Perspective

Journal of Psychopharmacology
22(8) (2008) 821–827

ISSN 0269-8811
SAGE Publications Ltd,
Los Angeles, London,
New Delhi and Singapore
10.1177/0269881108091597

Is it time to revisit the role of psychedelic drugs in enhancing human creativity?

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Abstract

Human creativity is difficult to define and measure, but it is undoubtedly an important cognitive process. This makes it an interesting challenge for modern neuroscientific exploration – especially given the current interest in developing cognitive enhancers for commercial and clinical uses. There are similarities between the typical traits of creative people and the subjective psychological characteristics of the psychedelic (hallucinogenic) drug experience. This phenomenon was studied in a number of small trials and case studies in the 1960s. Results were inconclusive, and the quality of these studies – by modern research standards – was merely anecdotal. Nevertheless, with today's current renaissance in psychedelic drug research and the growing interest in cognitive enhancing drugs, now may be the time to re-visit these studies with contemporary research methods.

Key words

psychedelic; creativity; LSD

Introduction

The psychedelic drugs and their related cousins are enjoying a renaissance in medical research. In the spirit of medicine's first foray into the possible uses for these drugs in the 1950s and 1960s, the majority of contemporary studies have focused on their potential clinical applications. However, just like some of the earliest scientific studies with lysergic acid diethylamide (LSD), modern research may also re-open avenues for experiments with less immediately obvious clinical applications that may nevertheless shed light on what these unique substances can teach us about the brain. One such area worthy of re-visiting with modern research is the role that psychedelic drugs play in the realm of creativity. To propose such a project one must first briefly describe some of the challenges that are faced when studying the concept of creativity – such as how creativity is defined and measured.

What is creativity?

The word create derives from the Latin *creatus*, 'to have grown'; defined as a mental process involving the generation of new ideas or concepts or new associations between existing ideas or concepts. The ancient Greeks talked about creativity in the context of poetry 'bringing new life into the world', and ancient Rome expanded this further to encompass the creativity of art and architecture. Creativity may be seen from the perspective of theology, philosophy and psychology – but is most frequently applied from the point of view of art and design – and more recently in the commercial industry of advertising – where it is seen as an essential tool in stimulating product development and marketing strategy.

Formal attempts at defining creativity

In his book *The Art of Thought* (1926), Graham Wallas described five stages of the creative process, from *preparation*, *incubation*, *intimation* and *illumination* through to *verification*, and considered creativity to be an evolutionary process allowing humans to adapt to their changing environments. The American psychologist Guilford (1966) made the distinction between convergent and divergent thinking processes, whereby the latter involves creative generation of multiple answers to a set problem opposed to aiming for a single, correct solution to a problem.

Neurobiology of creativity

The well-documented 'left brain–right brain' model of brain function often polarises an individual's skills as artistic at the expense of language and mathematics. However, using evidence from lesion analysis, functional imaging and drug studies, the Harvard neurologist Alice Flaherty (2005) challenges

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this popularly held belief and describes a *three*-factor anatomical model of creativity that focuses on interactions between the temporal lobes, frontal lobes and limbic system – mediated by dopamine activity.

It is recognised that creative thinking requires more than just a general intelligence and specific knowledge, but also the ability to develop alternative solutions to a single question – or divergent thinking (Balzac, 2006). Heilman, *et al*. (2003) proposed that creative innovation requires the co-activation and communication between regions of the brain that ordinarily are not strongly connected. Heilman suggests that highly creative individuals are able to store extensive specialised knowledge in their temporoparietal cortex, be capable of divergent thinking mediated by the frontal lobe and, crucially, be able to modulate the activity of the locus coeruleus (which fires in response to novel stimuli) via the norepinephrine system, 'to understand and express novel orderly relationships.'

There is a current trend for exploring the concept of cognitive enhancing drugs. Although many of these so-called *smart drugs* or nootropics available over-the-counter have little in the way of objective scientific validity, there remains a genuine furious exploration for such agents. Research in this field seeks the role of relevant receptor systems in learning and other cognitive processes. The use of D-cycloserine as an adjunct to psychotherapy is well studied (Ressler, *et al*. 2004), and a recent study by Harvey (2003) describes using LSD (a 5-HT_{2A} receptor agonist) to enhance associative learning in rabbits.

How is creativity measured?

Since renaissance times, creativity has often been measured in terms of examining the output of so-called *creators*. The sheer volume of works by Da Vinci and Michelangelo are frequently quoted as testament to their creative geniuses. However, defining objective measures for the process of creativity is notoriously difficult – especially when taking into account the subjective nature of an individual's aesthetic appreciation of a particular creation. Some scholars (Zinkhan, 1993) have argued that creativity, by definition, defies measurement because all tests have predetermined correct answers and originality is a requirement of creativity – therefore, any 'correct' answer in a creativity test could not be creative.

Tests to measure creativity fall into two broad categories – the more scientific psychometric tests and the more subjective, but widely used, method of 'Expert Opinion'. Many of the psychometric tests developed have arisen from Guilford's definition of creativity as a product of divergent thinking. Tests that measure divergent thinking include the 'Unusual Uses' test, the 'Structure Of Intellect' test and Mednick's Remote Associates Test (1962). The creativity researcher Paul Torrance (1974) further developed Guilford's tests to produce the Torrance Tests of Creative Thinking (TTCT), which tested divergent thinking and other problem-solving skills, through *Fluency, Flexibility, Originality and Elaboration*. Further related tests include the Starkweather Originality Test (1964) – for young children only – and the Group Inventory for Finding Creative Talent (GIFT) (Rimm, 1980).

Critics of psychometric tests have suggested that it is not possible to articulate clear, objective criteria for a creative product, but that if external appropriate judges can agree on a product's creativity, it can be accepted as such (Amabile, 1982), and this point of view underlies the evaluation of identifying creativity by Expert Opinion. Techniques include Amabile's Consensual Assessment Technique (CAT) (1982). The judgement of panels of esteemed experts in the relevant field continues to be a popularly accepted method for assessing creativity in the arts. For example, The Turner Prize and The Booker Prize.

Characteristics of creative people

'We are all, to a varying extent capable of creativity – we participate in it simply by thinking.' (Barron, 1965). In a slightly archaic qualitative study, Barron (1965) examined the psychological profiles of a large group of individuals from different professional fields who frequently produced highly creative, original work, such as mathematics, the physical sciences, architecture and creative writing. He used a variety of (mainly psychodynamic) psychological rating scales and diagnostic instruments to postulate a list of eight traits that characterised these highly creative individuals, as follows:

1) Creativity was not linked directly to IQ. Although intelligence is in some degree necessary, it is not alone a sufficient condition for high creativity.
2) Finding meaning in the world – and being enthusiastic and able to communicate that meaning to others in one form or other.
3) Being intuitive
4) Being introverted
5) Finding a simple explanation to a complex problem (and this refers to creativity in both art and mathematics).
6) Being slightly more 'psychologically imbalanced' (measured by Barron as 'schizoid tendencies') than the general population.
7) Ability to maintain independent judgement (even in the face of alternative peer consensus).
8) 'Maintenance of psychic opposites' – for example, individuals who displayed a tendency to be both free and disciplined or both 'masculine' and 'feminine'.

Rogers (1959) described how particular *internal* and *external* conditions are necessary to enhance the creative process. Internal conditions (many of which share similarities with Barron's descriptions of characteristics of creative people) include a low psychological defensiveness, a lack of rigidity, a permeability of boundaries in concepts, beliefs, perceptions and hypotheses, a tolerance for ambiguity, an ability to receive and integrate apparently conflicting information, a sensitive awareness of

feelings and openness to all phases of experience, intuition, aesthetic sensibility, a sense of satisfaction in self-expression, the ability to think in terms of analogues and metaphors and the ability to 'toy' with ideas, shapes and hypotheses. Rogers' external conditions that facilitate the enhancement of creativity include an atmosphere of psychological safety and psychological freedom in which the subject is permitted to think and feel whatever is discovered within oneself.

How the psychedelic experience might enhance the creative process

The term 'Psychedelic Experience' was coined in the 1950s to describe the subjective psychological effects of the human user when under the influence of a hallucinogenic drug. Such drugs, which occur in abundance in many plants and fungi and may also be synthesised artificially, include lysergic acid diethylamide (LSD), mescaline (found in the *Peyote cactus*), dimethyltryptamine (DMT, the active component in Ayhuasca) and psilocybin (the active component found in many species of 'magic' mushrooms.)

The psychological experience induced in humans under the influence of psychedelic drugs is multifarious and idiosyncratic, but nevertheless a broad range of common characteristics are frequently identified. These include alterations in the user's perceptions (in all the sensory modalities), changes in the emotions and expansion in an individual's sense of thought and identity. A particular feature of the experience – that is encompassed by all the above characteristics and has special relevance to the creative process is, that of a general increase in complexity and openness, such that the usual ego-bound restraints that allow humans to accept given pre-conceived ideas about themselves and the world around them are necessarily challenged. Another important feature is the tendency for users to assign unique and novel meanings to their experience – together with an appreciation that they are part of a bigger, universal cosmic-oneness.

In the introduction to their original article describing a pilot study to explore the use of psychedelic agents in creative problem solving (below), Harman, *et al.* (1966) suggested that using a psychedelic drug under the appropriately controlled test conditions satisfies all of the criteria outlined by Rogers (above) to enhance the creative process.

Anecdotal historic examples of using psychedelic drugs to enhance artistic creativity

There are many anecdotal examples of artists and writers describing the use of psychedelic drugs such as LSD to enhance the creative process (and a similar number of such accounts disputing this suggestion). The use of drugs to enhance artistic creativity is not new, illustrated when the Roman poet Ovid said, 'There is no poetry among water drinkers.' There are examples of pre-historic art from all around the world, which use optical illusions or *entoptic phenomena* to enhance the visual experience. The linkages between this form of artwork and pre-historic use of psychedelic drugs is well established and described in the art work of many pre-historic cultures from Ireland (Dronfield, 1995), Africa and France (Lewin, 1991) to South America (Howard, 1957) and as far afield as Siberia in the Arctic circle (Dikov, 1971).

The use of opium (whilst not usually credited as a *psychedelic* drug) to influence creativity is well recognised. Thomas De Quincey describes the pleasures, as well as the pitfalls, of taking opium in *Confessions of an English Opium-Eater* (1822). The English Romantic poet Samuel Taylor Coleridge also reports the vivid imagery of the opium experience in his poem *Kubla Khan* (1816), as does Alexandre Dumas père, in *In The Count of Monte Cristo* (1844). And the 1832 poem by Alfred Lord Tennyson, *The Lotus-Eaters* describes how opium is used as a creative tool in the nineteenth century. In the 20th century, the French poet and playwriter Antonin Artaud used opium extensively, as well as the *Peyote cactus* (Artaud, 1937).

More recent examples of artists using psychedelic drugs include Henri Michaux, the Belgian-born French painter, journalist and poet, who at the age of 56 started using mescaline and cannabis and wrote about his experiences in his later works (Michaux, 1956). A now very famous account of the mescaline experience by the English intellectual writer Aldous Huxley in 1954 placed Huxley as a centrally revered figure for the subsequent cultural drug revolution that followed. Then since the 1960s, the volume of modern Western art and music that attributes its influences to the psychedelic drugs is vast. Some such artists and musicians openly proclaim themselves to be 'psychedelic artists,' whereas many others will frequently acknowledge the influence of psychedelic drug experiences have had on their work. One such piece of psychedelic drug–influenced artwork recently appeared in the *British Journal of Psychiatry* in homage to the discoverer of LSD, Dr Albert Hofmann (Sessa, 2007)

Oscar Janiger's unique study

An attempt to explore the value of the agent LSD in influencing artistic creativity was made in a remarkable long-term series of anecdotal case studies by the American psychiatrist Oscar Janiger (Dobkin de Rios and Janiger, 2003). Between 1954 and 1962, he facilitated LSD sessions for almost 1000 people between ages 18 and 81 in a variety of professions from doctors and nurses, lawyers, housewives and police officers to judges, truckers, students and the unemployed and retired. One of his participants was the film star Cary Grant. In contrast to the often highly systematised design of most other psychedelic research of this period, Janiger's experiments were largely unguided and took place in a naturalistic setting, with a view to explore what the nature of the 'intrinsic, characteristic LSD response' (if indeed there was one) might be. Unsurprisingly, the volunteer's experiences varied widely, but adverse reactions were extremely rare, and the vast majority

described the experience as valuable and sustaining. During the course of this work two experiential characteristics emerged repeatedly – those of spontaneous spiritual experiences and those of LSD boosting the subjects' experiences of creativity.

These latter observations lead Janiger to conduct a parallel study examining the effects of the drug on creativity in a controlled setting. He subsequently gave LSD to a mixed group of 60 visual artists over a seven-year period, and they produced over 250 drawings that were later analysed by a professor of art history, who compared the artists' work before and after the LSD sessions. Because of the heterogeneity of the population and the aesthetic nature of analysing the results, making objective statements about how LSD effected the artists' creativity is impossible, but the drug did appear to enhance certain aspects of the artists' work; namely there was a tendency towards more expressionistic work, a sharpening of colour, a greater freedom from prescribed mental sets, an increased syntactical organisation, a deeper accessibility of past impressions and a heightened sense of emotional excitement. However, perhaps the most valuable aspect of Janiger's study is the many qualitative reports from the artists themselves, who without exception found the LSD experience artistically and personally profound.

Further experiments in creativity and psychedelics

An article by Stanley Krippner (1972) outlines five studies. In a study by Berlin, *et al*. (1955), four prominent graphic artists were given mescaline and LSD and encouraged to complete paintings whilst under the influence of the drug. A panel of art critics judged their subsequent paintings to have 'greater aesthetic value' than the artist's usual work.

The American psychologist Frank Barron (1965) gave psilocybin to creative individuals and recorded their subjective impressions. The psychiatrist McGlothlin, *et al*. (1967) gave 200 μg of LSD to 72 graduate students together with two control groups. In long-term follow-up, the experimental group showed a subjective greater appreciation of music and the arts, but no actual increase in creative ability.

In an experiment by Zegans, *et al*. (1967), 19 graduate students were given one of three varying doses of LSD, alongside 11 students who received a placebo. The subjects did not know they were to be given psychotropic drugs when they initially signed up for the experiment, and they were not selected for their creative abilities. A range of creativity test data (including the Mednick Association Test, the Modified Word Association Test, the Mosaic Design Test and the Free Association Test) were conducted at baseline, during and after the acute intoxication. Although results were not statistically significant, there was trend towards significance for the LSD group for all tests. One striking conclusion of the experiment was that whilst administering LSD to unprepared students did not result in a blanket statistically significantly improvement in creativity for all subjects, for certain subjects with particular 'creative personality traits', it was noted that LSD 'increased the accessibility of remote or unique ideas and associations to their conscious awareness'.

It is noteworthy that little emphasis was made towards the importance of (personal mind-) set and (environmental) setting during these studies – two very important factors that have been shown to radically alter the outcome of individual's experiences under psychedelic drugs. All these studies report the variable successes of demonstrating the psychedelic drug's ability to improve creativity in the experimental context – especially when subjects are taken from an unselected population of graduate students.

However, the pilot study by Harman, *et al*. (1966) from the Institute of Psychedelic Research of San Francisco State College deserves closer attention. The researchers took particular care to select individuals ($n = 27$) engaged in creative industries (engineers, theoretical mathematicians, physicists, architects and designers) and 'primed' them with a pre-drug session in which they were encouraged to select problems of a professional interest that required a creative solution. A very positive mind-set was, therefore, encouraged by the researchers, who told the subjects that the drug *would* enhance their creativity and help them to work more productively without distractions. Baseline psychometric tests included the Purdue Creativity Test, the Millar Object Visualisation Test and the Witkin Embedded Figures Test. At the psychedelic sessions (using mescaline) a few days later, subjects were encouraged to work in groups and as individuals to tackle their chosen problems and were subjected to further psychometric tests. Follow-up consisted of subjects submitting a written subjective account of their experience within 1 week of the drug session and further interviews with the researchers 8 weeks later in which subjects were asked whether the drug session had offered an impairment, no change or an improvement in their creativity and work performance. All participants showed enhanced abilities on all tests when under the drug compared with the previous non-drug tests ($P < 0.01$). In the subjective written accounts, all the participants described subjective enhanced effects of the drug on their creative process. From these qualitative reports 11 'Strategies of Enhanced Functioning' were extracted:

1) Reduced inhibition and reduced anxiety.
2) Improved capacity to restructure problems in a wider context.
3) Increased fluency and flexibility of ideas.
4) Increased visual imagery and fantasy.
5) Increased ability to concentrate.
6) Increased empathy with objects and processes.
7) Increased empathy with people.
8) Subconscious data more accessible.
9) Improved association of dissimilar ideas.
10) Heightened motivation to obtain closure.
11) Improved ability to visualise the completed solution.

At 8-week follow-up, all subjects reported either improvements or no change in their creative abilities – with no reports of impairments. Although this study is severely limited in not being double blind and placebo controlled, it reports the power of (and importance) of set and setting, and its potential implications for the creative industries is highly significant.

The commercial industry implications for enhancing creativity with drugs

A better understanding of creativity, how best to measure and, crucially, how best to enhance it, has vast implications for commercial industry. Above and beyond the artistic and neuroscientific interest in the creative process, practically all aspects of modern industry rely to some extent on the concept of product design – particularly in the advertising industry, where creativity is arguably the most important element of success (El-Murad and West, 2004). Despite the enormous amount of money and energy invested in such commercial industries, the scientific concept of *how* creativity is enhanced is poorly understood. This makes the neuroscientific understanding of these processes particularly relevant.

There have been some notable historical examples of designers using psychedelic drugs to improve their skills. One such example, from 1965, is when the architect Kyoshi Izumi was asked to design a psychiatric hospital in Canada and decided to take LSD (as a psychotomimetic) and perform extensive visits to old mental institutions in an attempt to see the wards in a new light. He found himself terrified by the standard hospital paraphernalia such as the tiles on the walls, the recessed closets and the raised hospital beds. There was no privacy, and the sense of time was nil, because of the absence of clocks and calendars. After his LSD insights, Mr. Izumi was able to design what has been called 'the ideal mental hospital.' The first was built in Yorkton, Saskatchewan, and five others have been modelled upon it elsewhere in Canada (Stafford and Golightly, 1967).

Another possible example of the creative influence of psychedelic drugs comes from the alleged use of low doses of LSD by the Nobel Prize winner Francis Crick, who discovered the double-helix structure of the DNA molecule in Cambridge in the 1950s. The drug was freely available at that time as a tool for psychotherapy. Crick was a well-known admirer of Aldous Huxley and went on to campaign for the legalisation of cannabis in the 1960s as a founder member of the 'Soma' group – named after Huxley's mythical drug from the book Brave New World.

Another incidence of psychedelic drug–induced creativity from the scientific community comes from the Nobel Prize winning chemist Dr Kary Mullis, the inventor of PCR, who is quoted as saying: 'Would I have invented PCR if I hadn't taken LSD? I seriously doubt it,' he says. 'I could sit on a DNA molecule and watch the polymers go by. I learnt that partly on psychedelic drugs.'

A further striking example of psychedelic drug–enhanced creativity of industry comes from the well-established computer industry in California. The liberal atmosphere and loose approach to creativity fostered by the 1960s use of LSD on the West Coast of the United States spawned a population a creative post-hippie entrepreneurs. Pioneers such as Steve Jobs and Steve Wozniak, founders of the Apple computer industry, were both products of the 1960s counter-culture who were part of a group of visionaries setting out to turn computers into a means for freeing minds and information (Markoff, 2006).

Clinical implications of drugs that may enhance creativity

Perhaps the most obvious clinical area that may benefit from an enhancement of creativity is autism. A common problem in patients with autism is the inability to see the intrinsic (and sometimes abstract) connectivity between people and objects. One of the central tenants of the psychedelic experience is its ability to encourage the user to find new meaning in and see associations between objects and feel part of the abstract connectivity of the universe. Although these are subjective effects enhanced only acutely during the psychedelic experience, they are experiences enjoyed by most people to a lesser degree at all times. In autism, such experiences are frequently impaired. This phenomenon was explored in the early part of the 1960s in a small number of studies using psychedelic drugs on children with autism (Mogar and Aldrich, 1969). Most subjects were between 6 and 10 years old, and all were considered severe cases of autism who had failed to respond to other forms of treatment. Consistent effects of the psychedelic drugs included improved speech in otherwise muted patients, a greater emotional responsiveness to other children and adults, increased positive mood with frequent smiling and laughter and decreases in obsessive-compulsive behaviour. The collective results argued strongly for more extensive research, but this, like all psychedelic research by the end of the 1960s, did not materialise because of socio-political reasons (see Sessa, 2005).

Set and setting

That the classical psychedelic drugs (LSD, Mescaline, DMT and Psilocybin) produce very variable psychological characteristics is undeniable. The role of fostering a positive set and setting is crucial to a positive outcome. This is also true for MDMA – which is generally accepted to produce an overwhelmingly positive mood for most users but is also subject to negative experiences in a minority of cases particularly when users have been given negative information about the drug's effects. Therefore, in exploring psychedelics as clinical tools, the concepts of set and setting ought not to be seen as *confounders* but rather as an *active* part of the experimental

intention. The totality of the psychedelic experience is a combination of pharmacological and psychological factors interacting together in a synergistic fashion; set and setting must be seen as essential components of the psychedelic experience that must be attended to achieve a maximum positive response. Although this is true for *all* clinically used psychotropic drugs to a certain extent (and SSRIs, for example, can have placebo efficacy rates of up to 45%), it is especially so of the psychedelic drugs. Therefore, studies that either deliberately or unintentionally disregard these set and setting factors and report negative outcomes ought not to be used as evidence to dispute the positive potential of psychedelic drugs.

It is well accepted that when under the acute influence of psychedelic drugs, performance on standard tests of intelligence, learning, memory and other cognitive functions, as well as certain psychomotor tasks, generally show impairment and sometimes show lack of change and only rarely show improvement (Carter, *et al*., 2005). However, it is often difficult to get meaningful data from such measurements because subjects frequently become engrossed in the subjective aspects of the drug experience and lose interest in the tasks presented by the investigators. Psychological tests are often seen as absurd or irrelevant by the subjects, illustrated well by this quote from the psychologist Arthur Kleps (1967), 'If I were to give you an IQ test and during the administration one of the walls of the room opened up, giving you a vision of the blazing glories of the central galactic suns, and at the same time your childhood began to unreel before your inner eye like a three-dimension colour movie, you too would not do well on an intelligence test.'

What is the benefit of revisiting psychedelics and creativity research now?

Psychedelic research's current renaissance is spurred on in part by a more realistic understanding of the safety profile of recreationally abused substances. LSD and MDMA were recently categorised far down the list of the potential hazards of 20 commonly abused substances (Nutt, *et al*., 2007). The political climate is beneficial for exploring the therapeutic possibilities of such drugs that have hitherto been considered off limits simply because they have been used recreationally. There are several trials underway throughout the world at present – some of which are aiming to recreate some of the famous studies of the 1950s and 1960s using modern research methods. One such trial recently recreated was Walter Pahnke's *1962 Good Friday Experiment* (Pahnke, 1969) in which psilocybin was seen to induce a subjective experience of spirituality in its users. In the famous 1960s experiment, Pahnke (who was both a physician and a religious minister) used a double-blind technique to administer 30 mg of psilocybin to 10 experimental subjects, whereas a further 10 subjects received an active (but non-psychedelic) placebo (nicotinic acid). All the subjects, who were Harvard theology students, then attended Good Friday Mass at Boston University's Marsh Chapel. Their subjective account of the experience was measured using the 'Stace Criteria' – a well-established scale for measuring the degree of mystical experience. In his 2006 recreation of Pahnke's study, Roland Griffiths of the Johns Hopkins School of Medicine in Baltimore, USA used a double-blind technique and gave psilocybin to 36 volunteers without previous experience with hallucinogens, using a matched-control group who were given methylphenidate (ritalin) as an active placebo. The degree of mystical experience was measured using a questionnaire developed by Ralph W Hood (2001). Sixty-one per cent of the psilocybin subjects reported a 'complete mystical experience', compared with only 13% of the methylphenidate group. Griffiths followed-up the subjects at 2 months and found that 79% of the psilocybin subjects reported moderately to greatly increased life satisfaction and sense of well being. It is noted that there were also some significant negative subjective experiences, with 36% of the psilocybin subjects participants describing a strong to extreme 'experience of fear' during the psilocybin session (which was not reported by any subject during the methylphenidate session), with about one-third of these (13% of the total) reporting that this dysphoria dominated the entire session. (Griffiths, *et al*., 2006). It is difficult to imagine the obvious clinical benefits of such a study, but heartening to see such an experiment that further expands our understanding of neuroscience. A recreation of the previously mentioned study by Harman, *et al*. (1966) would provide similar data to the neuro-scientific community, and as mentioned it could also have far greater implications for clinical and commercial sectors of society.

Conclusion

As with all psychedelic research, planning new projects using drugs that have a contentious history needs to be done cautiously to avoid the (often inaccurate) preconceptions about the relative usefulness and harm of these substances. However, common to all these drugs, there exists a rich wealth of anecdotal studies from 40 years ago that were abandoned prematurely before their full therapeutic potential was either adequately reported or discounted. The area of psychedelic enhancement of creativity is one such area that may have potential benefits for furthering our understanding of neuroscience. In addition, if we are to strive to comprehend the brain and mind in their entireties, these are areas that are worth revisiting with modern research methods.

Acknowledgements

We thank David Nutt from the Psychopharmacology Unit at Bristol University for suggestions and support in preparing this paper.

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