotherapy) > (Psychotherapy, Baseline measurements). These findings might indicate that the greater alteration of consciousness enabled greater improvements.

Altered states of consciousness can be therapeutically effective. Field (1992) proposed five mechanisms by which ASC can increase therapeutic benefit. Stress reduction or the lowering of tension is achieved through sleep and other states of relaxation. The second mechanisms, release of bad objects, includes confessions but also the lesson that feared situations from the past can have a different outcome. Next, ASC can help to restore emotional experience in order to rebuild basic trust and foster self-acceptance. Furthermore, ASC can facilitate the working alliance between the therapist and the patient. Last but not least, ASC enhance creativity (Field, 1992). However, it is currently unknown whether a linear relationship between alterations of consciousness and therapeutic efficacy exists.

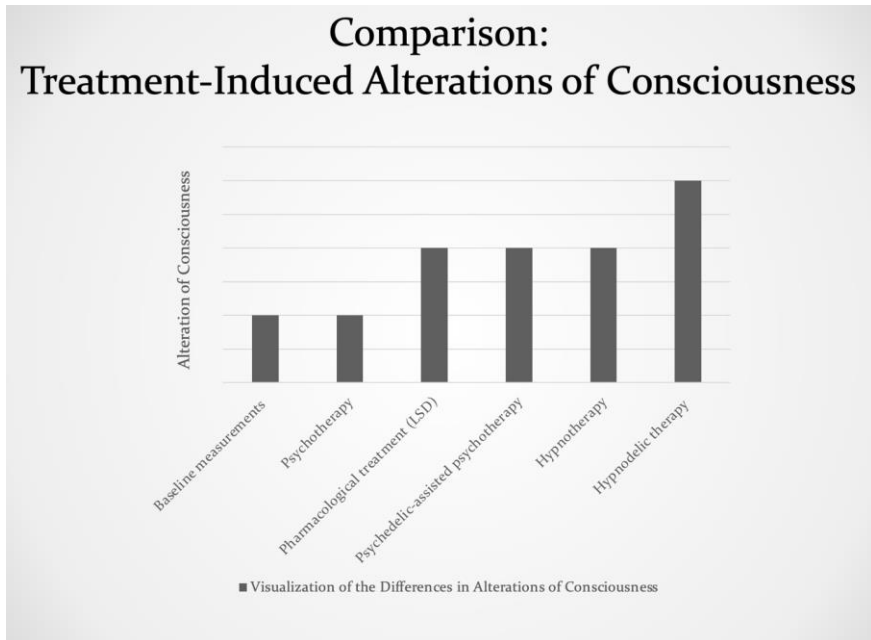


Figure 3. Visualization of the different treatment techniques employed by Levine and Ludwig (1965) with regards to their induced alterations of consciousness in patients with drug addiction. Baseline measurements and psychotherapy produced the least alterations and were not significantly distinguishable from each other. Psychedelic therapy, pharmacological treatment, and hypnotherapy showed similar alterations of consciousness which resulted in more altered states of consciousness than the other two. Finally, hypnodelic therapy significantly produced the most alterations of consciousness (Ludwig & Levine, 1965).

DISCUSSION

Psychedelics and hypnosis are both socially controversial and sensitive topics. Their combination (i.e., hypnodelic therapy) is probably even more controversial. This review intended to examine the potential efficacy of this treatment for addiction by first discussing hypnotherapy and psychedelic therapy on their own before moving on

to their combination. Hence, this line of reasoning should clarify whether hypnodelic therapy might have an additive value for psychotherapeutic outcomes. Despite its exploratory nature, this review offers some insight into the hidden potentials of psychedelics and hypnosis.

Hypnotherapy has proven to be an effective treatment for drug addictions. The American Medical Association (AMA) has accepted hypnosis as a medically valid tool. This treatment technique was specifically implemented as treatment for alcoholism over a century ago. Hypnosis can be applied to augment abstinence and prevent relapse by altering cognitive and behavioural processes (Pekala, 2016). According to the dynamic model of relapse by Witkiewitz and Marlatt (2004), relapse can be predicted by intrapersonal determinants and interpersonal determinants. The intrapersonal factors include cravings, coping skills, emotional states, motivation to change, self-efficacy, and outcome expectancy. The interpersonal factors include positive social support as well as negative peer pressure (Witkiewitz & Marlatt, 2004). Hypnotic suggestion can modify these factors to promote recovery, for instance, by increasing self-esteem or reducing and controlling negative Affects (e.g., anger, anxiety). Hypnosis and self-hypnosis also offer addiction patients the means to achieve a healthier or more productive altered state of consciousness. Overall, hypnotic suggestion can be an effective adjunct in the treatment of addiction and relapse prevention (Pekala, 2016).

Psychedelics have also demonstrated therapeutic potential and may have specific applications for patients with drug addiction. The Model of Possible Change Mechanisms in Hallucinogen-Assisted

Treatment of Addictions by Bogenschutz and Pommy (2012) suggests that there are four levels ultimately resulting in reduced substance use. The patient (set), the psychedelic substance, and the setting determine the treatment situation. Each psychedelic substance has acute effects which can be split in two dimensions. The acute physiological effects are primarily mediated by serotonin receptors and affect glutamate receptors. The acute psychological effects consist of the subjective experience such as a mystical experience. Persistent changes of psychedelics include improved mood, diminished anxiety, changes in beliefs and values as well as personality changes. Potential persistent functional or neuroplastic changes following psychedelic treatment have not been studied yet. Finally, an increase in motivation and self-efficacy with an additional decrease in craving are theorized to be the last mechanisms of change resulting in reduced substance use (Bogenschutz & Pommy, 2012). Psychedelics demonstrate low toxicity and non-addictiveness. Moreover, a single dose of psychedelics has significant, long-term beneficial effects (Burdick & Adinoff, 2013). Hence, psychedelics represent a safe and effective pharmacological intervention for patients with drug addiction.

Combining hypnosis with psychedelic-assisted psychotherapy may be more effective than each of these treatment techniques alone. Because of the observed phenomenological and neurophysiological similarities between psychedelic and hypnotic states, it was hypothesized that hypnosis could be used to modulate the LSD experience and, consequently, increase its psychotherapeutic efficacy. The findings suggest that, in general, hypnodelic therapy produces greater improvement in patients with drug addiction than any other

combination of these treatment techniques (i.e., hypnotherapy, psychedelic therapy, only LSD, or psychotherapy; Ludwig & Levine, 1967). It was also shown that it produces the strongest alteration of consciousness compared to the other four conditions (Levine & Ludwig, 1965). A greater alteration of consciousness can be beneficial for therapeutic outcomes by the means of stress reduction, release of bad objects, restorative emotional experience, facilitation of the working alliance between the therapist and the patient, as well as the enhancement of creativity (Field, 1992).

The observed phenomenological and neurophysiological similarities of hypnosis and psychedelics (Gubel, 1962; Lemerancier & Terhune, 2018) could contribute to their harmonious interaction as a combined treatment technique. More specifically, comparing hypnotic and psychedelic states shows that both treatment techniques affect the activity of several brain areas including the prefrontal cortex (PFC) and cingulate cortex (CC). However, psychedelics do affect a larger set of brain regions with subsequent broader changes compared to hypnosis. Especially the frontal regions, medial temporal lobe, occipital cortex (OC), hippocampus, and amygdala are affected by psychedelics (Ly et al., 2018). Both hypnosis and psychedelics decrease the activity and increase the connectivity in parts of the DMN or with other networks (Cardeña, et al., 2013; McGeown et al., 2009; Pasquini et al., 2020). Finally, both hypnosis and LSD have been found to promote neuronal plasticity which is suggested to underlie the antidepressant and anxiolytic effects (Ly et al., 2018) beneficial for psychotherapeutic outcomes.

Hypnodelic therapy may be particularly effective as treatment for drug addictions. Not only have both hypnotherapy and psychedelic therapy demonstrated to be effective, but they also address different aspects of the multi-dimensional process leading to recovery. Hypnosis can be used to modify cognitive and behavioural processes such as cravings and self-efficacy to augment abstinence and prevent relapse (Pekala, 2016). Psychedelics have neurophysiological effects that improve mood and diminish anxiety (Bogenschutz & Pommy, 2012). Mystical experiences could give patients new insights and motivation to change through consciousness raising (Bogenschutz & Pommy, 2012). Some of the effects of hypnosis and psychedelics on the recovery process of addiction do overlap (e.g., self-efficacy, improved mood) while each of them addresses additional aspects that promote recovery. For instance, hypnosis can help with coping skills and psychedelics can induce personality changes (Bogenschutz & Pommy, 2012; Witkiewitz & Marlatt, 2004). Thus, psychedelics and hypnosis are potential complementary adjuncts to psychotherapy as treatment for addictions.

The current review is limited by the lack of information on the relatively latent treatment technique due to a drastic decline in scientific interest caused by the prohibition of LSD in 1970. Only one recent article tried to revive the scientific interest in hypnodelic therapy (Lemercier & Terhune, 2018). Additionally, most studies included in this review investigated certain types of addiction (e.g., narcotic, opiates) and reported small sample sizes which limits the generalisability of findings to other substance related addictions (e.g., nicotine). Additionally, Ludwig and Levine did not include a placebo

control group as it would have been unethical to deny a patient recommended for psychotherapy some form of treatment. Nowadays, this dilemma is mainly solved by including wait-list controls. Without a control group, it may be that the observed changes are at least partly due to the nonspecific effects of milieu and time instead of therapy per se (Ludwig & Levine, 1965) or represent a placebo response. The authors were not blinded to conditions. Moreover, a social desirability bias cannot be excluded due to self-deception. This might especially be the case for the measurements of alterations of consciousness because the questionnaires are not able to objectively measure the validity of a patient's response. However, only considering the subjective response reliably measures the quantity of several subjective effects (Ludwig & Levine, 1965).

Notably, the first hypnodelic studies used psychedelic therapy which is no longer popular. The original psychedelic therapy that originated in America and Canada involved high doses of psychedelic substances (e.g., 400-500 µg of LSD) which are only administered once. The American psychedelic therapy is intended to create and focus on the "overwhelming" mystical experience (e.g., patients were able to write about their experiences after the session). This approach shares many similarities with religious mystical experiences and represents a symptomatic cure. In contrast, the European "psycholytic" therapy uses lower doses of psychedelic substances (e.g., 30-200 µg of LSD) throughout several sessions in order to activate and deepen psychoanalytic processes. The psychedelic experiences are analytically discussed and then compared to reality. This helps the patient to adapt their experiences to everyday life and integrate them

meaningfully (Majic et al., 2015). Ultimately, psycholytic therapy aims to reconstruct the personality by loosening of infant-parent attachments and learning of healthy coping mechanisms (i.e., “maturing process”). Notably, the psycholytic approach is more similar to our currently implemented psychedelic-assisted psychotherapy models than the original American psychedelic therapy. Therefore, it is important to distinguish between those two approaches when reviewing psychedelic studies.

The simultaneous and combined use of psychedelics and hypnosis is not the only promising way these treatment techniques can be used to improve therapeutic outcomes. In order to prevent bad trips and increase the probability of desirable outcomes, naïve patients could be familiarized with the effects of psychedelics by the means of a hypnosis-based training in a safe environment. This would not only reduce the degree of anticipated anxiety but also augment the positive response expectancies of the psychedelic experience (Lemercier & Terhune, 2018). Furthermore, hypnosis could be used to re-experience the psychedelic states in the following days after the administration without the need of the drug itself (Hastings, 2006). This would provide additional opportunities for the patient to explore and utilize the positive aspects of the psychedelic experience potentially enhancing the psychotherapeutic outcomes especially in the long-term (Lemercier & Terhune, 2018).

Although this review summarised the literature critically, there are still many questions in need of further examination. For instance, Ludwig and Levine (1967) argue that therapists who are quite familiar with the physiological as well as the psychological effects of

LSD and hypnosis could apply the hypnodelic treatment technique best. Thus, a standardized program for training professionals of specific mental health and medical sectors is needed to advance psychedelic-assisted psychotherapy research (California Institute of Integral Studies). Since not every therapist is trained (well) to apply these techniques, the studies mainly examined psychotherapeutic efficacy (ideal conditions) instead of effectiveness (real-world settings). Future research should, therefore, study psychotherapeutic effectiveness of the hypnodelic treatment technique. Additionally, it is important to compare the efficacy with conventional therapies in order to determine how promising the results are *de facto*. Furthermore, it is not clear yet how persistent the observed changes in attitude are (long-term follow up studies) and how these relate to actual behavioural change.

More research is needed to better understand the relationship between psychedelic and hypnotic states. For instance, this review only focusses on LSD but other psychedelic drugs such as psilocybin (“magic mushrooms”) or mescaline (peyote cactus) might have similar or dissimilar effects. Currently, it is not known what dosages are required to enhance suggestibility in patients and it may be possible to reduce the dose to a minimum without devaluing therapeutic outcomes (Lemercier & Terhune, 2018). Future research should also establish which patients or psychiatric conditions are most suitable for this treatment technique as the hypnodelic studies excluded patients who were overtly psychotic, had serious physical illness or more than minimal organic brain damage (Ludwig & Levine, 1967). Finally, more research is needed to bring about the long overdue policy changes and

make these treatments accessible to the patient populations (e.g., patients with drug addiction, depression, and anxiety) that could benefit from them.

CONCLUSION

Both psychedelic therapy and hypnotherapy have been proven to be effective treatments for addictions in the past. The combination of the two treatment techniques is likely to have an additive value partly due to their phenomenological and neurophysiological similarities such as the promotion of neuronal plasticity. Not only have both hypnotherapy and psychedelic therapy demonstrated therapeutic potential, but they also address different aspects of the multi-dimensional process ultimately leading to recovery. Hypnodelic therapy seems to be a promising treatment technique for patients with drug addiction. Hence, hypnodelic therapy deserves renewed scientific interest and has important implications for clinical practices. However, more research applying the modern standards of RCTs and statistical power for clinical trials is needed to determine its actual psychotherapeutic efficacy.

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