NATURALIZING PSYCHEDELIC SPIRITUALITY

by Chris Letheby

Abstract. A pressing philosophical problem is how to respond to the existential, anxiety and disenchantment resulting from a naturalistic worldview that eschews transcendent foundations for meaning and value. This problem is becoming more urgent as the popularization of neuroscientific findings renders a disenchanted conception of human beings ever more vivid, compelling, and widespread. I argue that the study of transformative experiences occasioned by classic psychedelic drugs such as lysergic acid diethylamide and psilocybin may reveal the nature of a viable practical solution to this problem. Despite the apparent centrality of nonnaturalistic metaphysical apprehensions to psychedelic transformation, findings from psychedelic research suggest that key elements of psychedelic or "entheogenic" spirituality are consistent with naturalism. These include disruption to neurocognitive mechanisms underpinning the sense of self, and consequent experiences of self-transcendence and of the decoupling of attention from personal concerns. This liberation of attention can result in the availability of broader perspectives and the development of wonder and appreciation for life.

Keywords: entheogen; LSD; mysticism; naturalism; neuroexistentialism; neuroscience; philosophy; psilocybin; psychedelic; spirituality

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One of the biggest philosophical problems of our age is how to respond to the existential anxiety caused by the "disenchantment of the world"—the transition from a religious worldview to a naturalistic one that eschews transcendent foundations for meaning and value. Some philosophers have suggested that this problem is currently becoming more acute as the results from contemporary neuroscience filter into the zeitgeist, rendering a disenchanted naturalistic conception of human beings ever more unavoidable and undeniable, and leading to a distinctive "neuroexistentialist" anxiety (Flanagan and Caruso forthcoming; Metzinger 2009).

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Various theoretical solutions to this problem have been pursued, often in the form of efforts to "naturalize" some central pillar of meaning or purpose such as free will or morality (Dennett 1984; Sturgeon 2006). But to (somewhat facetiously) paraphrase Douglas Adams (1979), this is odd because, on the whole, it isn't our theories that are unhappy. I want to explore the prospects for a different, more practical kind of solution, based on a remarkable empirical observation about the conditions under which human beings can regain a sense that life is worth living. I refer to the finding that classic psychedelic drugs such as lysergic acid diethylamide (LSD) and psilocybin can, under conducive circumstances, occasion intense experiences leading to lasting psychological benefits—including the amelioration of existential distress resulting from terminal illness (Grob et al. 2011; Gasser et al. 2014; Griffiths et al. 2016; Ross et al. 2016). A renaissance of scientific research into an "existential medicine" (Grob 2007, 213) certainly warrants the attention of philosophers interested in the overcoming of disenchantment and nihilism.

There is a problem, however, in that some evidence suggests that the existential reenchantment occasioned by psychedelics depends crucially on the induction of mystical experiences involving apparent encounters with transcendent nonnatural levels of reality (Griffiths et al. 2006). If this is so, then psychedelics would seem less a means to making peace with a naturalistic worldview than a means to becoming persuaded of its falsity. In the spirit of the philosophical project of "naturalizing spirituality," I will argue that such nonnaturalistic metaphysical epiphanies are far from the whole story: that there are key elements of psychedelic spirituality that can be practiced by a naturalist in intellectual good faith, and that represent a promising path to reenchanting the naturalistic world on its own terms.

I will begin by describing the neuroexistentialist predicament, and two possible kinds of solutions to it in more detail. Next, I will describe the potential psychedelic solution and the apparent problem with it. Finally, I will draw on neuroscientific research into the mechanisms of psychedelic-induced transformative experience to argue that there is a naturalistically viable kind of spirituality to be found here. The basic idea is that psychedelics degrade the mechanisms of self-representation in the brain, in some cases allowing subjects to see that the ordinary sense of self is a useful fiction, and in other cases freeing their attention from self-focused concerns leading to the availability of broader perspectives on life. The common thread is that a good deal of existential suffering stems from an excessively rigid focus on and reified belief in a solid and enduring self and its travails. Loosening the bonds of this egocentricity and ego identification, by psychedelics or other means, is one good idea about what naturalized spirituality might amount to, and a promising practical response to neuroexistential anxiety.

The Neuroexistentialist Predicament

Naturalism, in its most basic form, is the denial of the existence of nonnatural or supernatural entities such as gods, souls, spirits, and nonphysical minds. It is a commonplace by now that the gradual transition from a religious to a naturalistic worldview over the past few centuries—due to the rise of modern science, and especially since Darwin—has created a crisis of meaning and value. The growing plausibility of naturalism, which leaves no room for any of the traditional foundations of value, evokes anxiety about what, if anything, could possibly replace those foundations, and how, if at all, we might come to terms with a world devoid of them. This naturalistic crisis is sometimes referred to as the *disenchantment of the world* (Dreyfus and Kelly 2011).

Owen Flanagan and Gregg Caruso (forthcoming) argue that we are currently experiencing a new and distinctive wave of existential anxiety as a result of impressive advances in neuroscience and the popular dissemination of these findings. It is not that neuroscience has discovered anything new about how disenchanted the naturalistic world is; rather, it is painting a vivid and dramatic picture of what this disenchantment looks like, in the specific and cherished case of human beings. Part of what is hardest to swallow about a naturalistic view of the world, at least for some, is its implication that human beings are ultimately nothing special—a very smart animal, to be sure, but a mere accidentally evolved, cognitively limited, mortal animal nonetheless. We have no Cartesian ego, no contracausal free will, and no eternal destiny. With every new stride in the neuroscientific mapping of the material bases of decision making, reward, emotion, and so on, this reality becomes ever more palpable. And the popularization of neuroscience plausibly heralds the dissemination of this vision beyond intellectual and academic circles into the broader culture, threatening a wholesale and widespread crisis of meaning.

One useful way of conceiving of this situation is in terms of Wilfrid Sellars's (1963) manifest and scientific images of humankind. The manifest image is simply the potentially highly reflective and refined, but nonetheless prescientific, conception of what kinds of things human beings are, developed and expressed in the arts and humanities as well as in everyday talk and thought. The scientific image, meanwhile, is the theoretical conception of the nature of human beings delivered collectively by biology, psychology, anthropology, and so on—including, most recently and notably, neuroscience. Sellars thought—and others since (e.g., Dennett 2013) have agreed—that dealing with the various apparent conflicts between the manifest and scientific images is one of the central tasks, if not the central task, of philosophy today. It is an important and difficult business trying to "know [our] way around" (Sellars 1963, 1) a world in which our most successful epistemic enterprise seems to keep telling us that we are

something very different from what we automatically and perhaps unavoidably take ourselves to be.

Flanagan and Caruso (forthcoming) describe the manifest image as incorporating commitments to such things as transcendent foundations for meaning, contra-causal (or "libertarian") free will, human exceptionalism, the immortality of the soul, and so on. Doubtless there is considerable interindividual and cross-cultural variation in the precise content of the manifest image. Nonetheless, it seems plausible that most of us operate at least tacitly with an individual and collective self-conception that is significantly at odds with the disenchanted scientific image.

The philosophical attempt to grapple with this interimage conflict is exemplified in the "naturalizing" industry that has sprung up in the last several decades. The basic strategy is to take some component of the manifest image, such as free will, or objective moral requirements, that seems inadmissible to the scientific image, and give an analysis or account of the phenomenon in question that shows that it can be a real and unmysterious part of a purely naturalistic world. Such responses attempt to demonstrate theoretically that the problem is not as bad as it seems, because the naturalistic world is not as devoid of cherished foundations for meaning and purpose as we thought it was.

There is nothing wrong with this kind of strategy, but an interestingly different sort of response is available. This is exemplified by the project that Flanagan (2007) has called *naturalistic eudaimonics* (from the Greek *eudaimonia*, usually translated as "human flourishing")—an empirically based inquiry into the conditions under which human beings can flourish and live meaningful lives. This project arises from a recognition that the neuroexistentialist predicament, while it may have its genesis in our theoretical beliefs about how things are, is not merely a theoretical or intellectual problem—it is a practical, emotional problem, a problem of living. A reflective person who is struggling with the problem of nihilism and disenchantment in our neuroscientific, post-Darwinian age wants to know: how can I, or how can we, live well and find meaning and fulfillment, given the kinds of creatures it seems that we are and the kind of world it seems that we inhabit? Of course, one possible answer to that question is by gaining a theoretical, philosophical understanding, and appreciation of how phenomena such as morality and freedom fit into a naturalistic world. But the eudaimonic approach does not presuppose that the only or the best answers will take this form. Rather, it starts with the question: how do human beings achieve meaning, fulfillment, and flourishing, when in fact they do?

This is similar in spirit to the methodology of the movement known as *neurophilosophy* (Churchland 1986). Practitioners of neurophilosophy—neurophilosophers—seek to bring the results of neuroscience to bear on

traditional philosophical questions. For instance, a neurophilosopher interested in understanding the nature of morality might start her inquiry by looking at neuroscientific evidence concerning moral judgment: its alterations under various conditions, its relations to other cognitive capacities, its neural substrates, and so on (Churchland 2011). She would then use these facts as a basis for philosophical conclusions about morality.

Here, I want to suggest that a helpful contribution to Flanagan's naturalistic eudaimonics could be made by a neurophilosophical inquiry into certain kinds of experiences that are repeatedly referred to as "spiritual," and which sometimes seem to help those who undergo them to overcome existential anxiety and find meaning in life. A golden opportunity for such an inquiry currently exists, in the form of a recent surge of cognitive neuroscience research into pharmacological agents that reliably evoke such experiences—namely, classic psychedelic drugs.

An Existential Medicine?

Patients with terminal illness undergo intense suffering of many kinds, not least of which is the sense that life is worthless or meaningless in light of their impending mortality. Powerful, effective, and reliable methods of ameliorating this existential distress have thus far proven elusive (Henoch and Danielson 2009). Hence, the following quotations from terminal patients are noteworthy: "It was less about my illness. I was able to put it into perspective. . . . Not to see oneself with one's sickness as center. There are more important things in life. . . . The evolution of humankind for example. . . . Your Inner Ego gets diminished, I believe, and you are looking at the whole" (Gasser, Kirchner, and Passie 2015, 62). And: "Dying is as usual or unusual as life itself. You cannot separate it. I simply have to familiarize myself with the idea and the process" (Gasser et al. 2015, 62).

These patients are describing experiences and insights they had while intoxicated by the infamous drug LSD, as subjects in the first controlled study of LSD-assisted psychotherapy in over four decades. The twelve subjects in this study showed reductions in anxiety for twelve months after two LSD sessions (Gasser et al. 2014). Similar results were found in an earlier pilot study using psilocybin, another classic psychedelic, to treat anxiety relating to terminal illness (Grob et al. 2011). More recently, these results have been replicated in two larger, double-blind, placebo-controlled studies of psilocybin treatment for psychological distress in life-threatening cancer (Griffiths et al. 2016; Ross et al. 2016). As a result of these new studies, the treatment of psychological distress in terminal illness is now the best-studied therapeutic application of classic psychedelics (Nutt 2016). Considerable research in the 1960s and 1970s (albeit typically not based on placebo-controlled trials) found promising results using psychedelics

for this indication; a fascinating account is given by William Richards (2015).

So, we have evidence for thinking that experiences occasioned by classic psychedelics can help people to deal with a sense of the meaninglessness of life in light of mortality. This suggests the possibility of an analogy with other kinds of existential anxiety: could psychedelics offer part of a solution to neuroexistentialist anxiety and the crisis of meaning resulting from the disenchantment of the world? This kind of solution might take two forms: either the careful, controlled administration of psychedelics (in a vastly different legal, regulatory, and cultural situation from that which exists today) to volunteers afflicted by neuroexistentialist anxiety, or the study of the mechanisms of psychedelic therapy in the hopes of finding nonpharmacological routes to their salutary psycho-existential effects.

Before I explore this possibility in more detail, a little background is in order. LSD and psilocybin are both "classic" psychedelics, meaning that they alter consciousness mainly by agonism of the serotonin 2a receptor. Other famous exemplars of this class include mescaline (from the peyote cactus) and dimethyltryptamine (DMT, an ingredient in the South American beverage ayahuasca), both of which have long histories of traditional religious use (as does psilocybin.) I will confine my discussion here to these classic, serotonergic psychedelics, and reserve the term *psychedelic* for them alone, omitting other drugs which have been called "psychedelic" on phenomenological grounds despite different mechanisms of action (e.g., ketamine, Salvia Divinorum, and 3,4-methylenedioxymethamphetamine [MDMA] or "ecstasy"; Sessa 2012).

From the 1940s to the 1960s, there was widespread scientific interest in psychedelics following Albert Hoffman's discovery in 1943 of the potent effects of LSD. The propensity of psychedelics to induce experiences that subjects described in spiritual or mystical terms was one factor responsible for this interest (Dyck 2008). It should be noted that another distinctive property of psychedelics is the extreme variability of their effects; as such, it is certainly not the case that every psychedelic experience is of a spiritual nature (Masters and Houston 1966). However, experiences of this broad kind seemed to keep happening unbidden, even when the drugs were being studied for quite different reasons, such as their putative capacity to mimic psychosis (Mangini 1998).

Since the early days of psychedelic science, there has been a debate over the credentials of drug-induced mystical-type experiences: whether they are identical or different, equivalent or inferior, to "genuine" mystical experiences which occur spontaneously or through religious practice (Zaehner 1958; Smith 1964; Walsh 2003). However, it is beyond doubt that many psychedelic experiences possess core phenomenological features characteristic of nondrug mystical states, such as the dissolution of the sense

of self, a feeling of unity with the cosmos, ineffability, and profound joy and peace (Pahnke 1969; Griffiths et al. 2006). This similarity was emphasized by intellectuals such as Aldous Huxley (1954), Alan Watts (1962), and Timothy Leary (Leary, Metzner, and Alpert 1964), who explicitly connected the psychedelic state to the consciousness alterations aimed at by Eastern meditative practices, laying the conceptual groundwork for the psychopharmacological mysticism of the 1960s counterculture. Many psychedelic mystics of the era became dedicated practitioners, sometimes teachers, of meditation (Dass 1971; Osto 2016).

Ultimately, psychedelics became the focus of intense sociopolitical controversy due to widespread use by members of the counterculture, leading to their prohibition and the subsequent virtual cessation of human research for some decades (Dyck 2008). Since the 1990s, however, a slow but steady "renaissance" of scientific interest in psychedelics has occurred (Sessa 2012). As well as establishing the feasibility and safety of careful and controlled psychedelic administration, this new wave of research has begun revisiting earlier claims for the therapeutic and transformative efficacy of psychedelics.

I already mentioned the four studies published to date of LSD and psilocybin in the treatment of anxiety resulting from terminal illness. Besides these, small studies have also investigated the potential of psilocybin, LSD, and ayahuasca to treat addiction, obsessive-compulsive disorder, and depression, with uniformly promising albeit tentative results (reviewed in dos Santos et al. 2016a). Meanwhile, studies in healthy nonpatient populations have found that mystical-type experiences induced by psilocybin can lead to positive personality change lasting over a year (MacLean, Johnson, and Griffiths 2011). One frequent result, both in these studies of healthy subjects and in studies of therapeutic applications, has been that the degree of mystical experience predicts the degree of long-term psychological benefits. This echoes results from earlier, often less methodologically rigorous mid-twentieth century studies (Pahnke 1969). So there is mounting evidence that classic psychedelics can durably improve quality of life by inducing mystical or spiritual experiences, bolstering the case for them as a potential remedy to neuroexistential anxiety and disenchantment.

There is a problem, however, in that such mystical experiences almost by definition involve the apparent apprehension of a transcendent, nonnatural reality or "Ground of Being" of precisely the kind that is denied by a naturalistic worldview. If inducing such experiences really is the means whereby psychedelics improve individuals' psycho-existential situations, then it would seem that these drugs are suited not to reconcile subjects to naturalism but to persuade them of its falsity. This is a serious reason to doubt whether my proposed neurophilosophical response to the neuroexistentialist predicament can even get off the ground.

Naturalistic Entheogenics

To some—especially those who have themselves benefited from a psychedelic mystical experience—it may seem that there is little here to worry about. If psychedelic mysticism can solve our neuroexistentialist problem by showing us that there is no problem, because a transcendent foundation for meaning exists after all, then so much the better!

The problem is that those who are impressed by the theoretical arguments for naturalism will be unimpressed by this response. The arguments for naturalism strike many philosophers as very persuasive, and if these arguments are sound—if naturalism is true—then the apparently nonnaturalistic dimensions of mystical experience must be illusory. I am not undertaking a defense of naturalism here, but rather asking: on the (plausible) supposition that naturalism is true, is there a way that we can existentially come to terms with that fact? It should be clear that taking nonnaturalistic mystical realizations at face value cannot support an affirmative answer to this question. Becoming convinced that a fact does not obtain is not coming to terms with it.

A related objection to my project is that strong realism about mystical experience is not actually in tension with naturalism. After all, runs the thought, "naturalism" is just the view that the natural is all there is. But if such things as a fundamental universal consciousness turn out to exist, then they are part of the furniture of the natural world, and so a view that countenances them can legitimately be called "naturalistic."

This line of thought is strictly correct, but such a version of naturalism—one which could stretch to accommodate a universal consciousness or transcendent source of meaning—is clearly not the kind that is at issue in the neuroexistentialist project. The version of naturalism that underpins much current theorizing about the mind, and that is sufficiently austere and "disenchanted" to give rise to the neuroexistentialist predicament, is one which centrally involves a rejection of all transcendent sources of meaning (such as a universal consciousness) and a commitment to the view that consciousness is identical with, or somehow emerges from, brain activity.

Of course, this austere naturalism may turn out to be false. Perhaps psychedelic and other evidence will force us to reexamine our assumptions about the mind–brain relationship and the fundamental nature of reality. And perhaps the alleged ineffability and paradoxicality that are hallmarks of mystical experience (Griffiths et al. 2006) somehow hold the key to reconciling a transcendent worldview with the apparently strong evidence that consciousness is brain-bound (Revonsuo 2006). But perhaps not. From a theoretical standpoint, it must be acknowledged that the famed "noetic quality" (James 1902) of mystical experience—the subjective sense of indubitable metaphysical insight—may well be an illusion, no different in principle from the subjective sense of familiarity in déjà vu

experiences. And it is conceivable that psychedelic research, far from providing evidence against austere naturalism, may ultimately help us understand exactly *how* consciousness emerges from brain activity (cf. Brogaard and Gatzia 2016). At any rate, this no-transcendent-meaning, consciousness-brain-bound worldview is the one for which I am reserving the term *naturalism* in this article, and whose existential consequences I am interested in exploring.

My psychedelic response to the neuroexistentialist predicament is intended as a contribution to the project of naturalistic eudaimonics, which Flanagan and Caruso (forthcoming) explicitly define as an inquiry into the conditions of flourishing for beings "whose self understanding includes the idea that [a naturalistic world] is the only kind of world that there is." The key question then becomes: is it true that the basic way in which psychedelic experiences alleviate psychological and existential distress is by convincing subjects that some more comforting metaphysical worldview than naturalism is correct? I am going to argue that it is not; that there are core aspects of the psychedelic transformative process, even in intense peak experiences, which are independent of apparent nonnaturalistic metaphysical apprehensions. Moreover, I am going to suggest that even some of the aspects of psychedelic experience which prompt the description *spiritual* fit this naturalistic bill.

At this point my project connects with recent philosophical endeavors to naturalize spirituality, as distinct from religious belief. The very idea of something worth calling "spirituality" that is both separable from religion and consistent with a naturalistic metaphysics may sound strange at best, contradictory at worst. But there is a growing recognition that one common use of the word *spiritual* denotes something that is distinct from religion, that has more to do with a personal quest for meaning based on transformative practice and experience, specifically experience of a self-transcendent nature. And proponents of naturalistic spirituality have been arguing that at least some of these practices and experiences can be pursued and cultivated in a way that is compatible with both intellectual honesty (Metzinger 2014) and a commitment to naturalism (Stone 2012). My aim here is to extend these efforts into the psychedelic sphere.

The neologism *entheogen* (generating the divine within) has become popular as a way of referring to psychedelics when used specifically for spiritual purposes (Ruck et al. 1979; Smith 2000). It is not too much of a stretch to say that the history of psychedelic research has been witness to a tension between an "entheogenic conception" of the drugs and a seemingly opposing "psychotomimetic/hallucinogenic conception" favored by less mystically and more naturalistically inclined thinkers. This latter conception sees psychedelics as fundamentally agents of misrepresentation and cognitive distortion, lacking significant epistemic value; according to Nicolas Langlitz's (2012) anthropological studies of psychedelic science,

such a conception is implicit in much of the language used to frame model psychosis research. But Langlitz notes a tendency to rapprochement on the part of certain psychedelic researchers who embrace what he calls a *mystic materialism*. In effect, I am going to be suggesting that such a view is legitimate, by trying to naturalize the entheogenic conception of psychedelics.

I will not be assuming or defending any specific philosophical account of naturalistic spirituality. Instead, in keeping with my neurophilosophical orientation mentioned earlier, I propose that we take a "bottom-up" approach to understanding the phenomenon: look first at what is known neuroscientifically about the kinds of experiences and practices in question, and try to identify the features and qualities that cause people to describe them as "spiritual." We can come to understand what spirituality is, and whether and how it is compatible with naturalism, by looking closely at the details of paradigm cases of putatively spiritual phenomena. And subjects' overwhelming tendency to describe them in such terms suggests that psychedelic peak experiences certainly fit the bill.

Even though I will not endorse any of the existing theories, I will note that one ground for optimism about naturalizing entheogenics is that many common features of psychedelic experiences are also common themes in theories of naturalistic spirituality. Among these are wonder and awe, especially at the natural world (Goodenough 1998), love of life (Solomon 2002), and dissolution or transcendence of the individual sense of self (Harris 2014; Simpson 2014).

Ursula Goodenough proposes that reflective contemplation of scientific descriptions of nature, along with philosophical mysteries such as why there is something rather than nothing, can evoke deeply thoughtful but also affective responses of wonder and reverence at the vastness, complexity, and improbability of the natural world and of our own existence. Part of this process involves broadening our perspective and learning to see the individual self in a much larger spatiotemporal context (Goodenough 1998; Goodenough 2001; Goodenough and Woodruff 2001). Robert Solomon's account of naturalistic spirituality echoes many of these themes, recommending a thoughtful (intellectually well-grounded) sense of love and reverence for life as it is, and a sense of existential gratitude grounded in an appreciation of the vulnerability and contingency of our own lives. Like Goodenough, Solomon (2002) suggests that a key part of the spiritual process is the broadening of perspective beyond the concerns of the individual self.

While these theories of spirituality recommend transcending the self by a broadening of perspective, Sam Harris (2014) holds that spirituality consists precisely in attaining and then deepening a direct, experiential insight into the nonexistence of the self. Of course, Harris does not deny that conscious biological organisms as constantly evolving processes exist. But the claim here, common to many mystical traditions and articulated

most clearly in Buddhism (Albahari 2006), is that we tacitly and habitually take ourselves to be something more than a constantly changing process—a persisting and indivisible subject of experience sharply distinct from the rest of the world. Our acceptance of this "self-illusion" is claimed to give rise to much psychological suffering, and as such, seeing through the illusion is prescribed as a remedy.

As Harris is at pains to emphasize, despite the stronger metaphysical commitments of some schools of Buddhism, there is nothing nonnaturalistic about this core psychological claim (cf. Simpson 2014). Ultimately, I will suggest that psychedelics dissolve (or weaken) the self-illusion, and broaden our perspectives, by the same basic mechanism. Evidence to be discussed below suggests that the neurocognitive systems underpinning the sense of self are the same ones that constrain cognition in accordance with the goals and interests of that self, and disrupting these systems both diminishes the felt sense of self and liberates attention from bondage to self-centered concerns. Thus, despite their differences in emphasis, there is plausibly a mechanistic unity to the varieties of "deselfing" recommended in these various accounts of naturalistic spirituality.

A second ground for optimism is that some psychedelic researchers describe the entheogenic transformative process in terms that do not sound unambiguously nonnaturalistic. For instance, Charles Grob, describing the use of psilocybin for anxiety relating to terminal illness, says this: "Under the influence of hallucinogens, individuals transcend their primary identification with their bodies and experience ego-free states before the time of their actual physical demise, and return with a new perspective and profound acceptance of the life constant, change. . . . This implicit acceptance of the inevitable cycles of life leads to a drastically altered approach to what time is remaining without the panic, fear, pain, and dependency that were previously so overwhelming" (Grob 2007, 213).

Of course, references to transcending a "primary identification" with the body, and to experiencing "ego-free states," may sound somewhat questionable to naturalistic ears. However, as I have indicated, I think that there is perfectly plausible naturalistic sense to be made of such talk. In order to establish this, I turn now to recent cognitive neuroscience research on the mechanisms of psychedelic transformation.

Mechanisms of Mysticism

Recent functional magnetic resonance imaging (fMRI) studies of the psychedelic state have provided a fascinating window onto the mechanisms whereby these substances exert their effects on consciousness. Robin Carhart-Harris et al. (2012) found, to their surprise, that intravenous psilocybin decreased brain activity, rather than increasing it as had previously been thought. Moreover, the decreases were concentrated mainly

in the famous default mode network (DMN), a network of densely connected brain regions, most active in resting task-free conditions, which has repeatedly been implicated in generating the sense of self, as well as in mind-wandering, mental time travel (the simulation of past and future events), and theory of mind (the attribution of mental states to self and others; Raichle et al. 2001; Spreng and Grady 2010).

The decrease in activity and connectivity within the DMN was accompanied by a global increase in the unpredictability of the patterns of functional connectivity throughout the brain, quantified by the information-theoretic construct of *entropy*. Carhart-Harris et al. (2014) used these findings to argue that the core mechanism of psychedelic consciousness alteration is downregulation of the DMN, which they claim implements ego functions and serves as a "conductor" of the global neurocognitive orchestra, constraining the quality of cognition to maintain an efficient and adaptive functional profile. Disruption to the DMN disrupts its ability to constrain cognition and allocate resources in a goal-driven fashion, and this explains many key features of the psychedelic state such as the detaching of attention from personal concerns and the sense of "mind expansion" resulting from a broadening and loosening of attention.

Note that Carhart-Harris et al. (2014) are here offering a *neurocognitive theory* of psychedelic consciousness—that is, one which explains the phenomenology of the psychedelic state in terms of changes to the functioning of a complex computational architecture implemented in neural circuitry (cf. Gerrans 2014). This accords with ubiquitous methodological principles in current philosophy of mind and cognitive neuroscience. Of course, the "hard problem" (Chalmers 1995) of exactly how neurocomputational activity gives rise to phenomenal experience has not yet been solved. But that it does somehow is a compelling and parsimonious inference from the vast body of empirical and theoretical research in cognitive neuroscience. The success of this research program constitutes a prima facie vindication of its foundational postulate, the "heuristic identity theory" (Bechtel and McCauley 1999) that says that mentality is ultimately nothing other than brain activity of some (to-be-identified) kind.

The dissolution of the ego or sense of self is a quintessential feature of psychedelic experiences, particularly mystical ones, which also seems explicable on the basis of this neurocognitive theory. Remarkably, subjective ratings of ego dissolution in these studies correlated strongly with decreases in alpha oscillations in the posterior cingulate cortex (PCC), a key DMN hub whose activity is also decreased in states of "effortless awareness" achieved by meditation (Brewer, Garrison, and Whitfield-Gabrieli 2013). (Such relationships of mutual manipulability between brain and mind—affecting one by intervening on the other, and vice versa—go beyond mere correlation to support a stronger explanatory link of the kind posited by the heuristic identity theory; cf. Craver 2007.) Moreover, a

study of cortical thickness in long-term religious users of ayahuasca found thinning in the PCC relative to matched controls. This thinning correlated with the extent of prior ayahuasca use, as well as with psychometric scores for the personality trait of "self-transcendence," and was not accompanied by any impairment to neuropsychological function (Bouso et al. 2015). Combined with the finding that acute ayahuasca intake increases capacities cultivated in mindfulness meditation, such as psychological "decentering" and a nonjudgmental perspective on inner experience, this set of observations is intriguing to say the least (Soler et al. 2016).

Carhart-Harris et al. (2014) argue that ego dissolution and entropy elevation both result essentially from psychedelic-induced downregulation of the DMN and related networks. Discussing the therapeutic effects of psychedelics, they note that many of the conditions indicated—addiction, depression, anxiety, and obsessive-compulsive disorder—are characterized by cognitive rigidity. They propose that the psychedelic-induced entropy elevation shakes the cognitive system out of its rut, breaking down entrenched patterns (i.e., habits) of thought, feeling, and perception, creating the possibility of forming new, more adaptive patterns by potentiating novel and underutilized pathways. This claim is further supported by the recent finding that the degree of entropy elevation induced by LSD predicted the magnitude of increases in the personality trait of openness to experience displayed by healthy subjects a fortnight later (Lebedev et al. 2016). This is the same personality trait that was increased following psilocybin-induced mystical experiences (MacLean et al. 2011).

Many questions remain unanswered in the cognitive neuroscience of psychedelics. Not all neuroimaging studies have produced consistent results (see dos Santos et al. 2016b for a review). However, the theoretical speculations I have just described represent a plausible synthesis of current mechanistic knowledge that is consistent with phenomenological observations and provides a useful basis for thinking about the spiritual dimensions of the experience.

Consider ego dissolution, a prominent element of mystical experience. As I mentioned earlier, it is a plausible naturalistic view that the self or "I" as we ordinarily experience it does not exist—that the sense of self is a useful fiction created by the brain (Metzinger 2003). Buddhism contends that our belief in the reality of this fictitious entity, and our subsequent attachment to its fortunes, is the source of all psychological suffering (Albahari 2006). The DMN has repeatedly been implicated in both mind-wandering and the sense of self, and empirical studies have shown that time spent mind-wandering, and functional connectivity within the DMN, both predict unhappiness. Matthew Killingsworth and Daniel Gilbert (2010) used an experience-sampling methodology implemented by a smartphone app to track participants' self-reported levels of mind-wandering versus mindfulness, and happiness versus unhappiness, throughout the day. They

reported that mind-wandering was both extremely common and strongly correlated with a state of unhappiness. Meanwhile, Yangmei Luo et al. (2015) found that high levels of functional connectivity within the DMN as revealed by resting-state fMRI were correlated with trait unhappiness as determined by psychometric questionnaires (cf. Machado and Cantilino 2016). There is no need to swallow Buddhist psychology whole to entertain the view that excessive rumination about the self and its travails causes much needless distress.

Granted this much, the ego dissolution experience may well involve a genuine insight, a veridical apprehension of the fact that our sense of being a discrete and persistent "I" arises out of a habitual process of creating models and spinning narratives about an ultimately fictitious entity (Dennett 1991; Simpson 2014). And if breaking the cycle of self-focused rumination can help to alleviate anxiety and depression, in general, then it theoretically ought to work for existential anxiety, in particular. After all, existential anxiety, as much as any other kind, intrinsically involves a focus on the prospects of a subject, a self, in a threatening predicament.

There is an obvious worry about the very idea of an ego dissolution experience: that it is conceptually incoherent to claim that a subject has a memory of an episode during which their sense of self was absent (Metzinger 2005). It is possible to reply to this by suggesting that, despite appearances and intuitions, the cognitive processes supporting self-representation and autobiographical or episodic memory encoding are dissociable (cf. Letheby 2015). But further empirical research would be needed to determine this. A simpler line of response is to concede that probably some minimal sense of self remains in most if not all psychedelic experiences (Pahnke 1969; Shanon 2002). Even if that is true, clearly the dramatic alteration or diminution of the ordinary sense of self is enough to have a profound impact on a subject.

Moreover, there is reason to think that a "mere" loosening, rather than dramatic diminution, of the sense of self can have a profound effect. In the recent study of LSD in terminal illness, full-blown mystical experiences were not generally observed. Instead, reductions in anxiety were brought about by emotional, not metaphysical, peak experiences, characterized by loosening, not disintegration, of ego boundaries (Gasser et al. 2015). The researchers suggest that the reductions in existential angst were brought about by a liberation of attention from its bondage to personal concerns, enabling patients to access new, broader perspectives on their predicament: "Throughout an altered basic emotional experience, loosening of ego functions combined with pronounced self-referential processing of significant (intellectual/emotional) content, patients may gain a new perspective on themselves and a reduction of ruminations and ego-centeredness" (Gasser et al. 2015, 9).

One patient in this study commented that when the sense of ego is diminished, "you are looking at the whole . . . you are indeed starting to build relations with plants or with the entire living world around. You think less about yourself, you are thinking—across borders" (Gasser et al. 2015, 6).

These observations suggest a mechanism, distinct from but continuous with the mechanisms of full-blown mystical or ego dissolution experiences, whereby psychedelics could induce the kinds of experiential qualities emphasized in Goodenough's and Solomon's theories of naturalistic spirituality: broader perspectives, wonder and awe, and appreciation of life. Recall, Carhart-Harris et al. propose that the DMN, as part and parcel of the "ego functions" it implements, serves to constrain the quality of cognition, allocating attentional resources to stimuli in accordance with an organism's goals. We have seen that an excessive focus on the self and its travails, existential or otherwise, plausibly underpins much psychological distress, existential or otherwise. But this excessive focus also consumes attentional resources that otherwise could be devoted to nonself-related cognitive contents, such as reflection on the natural world and the human condition.

Indeed, psychedelic phenomenology suggests that when attention is freed from a bondage to self-related concerns by the downregulation of "selfing" systems in the brain, these are exactly the kinds of places that it tends to go. It is very common, even in nonmystical states, for psychedelic subjects to report feeling a sense of kinship with the natural world, or wonder and awe at the miracle of existence, in general, and human existence, in particular (Shanon 2002). In his literary analysis of narrative reports of psychedelic experience, R. A. Durr (1970) argues that changes to attention in the psychedelic state lead to the same kind of (essentially imaginative) appreciation of life that is expressed in verse by the Romantic poets. When the bonds of self-concern are weakened psychopharmacologically, "looking at the whole [and] starting to build relations with plants or with the entire living world" becomes, it would seem, not only possible but probable.

The philosopher Jesse Prinz (2014) proposes an account of the cognitive dynamics of aesthetic appreciation that seems applicable to the broader kind of appreciation of life resulting from psychedelic states. On Prinz's view, appreciation amounts to a positive feedback loop between attention and wonder. Attention alights on some element of a visual object that evokes wonder, and the sense of wonder leads to increased attention to the visual element, and so on. Perhaps by disrupting the analogous but deleterious positive feedback loop between existential anxiety and excessive attention to the existential predicament of the self, psychedelics create space for other, more beneficial attentional cycles to arise (cf. Nichols, Johnson, and Nichols 2017).

Everything I have said so far points to a central common element in mystical and nonmystical psychedelic experiences: the weakening of the ego by disruption to the DMN, whether this results in an "ego dissolution" experience or a broadening of attention and loosening of cognition. In either case, something occurs that could reasonably be called mind-expansion, a liberation of focus from a narrow, rigid, and maladaptive preoccupation with a reified self and its predicament. There is evidence that this basic process is important to the therapeutic and transformative effects of psychedelics. And while clearly compatible with a naturalistic outlook, a transformative process that involves broadening perspective beyond the individual self, and apprehending its interconnectedness, transience, and ephemerality, surely deserves the name *spirituality* if anything does.

Conclusion

The disenchantment consequent upon naturalism, particularly in its current neuroexistentialist incarnation, is a pressing problem deserving of serious philosophical attention. Various theoretical solutions exist, in the form of attempts to "naturalize" some aspect of the manifest image and show how it can be located unproblematically in the scientific image. But in accordance with Flanagan's (2007) project of naturalistic eudaimonics, it is also well worth pursuing practical solutions to this problem via a neurophilosophical inquiry into transformative experiences that may offer a path to the alleviation of existential distress.

Building on promising earlier research, the recent renaissance of psychedelic science has found evidence that substances such as LSD and psilocybin can cause remarkable consciousness alterations with lasting psychological benefits—including reductions in the existential distress of terminal patients. This suggests that psychedelic science is a very good place to look for practical solutions to the neuroexistentialist predicament. But when we look more closely, we find that psychedelic transformation seems to depend crucially on mystical experiences that often move subjects to embrace radical, transcendent metaphysical views of reality. This raises the question: do psychedelics just alleviate subjects' existential distress by facilitating extremely vivid and convincing experiences of a nonnaturalistic metaphysical vision—a "joyous cosmology" (Watts 1962)? If this turned out to be so, it would stop any naturalistically acceptable neuroexistentialist application of psychedelics dead in its tracks.

I have argued that this is not the case: that many key aspects of the psychedelic transformative process are perfectly compatible with an austere version of naturalism that eschews transcendent foundations for meaning and sees consciousness as identical to or emergent from brain activity. The recent neurocognitive theory of psychedelic consciousness and its beneficial effects, developed by Carhart-Harris et al., provides a helpful basis for

thinking about the putatively spiritual dimensions of these experiences. Combining this theory with clinical and phenomenological evidence leads to the conclusion that psychedelic spirituality is, in large part, a matter of disrupting the functioning of neurocognitive systems (e.g., the DMN) that give rise to an illusory sense of a separate self and constrain cognition and consciousness in accordance with representations of the goals, priorities, and predicaments of that self. On this view, self-representation constricts and contracts the mind (*inter alia*), sometimes to undeniably pathological extents; loosening or disintegrating the ego can open and expand it to far broader horizons

Naturalistic spirituality is all about breaking down the illusion of being a solid, separate, and persistent self, sharply distinct and apart from the rest of the world, opening the door to a greater intimacy with life. By breaking the spell of narrowly self-focused rumination, psychedelics liberate attention from its egocentric bondage, enlarging perspectives, and expanding the mind. The resultant wonder and awe at the universe and the human condition does not depend on the acceptance or rejection of any specific, substantive metaphysical belief, but nonetheless leads to the kind of peace that is all apiece with profound appreciation of the natural world just as it is, in all its vastness, complexity, and mystery.

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