



ALIUS BULLETIN

exploring the diversity of consciousness

Martin Fortier, Matthieu Koroma & Rojwan Lemoine (eds.)

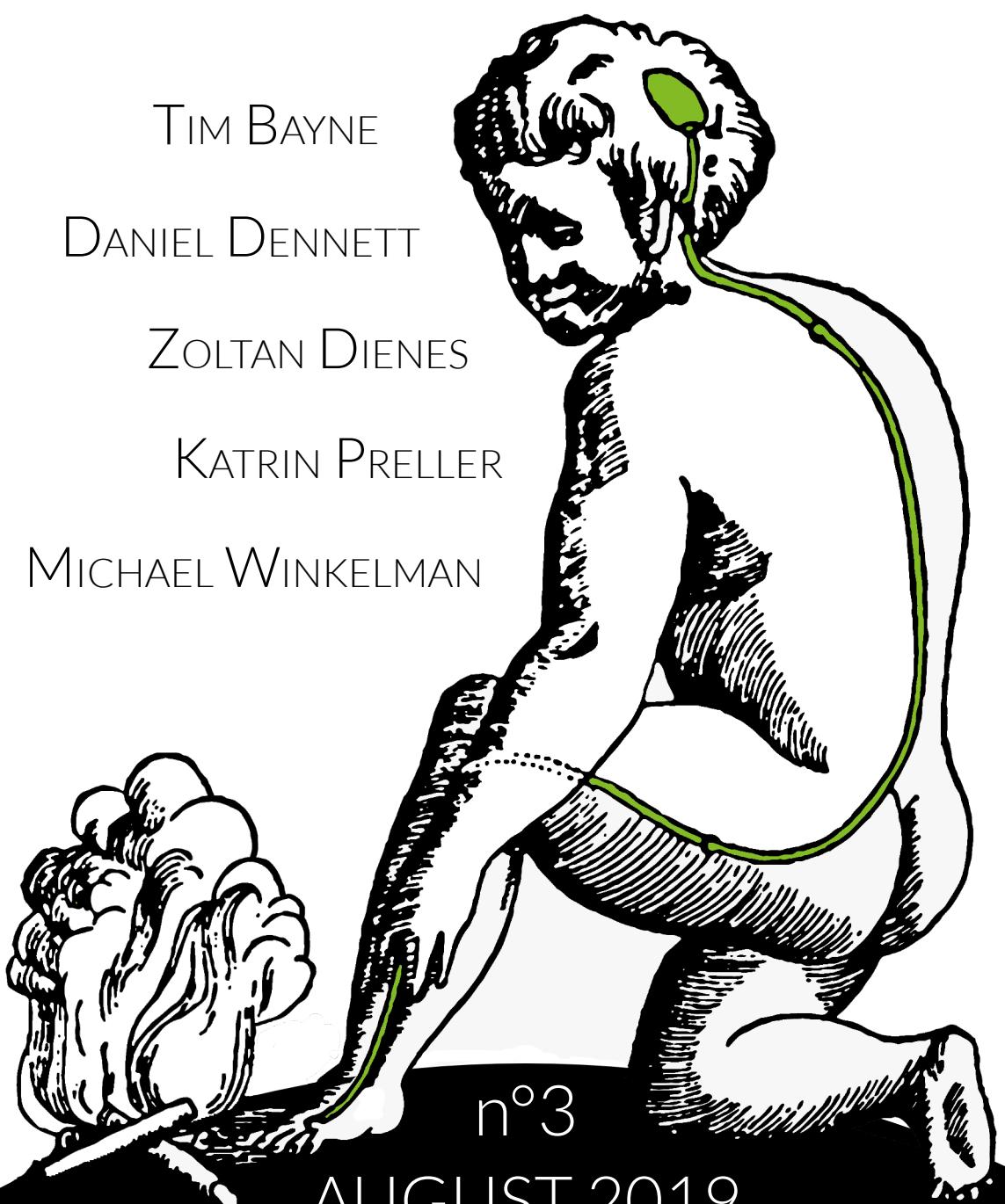
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Foreword

About ALIUS

ALIUS is an international and interdisciplinary research group dedicated to the investigation of all aspects of consciousness, with a specific focus on non-ordinary or understudied conscious states traditionally classified as *altered states of consciousness*.

In Latin, *alius* means “different”. This lexical choice reflects the group’s mission to study the diversity of consciousness in a systematic manner. ALIUS puts a particular stress on the need for a naturalistic approach to all aspects of consciousness, including states and experiences which have long been unduly associated to parapsychology and pseudoscientific hypotheses.

To this end, it fosters a unique interdisciplinary collaboration of researchers, involving neuroscientists, psychologists, philosophers of mind, psychiatrists and anthropologists, towards the development of a systematic and scientific model of consciousness supported by both theoretical work and experimental studies. This collaboration may take the form of joint articles, blog posts, editorial work on special issues, thematic workshops and international conferences.

Find out more about the group on the website: aliusresearch.org

About the Bulletin

The ALIUS Bulletin is an annual publication featuring in-depth interviews with prominent scholars working on consciousness and its altered states (ASCs). The goal of the Bulletin is to present a clear outline of current research on ASCs across a variety of disciplines, with an emphasis on empirical work. It also aims at dispelling the widespread stigma that still plagues the notion of ASC, while allowing a wider audience to discover rigorous scientific work on the topic presented by authors in their own words.

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Contributors

Tim Bayne is a Professor of Philosophy at Monash University (Melbourne). He specializes in philosophy of mind and cognitive science, with a particular interest in the nature of consciousness. He has written extensively on the ways in which the structural features of consciousness (such as its unity) can guide the search for a plausible account of its neural basis. He has ongoing interests in the taxonomy of consciousness, including the relationship between the contents of consciousness and global states of consciousness, and the relationship between conscious contents of different kinds. He also works on a number of issues in the philosophy of psychiatry, exploring questions relating to the etiology of delusions and the nature of psychiatric kinds. His current research focuses on the challenges posed by validating novel methods for detecting consciousness, and on whether it is possible to construct a ‘consciousness meter.’

Daniel C. Dennett is the Austin B. Fletcher Professor of Philosophy at Tufts University, and the co-director of the Center for Cognitive Studies at Tufts. Professor Dennett has written numerous books on the topics of philosophy of mind, free will, consciousness, evolution, and religion. He has been an important commentator on cognitive science for most of the latter’s history. He is particularly known for his “intentional stance” view of mental states, his compatibilist view of free will, and his multiple draft model (“cerebral celebrity”) of consciousness. Professor Dennett has been highly influential in academic philosophy and has also inspired swarms of students to go into the fields of cognitive science and AI.

Zoltan Dienes is a Professor of Psychology at the School of Psychology from the University of Sussex (Brighton, United Kingdom). He is internationally renowned for his research on the distinction between conscious and unconscious mental states, particularly knowledge and also intentions (he has published more than 170 academic articles, h-index = 54 on Google Scholar). He argues that hypnosis is a way of acting which is intentional but the person is strategically unaware of those intentions. Zoltan Dienes is a keen supporter of open science; he developed a way of thinking about Bayes factors for hypothesis testing in psychology, and is on the Registered Reports board of three journals. He provided the first online Bayes Factor calculator and wrote a book in which you can find more about foundational differences between Bayesian data inference and orthodox statistics: *Understanding Psychology as a Science: An Introduction to Scientific and Statistical Inference* (2008).

Katrin Preller, Ph.D., received her M.Sc. (Neuropsychology) from University of Konstanz, Germany. She completed her PhD at University of Zurich, Switzerland, investigating the neurobiological and social-cognitive long-term effects of cocaine, MDMA, and heroin use. After completing her PhD, she joined the

Neuropsychopharmacology and Brain Imaging lab at the Psychiatric University Hospital Zurich, investigating the effects of psilocybin and LSD on self-perception, social cognition, and multimodal processing using different brain imaging techniques. After working as a postdoc at the Wellcome Trust Centre for Neuroimaging, UCL, London, UK, and Yale University, New Haven, CT, USA, she now continues her research on the neurobiological effects of psychedelics at University of Zurich and Yale University.

Michael Winkelman. Although an anthropologist by training, Michael has made key contributions to numerous fields: anthropology of consciousness, anthropology of religion, evolutionary anthropology, evolutionary psychology, neuroanthropology, neurophenomenology, neurotheology, and psychedelic studies. In the 1980s, he pioneered the use of ethnological (cross-cultural) databases in the study of religion. Most of his subsequent work has explored how cross-cultural phenomena such as shamanism are fundamentally grounded in humans' evolved psychology and how altered states of consciousness can be profoundly adaptive. During many years he was a professor at Arizona State University's School of Human Evolution and Social Change. He is now retired, and lives in Brazil—but is still very active academically. His books notably include *Shamans, Priests, and Witches: A Cross-Cultural Study of Magico-Religious Practitioners* (1992), *Shamanism: A Biopsychosocial Paradigm of Consciousness and Healing* (2010), and, in collaboration with John Baker, *Supernatural as Natural: A Biocultural Approach to Religion* (2010). He also co-edited two acclaimed volumes entitled *Altering Consciousness: Multidisciplinary Perspectives* (2011). He has two new co-edited books—*Advances in Psychedelic Medicine* (2019) and *The Supernatural After the Neuro-Turn* (2019)—and a forthcoming special issue of the *Journal of Psychedelic Studies* on “Psychedelics in History and World Religions.” For more on his work, see his personal website: <http://michaelwinkelman.com>

How to study consciousness as a natural phenomenon

An interview with
Tim Bayne

by Alessio Bucci & Matthieu Koroma

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Abstract

The field of the scientific study of consciousness has seen a flourishing of methodologies and theories. The debate over what defines consciousness and how we should study it is, however, yet to be settled. Philosopher Tim Bayne has proposed the “natural kind” approach, suggesting that consciousness properties should be empirically informed rather than defined *a priori*. Relying on the cross-talk between philosophy and empirical science, he proposes a cautious and integrative outlook that takes into account the diversity of the conscious phenomenon, defending a multidimensional model of conscious states.

keywords: altered states of consciousness, global state of consciousness, levels of consciousness, multidimensional model, natural kind approach.

Consciousness remains one of the most puzzling phenomena for both philosophers and scientists. Could you explain what triggered your interest in this topic? What are the questions about consciousness you have been addressing with your research? Do you think that there are questions about consciousness that cannot be answered?

My initial interest in consciousness focused on the unity of consciousness. I was struck by the fact that philosophers have traditionally regarded unity as one of the central features of consciousness, whereas many consciousness scientists (and a significant number of philosophers!) seem to assume that consciousness is anything but unified. I began to wonder whether those who were “pro” unity had the same conception of “the unity of consciousness” as those who were against it, and the more I read on the topic the more convinced I became that there were many conceptions of “the” unity of consciousness. One of the first papers that I published—co-written with my PhD supervisor David Chalmers—was largely devoted to distinguishing different conceptions of the unity of consciousness. Since then I’ve gone on to

consider the ways in which the various aspects of the unity of consciousness might be explained, and what implications the unity of consciousness has for theories of consciousness. I've also written on various other facets of consciousness, such as the relationship between consciousness and agency and the nature of conscious thought.

Are there questions about consciousness that cannot be answered? Quite possibly. Many theorists believe that scientific advances will enable us to bridge the explanatory gap between the physical/functional properties of the brain on the one hand and conscious experience on the other but I have my doubts. I'm sure that there is much about consciousness that we will succeed in understanding, but I suspect that a residue of mystery will always remain.

“ I'm sure that there is much about consciousness that we will succeed in understanding, but I suspect that a residue of mystery will always remain. ”

In “Modes of Consciousness” (Bayne and Hohwy, 2016), modes of consciousness are defined as global states of consciousness which are mutually exclusive. In previous works, you argued against the possibility for a single creature to have different streams of consciousness at the same time, discussing for example the case of split-brain patients (Bayne, 2008). Is there a link between modes being mutually exclusive and the unity of consciousness you defended previously in Unity of consciousness (2010)? Still, some animals like dolphins or birds exhibit patterns of sleep in some restricted parts of the brain while having other parts awake (Rattenborg et al, 2000). Without falling in the mental error fallacy, which would infer a mental property directly from patterns of neuronal activity, how do you deal with such cases from the perspective of modes of consciousness?

Interesting question! Let me start by stepping back a bit. The main point here was to sharpen the contrast between conscious modes (or what I now prefer to call “global states of consciousness”) and conscious contents. This contrast is quite intuitive, but few theorists have provided an analysis of it. One of the suggestions that Jakob Hohwy and I made is that one of the things that distinguish modes from contents is that modes tend to exclude each other whereas contents don't. For example, you can hear a trumpet whether or not you are tasting ice-cream, but if you are (say) in the state of alert wakefulness then you can't also be mildly sedated.

Now, what should we say about cases in which an organism might seem to be awake in one hemisphere but asleep in another? It's a good question, and one that I'm not entirely sure how to answer. One option would be to resist the idea that modes of

consciousness should be ascribed to hemispheres, and to insist that it's only the organism as a whole that is in a particular mode of consciousness. The other option would be to allow that modes can be ascribed to hemispheres, but to insist that no single hemisphere can be in more than one mode at a time. I can see problems with both options. The worry with the first is that it threatens to ignore what we seem to be learning about the neural basis of some modes; the worry with the second is that it threatens to sever the conceptual link between modes and the functional capacities that govern the behavior of the organism as a whole. It's certainly a topic that requires more thought!

You proposed multi-dimensional modeling as a tool for the study of consciousness that better accounts for the differences among global states of consciousness (Bayne, Hohwy & Owen, 2016). What are the specific epistemic merits of this approach that you see for the field of consciousness studies? An issue concerning this approach is that it opens a Pandora's box: the dimensions can vary in number, nature (e.g., they can be functional or content-based) and thus far there are no clear guidelines on how to identify the most relevant dimensions to classify states of consciousness. Do you have a pluralist view on the dimensions that should be used to distinguish states of consciousness or do you think some dimensions would emerge as the most relevant? What would be the significance of one or the other finding for the conceptualization of consciousness?

It's true that we didn't propose any clear guidelines on what the relevant dimensions are for characterizing global states of consciousness, but whether that's a bug or a feature seems to me to depend on one's perspective. When it comes to global states, theorizing begins with cases. For example, the vegetative state and the minimally conscious state involve global states that are distinct from the ordinary neurotypical state and from each other. The state of consciousness associated with mild sedation is also a distinct global state, as is the conscious state associated with epileptic absence seizures. Psychedelics induce yet another kind of global state. After this—it's all theory. The main point of Bayne et al. 2016 was to show that the dominant approach to global states—the levels account—won't work. According to that account, consciousness comes in degrees (you can be more or less conscious), and your global state of consciousness just is a matter of how conscious you are. This proposal is pretty obviously hopeless, for it's clear that two people can be in different global states without differing in the degree to which they are conscious. But since the levels account is in effect a unidimensional account, rejecting it requires moving to a multidimensional account.

That, of course, doesn't answer the question that you posed about what the dimensions of these global states are and how they might be identified. A good place to begin in addressing these issues is to ask why we assume that (say) the vegetative state and the minimally conscious state are associated with distinct global states of

consciousness, or why we assume that REM sleep is associated with one global state of consciousness and psychedelics with another. I suspect that any plausible answer to this question will have to consider two things: what cognitive and behavioral capacities are in place, and what kinds of contents are (and are not) permitted by or associated with the global state in question.

In a recent article (Bayne, 2018), you argued that the scope of conscious phenomena covered by the axioms of the Information Integration Theory (IIT) (Oizumi et al., 2014) is limited to a restricted set of conscious phenomena or philosophical positions about consciousness. IIT proponents defend the view that axioms should be considered as working hypotheses that allow the theory to be coherent. Presumably, one advantage of such an approach is its explicitness about the assumptions endorsed by the theory. As an alternative, you propose the natural kind approach. What are the respective roles of theoretical thinking and empirical investigation in the natural kind approach?

I have no problem with the appeal to working hypotheses when it comes to developing theories of consciousness, but on my reading of IIT that's not the role that they ascribe to the axioms (the label "axioms" here is not an accident—working hypotheses are typically called "hypotheses" rather than "axioms"). As I read them, Tononi and the other advocates of IIT take an axiom to be a self-evident claim about the essential phenomenological features of consciousness. I have doubts about whether there are any axioms in this sense of the term, and even if there are any axioms, I doubt that it's possible to ground a theory of consciousness on the basis of an appeal to them in the way that the advocates of IIT attempt to do.

The natural kind approach doesn't start with alleged self-evident truths, but instead begins with defeasible claims about consciousness. These claims need not hold universally (for example, they might apply to human beings but not to the members of other species), and they need not be restricted to the phenomenology of consciousness (for example, they might also include the functional role of consciousness). The idea is to use these defeasible claims—"working hypotheses", if you will—as tools for homing in on the mechanisms that underlie consciousness.

“ The natural kind approach doesn't start with alleged self-evident truths, but instead begins with defeasible claims about consciousness. ”

When it comes to the natural kind approach theory-building and empirical investigation go hand-in-hand: we need theory for hypotheses formation and we

need empirical work in order to test the hypotheses. The situation is the same here as it is for any other domain in which we're looking for natural kinds.

In a recent article (Bayne & Carter, 2018), you argued against the characterization of psychedelic states as higher states of consciousness. The line of argument you develop revolves around cognitive functions associated with conscious processing. You reviewed evidence that some cognitive functions are enhanced during psychedelic experience (e.g. imagery and sensory salience), while others are impaired (e.g., decision making). You conclude that this argues against unidimensional accounts of consciousness that rank consciousness levels on a unique scale. As a consequence, in your view, this provides a challenge to theories like IIT and complexity-based approaches. Nevertheless, in such approaches, consciousness is not ordered according to cognitive or behavioral dimensions, but rather as the amount of integrated information accounting for phenomenal experience (Oizumi et al, 2016). Thus, it seems that your criticism is based on different conceptions about what dimensions are relevant for capturing the conscious phenomenon. In fact, a recent application of the IIT framework to the study of psychedelics suggests that even IIT might contest general claims about psychedelics being 'higher' states of consciousness (Gallimore, 2015). Could you comment on how your critique of the notion of levels of consciousness depends on theoretical assumptions guiding consciousness research?

There are a couple of issues here. One point concerns the criticisms that Olivia Carter and I make of the idea that the psychedelic state is a "higher" state of consciousness. Here, it's important to keep in mind that our focus was on the claim that the psychedelic state is a higher state of consciousness in the same sense in which disorders of consciousness (such as the vegetative state or epileptic absence seizures) are lower states of consciousness. We argue that if this were right, then one would expect the psychedelic state to be associated with general improvements in cognitive function, but that seems not to be the case. Denying that the psychedelic state is "higher" in this sense is of course compatible with accepting that it is higher in some other sense of the term.

As you suggest, the advocates of IIT propose that an individual's level of consciousness corresponds to the amount of integrated information that it involves. But here we need to ask how this proposal should be understood. If, on the one hand, it is to be understood as a proposal for how the term "level" should be used in consciousness science then that's fine, but it's not clear to me why anyone would use the term in this way unless they were already committed to IIT. If, on the other hand, it is to be understood as an account of levels of consciousness as that term has been used within consciousness science for the last decade or more than it's clearly unsatisfactory, for given current usage an improvement in an individual's level of consciousness requires a concomitant improvement in their general cognitive and behavioral capacities.

Your article on psychedelics fits within the growing trend of research that has been labeled the “psychedelic renaissance” (Sessa, 2012). How do you see this trend in consciousness studies? More generally, do you see any advantage in incorporating so-called altered states or fringe phenomena (like trance, meditational states, out-of-body experiences, lucid dreaming, etc.) in the study of consciousness?

As far as the study of consciousness is concerned, the psychedelic renaissance is part of a wider movement to take altered states of consciousness more seriously. Of course, altered states of consciousness have always had a place within the study of consciousness, but for the most part they've been relegated to the fringes of the discipline, and mainstream consciousness science has been dominated by the study of consciousness as it occurs in adult human beings in the state of ordinary wakefulness. (Indeed, for the most part it's been dominated by the study of visual consciousness as it occurs in the state of ordinary wakefulness!) I see the move towards taking psychedelic experience more seriously as motivated by a more general sense that consciousness really is multifarious in its expression, and that models which account for adult human experience in the state of ordinary alert wakefulness might not apply so well when it comes to other forms of experience.

Some recent theoretical papers focused on empirical studies (Gerrans & Letheby, 2017; Millière et al., 2018) suggest that through some alterations of consciousness (induced by certain classes of drugs or by meditational techniques) we can achieve a state of “ego dissolution”, where consciousness persists without the experience of being or having a self. In the past, you proposed to see the self as a “virtual center of gravity” for the unity of consciousness (Bayne, 2010). In relation to this, what do you think about empirical cases of ego dissolution? More generally, do you think that the study of these kinds of alterations can tell us something new about the structural features of consciousness?

In my view this is one of the most interesting aspects of psychedelic experience. It's tempting to suppose that a sense of being a single subject of experience is essential to human experience, and that no matter how seriously impaired consciousness is the “I” is always attached to each and every experience. But ego dissolution tells us that that assumption is false, and that the subjectivity of experience is not a necessary feature of human experience.

The multiple metaphysical options on the nature of consciousness discussed in philosophy (e.g. the hard problem of consciousness, the problem of mental causation, etc...) still seem to pose a problem for a unified scientific theory of consciousness. Should science take into account these philosophical debates, or should science rather focus on the “real problem” of the empirical investigation of the conscious phenomenon, as formulated by Anil Seth (2016)? Does consciousness raise, in your opinion, specific conceptual issues regarding its scientific study compared to other mental phenomena?

It's interesting to note that although philosophers have a fairly limited role when it comes to the study of most phenomena—for example, I suspect that few zoologists are motivated to keep up with developments in the philosophy of biology!—there are other domains in which philosophers and scientists have a great deal to learn from each other, and the study of consciousness is certainly one such domain. Having said that, it seems to me that the value and importance of dialogue between science and philosophy depends very much on the question at issue. I'm not sure that the scientific study of consciousness is likely to be enhanced by engaging with philosophical reflection on the nature of the hard problem or mental causation, but there are a number of other topics on which dialogue really is crucial. For example, there are important questions about what a scientific explanation for consciousness should look like, and whether it should have the notion of a neural correlate of consciousness at its heart. There are also deep and difficult questions about how to measure consciousness, and whether the subjectivity of consciousness poses any kind of principled difficulty for its scientific study. There are important treatments of these issues within both philosophy and the sciences, and it's a shame that all-too-often they are limited by disciplinary boundaries.

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Different strategies in consciousness science can be distinguished according to the role they give to phenomenology in their research program. Integrated Information Theory uses phenomenology as a starting point to define consciousness through the formulation of axioms. Neurophenomenological approaches consider phenomenological reports as first-hand empirical data that should be investigated equally along physical processes. Reductionists consider phenomenology as an *explanandum* that must be accounted for in terms of physical explanations. Would the natural kind approach allow these strategies to be complementary rather than in competition, insofar as it considers definitional properties of consciousness as testable working hypotheses while avoiding metaphysical commitments? What role should phenomenology play in today's consciousness science in your opinion?

In a sense, everybody starts with the phenomenal character of consciousness—that's the thing that we want to explain. The question is how far you can get by simply focusing on the phenomenology. My view is: not all that far. One of the problems

here is that people often disagree about the phenomenology. For an example of such disagreement take a look at discussions of “cognitive phenomenology”. But leaving disagreement about phenomenal character to one side, the problem is that there is an explanatory gap between phenomenal character and neurofunctional structure. Thus, it seems to me, it’s difficult to build a conceptual bridge from descriptions of the phenomenology to descriptions of neurofunctional structure. The natural kind approach takes the phenomenology of consciousness seriously, but it doesn’t assume that explanations of the phenomenology can be deduced from descriptions of it.

You developed a substantial body of work on consciousness that identifies key components of the conscious phenomenon through conceptual analysis of empirical results. How do you consider the current progress on a definition of consciousness? How do you see the development of the field of consciousness studies in the future? Is there any avenue that you deem particularly promising?

I’m not sure that the study of consciousness has made much progress with respect to defining “consciousness”. Here, it seems to me that we have yet to improve on Tom Nagel’s characterization of consciousness—a conscious state is a state that there’s “something that it’s like” to be in—even though it’s generally recognized that this characterization has at best limited utility. But significant progress has been made on other issues, even if that progress has often involved the posing of more questions than answers. I think that the increased attention given to non-visual consciousness has been salutary, and it is good to see burgeoning literatures in both science and philosophy on such topics as agentive awareness, conscious thought, and multisensory integration. It is also good to see lots of activity in the development of theories of consciousness, although I wish that this activity was accompanied by more discussion about how to test theories of consciousness. Looking forward, I suspect that issues relating to the detection of consciousness in machines and non-human animals will loom large in the coming decade.

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Dennett Explained

An interview with
Daniel Dennett

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Abstract

Throughout his long career, Professor Daniel Dennett has been notable for bringing together the ideas of academic philosophy, workbench scientists, artificial intelligence pioneers, and even “cultish” intellectual figures like Julian Jaynes and J.J. Gibson. In this interview, Dennett discusses his philosophical roots, as well as his thoughts on Freud, predictive processing, psychedelics, consciousness, and ancient Athens. Dennett believes that philosophers have the ability to criticize and contribute to the science of the mind, and speaks to the virtues of cross-disciplinary glances and “hybrid vigor.” He believes that psychoactive drugs have potential scientific and therapeutic value. Experimenting with psychoactive substances, however, should be done within the proper settings, and not left to rogue agents.

keywords: altered states of consciousness, cognitive science, consciousness, philosophy, psychedelics.

Your published works—and interviews—span volumes and fields, conveying complex ideas through engaging words and thought experiments. The singular *Intuition Pumps and Other Tools for Thinking* (2013b) breaks the fourth wall of being a philosophy professor, allowing the reader access to your mental processes. Works such as *The Mind’s I* (Hofstadter & Dennett, 1982) transcend genres as well as single authorship, positing deep questions to the philosophical, while also offering a doorway into philosophy for the inexperienced. *Darwin’s Dangerous Idea* (Dennett, 1996) is as a clear defense of evolution now, as it was before the current genomics era in biology. Even in your articles published in philosophy journals, your work retains an accessible feel to it. Such engaging and radically interactive types of philosophy are rare overall. The effect of your philosophical style has been to buck the typical insularity and over-professionalized nature of academic philosophy, providing an inroad for many people into some of the most valuable aspects of philosophical thinking, and also spurring an incredible amount of students into various areas of the cognitive sciences.

Where do you believe this strategy came from, and how has your perspective on communicating philosophy evolved over your career?

Well, my two chief advisors were W.V.O. Quine and Gilbert Ryle, who were both fine writers (who tried never to write a boring sentence and pretty well succeeded, at least for philosophically adept readers). I've also had, since I was an undergraduate, a suspicion of philosophers who seemed to go out of their way to make their work forbidding and technical and "deep." They didn't seem to want to explain what they were up to!

If you were to "start it all over" as a young person with the same mindset in 2018, do you think you would have stayed in academia and tried to break out again, or might you have explored other avenues for communicating philosophy?

The problem is that the audience for philosophy today includes many who don't have the time or patience or, in the end, interest to really dig into a topic; they want instant gratification. I once wrote a little fable about this, in my review of Bob Nozick's wonderful book (Dennett 1982):

There was once a chap who wanted
to know the meaning of life, so he
walked a thousand miles and climbed
to the high mountaintop where the wise
guru lived. "Will you tell me the meaning
of life?" he asked.

"Certainly," replied the guru, "but if
you want to understand my answer,
you must first master recursive function
theory and mathematical logic."

"You're kidding"

"No, really."

"Well, then...skip it."

"Suit yourself."

You playfully characterized your earliest venture into academic philosophy as a mission to "Refute Quine," an endeavor which ultimately led you to become something of the "village Quinian" by the time you had arrived at Oxford for graduate school. Following Quine, you view science and philosophy as continuous (Ross, Brook, & Thompson, 2000). This led you to reject the analytic-synthetic distinction, accept the indeterminacy of translation thesis, and find affinity with American pragmatic traditions (Hookway, 2016). You stated that Quine's view of a philosopher's primary role is to "[provide] the conceptual clarifications and underpinnings for theories that are

testable, empirical, scientific,” though noted that “he didn’t get much chance to actually do philosophy in this vein” (Dennett, 2003). This in some ways contextualizes your place in the conceptual landscape of philosophy: At a deep level, the perspective of Quine deeply resonates through your thinking. Yet methodologically, you have diverged from Quine and his ilk in that you rarely resort to the technical, mathematical, or otherwise formal presentations of your ideas that characterizes much of analytic philosophy.

First, do you find these points to be accurate?

Yes!

Second, today, what do you see as the biggest disagreement that you have with Quine methodologically, and also concerning cognition?

Quine, as a logician, wanted to get everything into a strict, well-policed system of expression. I viewed that project as hopeless and ill-motivated, but the effort was nevertheless full of enlightening challenges and pitfalls.

In what ways do you feel you changed Quine’s mind throughout his career?

Quine had a long friendship with B.F. Skinner, and simply bought into many of his friend’s proposed behavioristic simplifications. In those days it really was premature to try to hypothesize much in the way of particular neural mechanisms for cognition, so behaviorism could be viewed as a prudent noncommittal way of getting an account of a system’s input-output competence. But I think I got him to see that his pure Skinnerian behaviorism was too simple, more of a “nice try” than a “good trick.” He softened his line on the abandonment of intentional idioms in science after he saw that there was a rather Quinian way of handling them—my “intentional stance.”

Your early career was characterized by the fact that you took the time to learn neuroscience and psychology and incorporated these studies into philosophy of mind and philosophy of language. For many years you have argued against philosophers and scientists alike on what the implications of scientific findings are for the study of consciousness (e.g., neuroscientific studies purporting to show that we do not have free will). This sort of pioneering interdisciplinary work sowed the seeds for the approach we take here at ALIUS: to generate scientific knowledge about “consciousness” using diverse methodologies and conceptual frameworks. Further, you have also engaged in plausible speculations about as yet unanswered empirical questions, such as how hallucinations work, how neurons learn through evolution, and the nature of consciousness. In doing so, you have often anticipated future trends in cognitive science. For example, in your speculation on hallucinations, you anticipated the essence of the predictive processing paradigm (Dennett, 1993). All of these actions comport well with the view that science and philosophy are continuous. Nevertheless, there is a difference between providing conceptual and clarificatory underpinnings for scientific theories, and providing speculative scientific theories themselves—even if it is a matter of degree.

First, when, in your mind, is it appropriate or useful for a philosopher to engage in the latter end of this spectrum, i.e., speculating on empirical questions? What is the role of this speculation?

I don't think there are any useful principles or policies here; it is a matter of seeing an opportunity and acting on it. I found myself at workshops and other meetings where scientists were describing experiments and asking them "what if you gave subjects this variation...?" or "how do you know that subjects aren't...?"...and so forth, and sometimes the reply would be "that's a great idea, let's try it!" I had enough hits with that policy that I got into the habit of thinking about what experiments I would run and why. My contributions in such cases are no different from any experimenter's suggestions. But perhaps my familiarity with all the "bird's-eye-view" issues that philosophers worry about sometimes gives me a better perspective; experimenters can get stuck in the trenches and forget where they are on the battlefield.

Second, a perennial question in philosophy of science is whether or not philosophers can tell scientists how to do better science. In what ways, if any, do you believe that a philosopher can tell a scientist how to do their job?

Anybody can, in principle, tell scientists how to do better science. Scientists are just as vulnerable to illusion, sloppy thinking, unrecognized presuppositions as anyone else. And sometimes 'hybrid vigor' is particularly valuable. Schrödinger was no biologist, but he certainly gave a major boost to biology in *What is Life?*? Judea Pearl comes to mind as an AI researcher (and a good amateur philosopher!) who has developed statistical and mathematical methods that can teach researchers in lots of other fields how to do their projects better. I would love to see a curious and well-informed poet ask a question that opened the eyes of, say, neuroscientists or (let's be ambitious) geologists. But philosophers should be better positioned than most others to provide such perspectives because they claim to specialize in thinking the unthinkable, expanding the imagination, critiquing the hidden assumptions, etc.

“ Anybody can, in principle, tell scientists how to do better science. Scientists are just as vulnerable to illusion, sloppy thinking, unrecognized presuppositions as anyone else. ”

Recently Carhart-Harris and Friston (Carhart-Harris & Friston, 2010) integrated psychiatry with predictive processing and neuroscience to argue that "Freudian constructs may have neurobiological substrates." For example they claim that the

brain's default mode network (DMN) plays a functional role similar to the Freudian ego concept, and that distributed cortical activity functionally implements Freud's primary and secondary processes (processes that control the id & ego, respectively). If this analysis is correct, then the "virtual governor" you discuss (e.g. in (Dennett, 2018)) may not be so virtual, and may instead have a more delineated structural substrate. This anatomical network is not a Cartesian Theatre in which a "second transduction" occurs (Hobson & Friston, 2016). Nevertheless, functionally it is like the manager of cerebral celebrity (if not the celebrity itself), and in this sense suggests a more centralized picture of consciousness in the brain than you have often advocated for.

What is your attitude toward incorporating Freudian concepts into contemporary theories of consciousness? Are you willing to swap the Cartesian Theatre for the Freudian Ego?

Way back when I was a freshman in college I became fascinated with Freud and read most of his books and articles, and a lot of secondary literature. He was clearly getting at some aspects of mind that have been largely ignored for the last fifty years, and it would be good to see some renaissance of his ideas, though his methods are rightly shunned, in the main. I think I've always been quite open-minded about renegade thinkers, taking seriously and even championing ideas of even rather cultish figures: Erving Goffman, Julian Jaynes, J. J. Gibson, to name three. One idea of Freud's that I want to take very seriously is simply the idea that some thoughts are harder—more painful—to think than others, and it has nothing to do with how much information they contain or how many steps away from the sensory periphery they are. Bringing the affective or emotional dimension into cognitive science is now getting underway, long overdue. In *Inside Jokes: Using Humor to Reverse-Engineer the Mind*, Hurley, Adams and I argued that *all* control in nervous systems is accomplished by "emotional" signals; there is no highest-level executive control system (as there is in GOFAI models of cognitive agents). So in the end Freud will have the last laugh, in a way, since stormy conflicts between emotional subcomponents of the mind will be the underlying dynamics of the *res cogitans*.

Has the intellectual deficit spending of the psychoanalysts been paid off to some degree by the predictive processing paradigm (perhaps in the same way affordances have been), leading to better construct validity of Freudian concepts? It is interesting to note that Kant and Helmholtz influenced (in a fairly complicated and not fully understood way) Freud and Jung (Brook, 2003; Jung, 1963), as well as the predictive processing paradigm (Clark, 2013; Swanson, 2016).

Maybe. I haven't given it enough thought yet.

Consider content in the brain that has not achieved much cerebral celebrity, but which might have important consequences for an individual's personal life if it did achieve a certain level of celebrity (e.g., a belief about needing to quit a job, or that one has left the front door unlocked). In Jungian psychology, dreams are thought to be a stage for the

unconscious to communicate to the conscious mind via non-linguistic symbols. Predictive processing theories of dreams (such as the one you give in *Consciousness Explained*) state that dreams are expectation driven. It seems reasonable to suppose under this expectation-driven dream process, that cerebrally unfamous fears, desires, apprehensions, and so forth help to influence the dream narrative. Might such a situation then allow for a meaningful analysis of dreams as a way of uncovering “unconscious” material? In this sense, does predictive processing also lend construct validity to Jungian ideas?

That's a good way of putting it. Yes, the construction of content in dreams is clearly not random, so figuring out what processes interact to generate these remarkable sequences or narratives is a project that is likely to bear fruit in the near future. I can imagine somebody figuring out ways of biasing dreams by using optogenetic interventions for instance. The royal road to theory confirmation here, as always, lies in showing how a model predicts the results of well-aimed disruptions of the system.

Neurological recording/stimulation devices and human-computer interfaces are progressing rapidly. These technologies represent “Read/Write” access to the human brain. How do you think these technologies will change the study of human consciousness? Do you think that such technologies will prove to be an acid test for the computational theory of mind?

Yes, as I just said.

If you could design your dream empirical experiment in order to test some aspect of consciousness, what would you do? Feel free to ignore financial, methodological, or ethical constraints. What theory would this experiment aim to prove or disprove? If not answered above—what empirical evidence (if any) do you think it would take to sway your critics on Consciousness?

If I could design my dream experiment right now, I'd be off doing it. Give me a year or so and ask me again. Back when I wrote *Consciousness Explained* (Dennett 1995) and *Sweet Dreams* (Dennett, 2006), I was close to the cutting edge of the research going on, but I then took a few years off to work on religion, which struck me as a pressing political and moral obligation. I don't regret the decision at all, and it permitted me to get my thoughts about cultural evolution and its importance to the mind into much better shape and detail, but when I returned to full-time thinking about consciousness, I found I had some serious catching up to do. I'm happy with how well the theory sketch in *Consciousness Explained* (Dennett 1995) has stood up for twenty-five years, but now it's time to fill in a lot of details and extend it. In addition to the blossoming of new experimental paradigms—on beyond masked priming and blindsight to inattentional blindness and the attentional blink and others—there is mounting evidence, and hints of consensus, on the brain regions

involved. There is still some yawning chasms—nobody yet has a good account of how content is registered and transmitted, so far as I know—but there's now an embarrassment of riches to sort through, not a blank wall of befuddlement.

The idea of “affordances” (the idea that organism’s perceive possible interactions with objects in the environment) held an important role in your recent work *From Bacteria to Bach and Back* (Dennett, 2017). As far as we can tell, your writing about affordances began during your discussions of the predictive processing paradigm (Dennett, 2013a, 2014). You seem to think (Dennett, 2014) that predictive coding provides a way to pay off the intellectual debt that affordances took on when they were originally introduced by Gibson in the context of ecological psychology (Gibson, 1979). In particular, you suggest that brains produce “affordances galore” (Dennett, 2014) by predicting the ways in which the organism can interact with objects in the environment. Relatedly, there is the idea of *Umwelt*, referring to the aspects of the environment that make a difference to an organism, and with which an organism can interact. This concept has origins in the field of semiotics (Salthe, 2014; Uexküll, 1910). What led you to start thinking that affordances and *Umwelt* have an important role to play in how scientists study consciousness? In what ways does your concept of affordances differ from Gibson’s?

I’ve been saying for many years that the brain’s job is to “produce future” (I’m not alone in making that observation of course). Gibson’s idea of affordances and von Uexküll’s idea of the *Umwelt* together draw attention to the economy or efficiency of evolution: it is always optimizing, selecting the arrangements that most effectively, swiftly—and with energetic efficiency—do what needs to be done. Don’t waste time and energy on information-gathering and processing that won’t often pay for itself. Nature is a ruthlessly efficient finder of shortcuts and acceptable half-measures, which is why we find ourselves living in a macroscopic world of colored solid surfaces, liquids that don’t seem to be swarms of mobile molecules, invisible gases, etc.

If philosophers of mind discuss psychedelics, which they rarely do, they often treat them as little more than inducers of hallucinations and delusions (i.e., non-veridical perceptions and beliefs). Such a perspective does not comport well with people who have actually used these substances, for whom hallucinations and delusions play a relatively small part of the experience. These people instead typically value psychedelics’ ability to: facilitate metacognitive re-evaluations of the way they have been thinking, feeling, or acting (e.g., come to the realization that their alcoholism is killing them); temporarily change their sense of self, including the phenomenon of “ego death” whereby individuals come to the realization that their own consciousness is indeed, as you put it, a user-illusion; and in other ways positively impact long-term personal development. While this psychonautic autoheterophenomenology may provide data that is unconvincing on its own, there have now been a swell of studies concluding that psychedelics have substantial therapeutic value (Bogenschutz et al., 2018; Carhart-Harris & Goodwin, 2017; Garcia-Romeu & Richards, 2018). The clinical

value of psychedelics suggests a picture in which psychedelics impact the mind in a much more targeted, structured, interesting, complicated—take your pick—way than in the traditional psychotomimetic model, wherein psychedelics simply induce temporary psychotic like symptoms. There are many, for this reason, who believe that psychedelics provide an important inroad into studying consciousness and cognition at large. An interesting quote on this matter comes from Terence McKenna (Lorenzo 2017):

"I don't think you could discover consciousness if you didn't perturb it, because as Marshall McLuhan said, 'whoever discovered water, it certainly wasn't a fish.' Well, we are fish swimming in consciousness; and yet we know it's there. Well, the reason we know it's there is because if you perturb it, then you see it; and you perturb it by perturbing the engine which generates it, which is the mind/brain system resting behind your eyebrows. If you swap out the ordinary chemicals that are running that system in an invisible fashion, then you see: it's like dropping ink into a bowl of clear water—suddenly the convection currents operating in the clear water become visible, because you see the particles of ink tracing out the previously invisible dynamics of the standing water. The mind is precisely like that, and the psychedelic is like a dye-marker being dropped into this aqueous system. And then you say, 'Oh, I see—it works like this...and like this.'"

Do you believe that psychedelics can play an important role in the study of the mind? What is the role of various “altered states of consciousness” in your work? For example in Dennett (2017) you talk about LSD in the context of hallucinations, but we find few other discussions on the topic.

Yes, you put it well. It's risky to subject your brain and body to unusual substances and stimuli, but any new challenge may prove very enlightening—and possibly therapeutic. There is only a difference in degree between being bumped from depression by a gorgeous summer day and being cured of depression by ingesting a drug of one sort or another. I expect we'll learn a great deal in the near future about the modulating power of psychedelics. I also expect that we'll have some scientific martyrs along the way—people who bravely but rashly do things to themselves that disable their minds in very unfortunate ways. I know of a few such cases, and these have made me quite cautious about self-experimentation, since I'm quite content with the mind I have—though I wish I were a better mathematician. Aside from alcohol, caffeine, nicotine and cannabis (which has little effect on me, so I don't bother with it), I have avoided the mind-changing options. No LSD, no psilocybin or mescaline, though I've often been offered them, and none of the “hard” drugs.

“ It's risky to subject your brain and body to unusual substances and stimuli, but any new challenge may prove very enlightening—and possibly therapeutic. ”

As a philosopher, I have always accepted the possibility that the Athenians were right: Socrates was quite capable of corrupting the minds of those with whom he had dialogue. I don't think he did any clear lasting harm, but it is certainly possible for a philosopher to seriously confuse an interlocutor or reader—to the point of mental illness or suicide, or other destructive behavior. Ideas can be just as dangerous as drugs.

“ Ideas can be just as dangerous as drugs. ”

Since psychedelics were made illegal in 1966, much of psychedelic research has been carried out by “underground” scientists and psychonauts. While there has been progress in the last 50 years in terms of making psychedelic research more respectable and possible, it is still extremely limited. While now “above ground,” much of the work is outside of academia. For example, much research is carried out or organized by the Multidisciplinary Association for Psychedelic Studies (MAPS). Our group ALIUS is unaffiliated with any academic organization. Altered States of Consciousness research is not alone in this flight from academic halls. Another example, with very different causation, is that private and governmental sector AI research sectors are surpassing academic AI research. Similar escapes from academia may occur for biological areas like genomics, brain-computer interfaces, and neurofeedback as well.

Do you think that universities should make a greater effort to absorb or otherwise integrate these extra-academic research veins? Or do you think it is admissible for schisms in research to persist, with only the migration of researchers to and fro facilitating communication between?

Do you think philosophers have a unique position to publicly advocate for the academic and scientific study of (altered states of) consciousness? Is it important to impress upon people that not only are psychedelic substances useful for psychotherapeutic purposes, but that they are also important ingredients in studying and understanding our ordinary mental functions?

I think that the policies that have been hammered out in academia for doing ethically defensible research, while not perfect, should be followed everywhere, and I don't know how that can be enforced. Perhaps—perhaps—by passing legislation making developers, wherever they are, strictly liable for any harmful applications of their products. Strict liability laws (which disallow ignorance as an excuse), if done right, can set up prudent systems of self-policing: investors won't invest their money if they know that they cannot insure themselves against catastrophic losses in class action suits, etc, and insurance companies will not provide coverage unless they have convinced themselves that the insured have taken all reasonable steps and followed all the rules scrupulously. I think these conditions should be in force for AI as well as for psychedelics and gene-tinkering. There will still be rogues, for whom such risk

is not motivating, apparently, and they should not be romanticized or honored at all; they should be regarded as intellectual vandals. The power to do tremendous harm to society, to life itself, is growing, and it will be very hard to keep irresponsible adventurers from launching projects that have terrible consequences.

“ I think that the policies that have been hammered out in academia for doing ethically defensible research, while not perfect, should be followed everywhere... There will still be rogues, for whom such risk is not motivating, apparently, and they should not be romanticized or honored at all; they should be regarded as intellectual vandals. ”

You have said that we should teach children about religion, and in fact all of the world’s religions, as a way to vaccinate them against absolutist beliefs held by their elders (Frazier, 2009). Pluralistic education may vaccinate children against traditional religious extremism, but it is not clear that such an approach would prevent the adoption of differently-dangerous views such as extreme moral relativism, nihilism, or worse. Since you are an advocate of maintaining a “Moral Agents Club,” legions of children adopting these latter types of perspectives and engaging in a bit of the old ultraviolence would be a bad thing. How then should we tell children which set of behaviors are actually preferable?

“Show, don’t tell”—as the teachers of fiction-writing urge. The project of rearing and socializing our children so that they can enter the adult world with a good chance of success is well-known to be a daunting challenge, requiring patience, persistence, judgment and flexibility, which would be too much to expect of many if not most of us were it not for the biases inherited with our genes: we normally find our offspring cute, cuddly, adorable, and worthy of considerable sacrifice. There is plenty of cultural variation around this central pattern, but no exceptions.

Don’t get between a mother bear and her cub, and don’t get between a human mother and her baby. (This holds for fathers too, of course, but for well-explored biological reasons, careless fathers are much more common than careless mothers.) The natural, genetically endorsed tendency of all of us to love and protect our children has been wisely—if largely unwittingly—exploited by the processes that have generated our moral policies and their supporting intuitions. In short we try not to “spoil” our children. Some parents succeed better than others. It is a tightrope act, with mistakes and pitfalls on both sides. Too much blaming and scolding can create a guilt-ridden adolescent and adult, to say nothing of the excesses of corporal

punishment and outright abuse. Too little “supervision” can produce young adults who, “through no fault of their own,” are burdened with an unwarranted sense of entitlement, unable to summon the self-control required to negotiate the complex social world of adulthood without constantly falling into conflict with their fellow citizens and with authority.

“ The natural, genetically endorsed tendency of all of us to love and protect our children has been wisely—if largely unwittingly—exploited by the processes that have generated our moral policies and their supporting intuitions. In short we try not to “spoil” our children. ”

Negotiating these opposing pitfalls is a delicate task, especially in light of the fact that every move we make is public, discussable, criticizable, likely to “telegraph our punches” to those we are trying to influence (for their own good, of course, but mainly for the good of society at large). We are not considering the most effective and humane policies of cattle raising or fishing or, for that matter, bricklaying, where the objects of concern are oblivious to our reasoning. We are considering how we, language-using, comprehending adults should go about influencing each other’s behavior. This fact is sometimes forgotten by proponents on one side or another.

What would you like your stance on Plato to be remembered as? Or, what did Plato get right?

I once set out to produce a textbook on Plato’s theory of forms, looking at all the Platonic texts that arguably could be considered to deal with the theory of forms, and inviting students to harmonize them—by reordering them, reinterpreting them, even rejecting some texts that didn’t “fit” an otherwise good version. This was in part inspired by Gilbert Ryle’s book *Plato’s Progress*, which I read in draft when I was Ryle’s student. Ryle called it his “naughty book” since it was so irreverently critical of much of the scholarship on Plato, and advanced an astonishing but speculative theory: Plato’s dialogues were composed as plays to be performed at the Olympic Games, and Plato himself typically played the role of Socrates! This was a project I abandoned in the late 60s, in spite of getting encouragement from publishers, in part because I have never been happy with either Plato’s methods or the fruits of his labors. He and Socrates seduced philosophers into several millennia of essence-hunting and counter-example-mongering that we are only just now recovering from. I view Plato’s views as wonderful examples to study, in the diagnostic spirit of “let’s see if we can pinpoint where these brilliant folks misled

each other." Their crowning achievement was, you might say, the invention of self-conscious meta-cognition, thinking carefully about thinking. That habit has been immensely fruitful across all human inquiry, but philosophers have often been trapped in diminishing returns by narrowing their focus onto their own thinking about their own thinking about their own thinking, while ignoring the thinking going on among their less self-absorbed contemporaries.

Genomic and paleological analyses suggest that New World monkeys split off from Old World monkeys within the last 60 million years, and arrived in South America far before any human ancestors (Bond et al., 2015; Perelman et al., 2011). How the New World monkeys were able to reach South America is still something of a mystery. It is not clear that they would have been able to amble across frozen Northern straits, or persist long travels on a floating mass of vegetation diffusing across the Atlantic. Would you care to offer a speculation of your own?

I'd guess that some band(s) of monkeys in Africa got swept out to sea on some floating vegetation and made it all the way across the South Atlantic to South America (or the Caribbean). That seems to be the favored hunch among the experts, but who knows what will turn up to settle the matter? You express doubt that this would be possible, but I don't see why. How tight was the genetic bottleneck through which New World monkeys had to pass? I don't know, and the articles I've skimmed don't discuss it, but I would think this bottleneck would leave a trace after 30-40 million years, discoverable via bioinformatics today.

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The role of hypnosis and meditation in consciousness research

An interview with
Zoltan Dienes
by Jean-Rémy Martin

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Abstract

In this interview, Zoltan Dienes (Brighton, UK), specialist in consciousness studies, answers questions related to hypnosis and meditation: Why are hypnosis and mindfulness interesting topics for the study of consciousness? Is the notion of altered state of consciousness a useful notion in the context of hypnosis and mindfulness? What do we know about the neurocognitive mechanisms sustaining the action of hypnosis and mindfulness? There is a long tradition of using hypnosis clinically, particularly as an analgesic method; might mindfulness and hypnosis work in the same way? Building on his empirical and theoretical research on hypnosis and meditation, Zoltan Dienes gives us his answers. Hypnosis and meditation are postulated to engage metacognitive processes, though in opposite ways.

keywords: consciousness, hypnosis, meditation, metacognition.

Why are hypnosis and mindfulness interesting topics for the study of consciousness?

Hypnotic response involves distortions in consciousness: hallucinations, delusions, and altered experiences of agency. Thus, the fundamental facts to be explained in hypnosis involve the nature of conscious experience. It may be these different experiences rely on a single distortion in conscious experience: That of non-volition. In fact, Weitzenhoffer (1978) defined the “classic suggestion effect” as the experience of a response being non-volitional. For example, if we take a suggested motor response, like the arm rising in the air by itself, in several prominent theories of hypnosis (like those of either Hilgard or Spanos) the person does intend for the arm to rise; but the experience is that they did not intend it. So, in these accounts, hypnotic response involves an illusion of involuntariness; in fact, in these accounts it is precisely that illusion that makes a response hypnotic. The illusion presents a unique window into the nature of experienced volition for consciousness researchers. This illusion may give rise not only to feelings of involuntariness during

motor responses but also to the other distortions of consciousness just mentioned, namely, hallucinations and delusions. For example, consider a suggestion that one will see an elephant. If one intends to imagine the elephant, but is unaware of that intention, the imagination may be experienced as a perception: A hallucination. Or consider a suggestion that one has the opposite sex to one's actual sex. If one intends to engage in pretence, but is unaware of that intention, the pretence may be experienced as a belief: A delusion. That in any case, is my take on hypnotic response (e.g. Dienes & Perner, 2007). This view of hypnosis is naturally related to a key approach to understanding consciousness: Higher order theories, like that of Rosenthal (2005). According to higher order theories, a mental state being conscious requires one be aware of that mental state—by a higher order state.

If the essence of hypnotic response is intending while forming the higher order thought that one is not intending, then hypnosis is naturally linked to one of the major approaches to understanding consciousness: The illusion of involuntariness comes about by inaccurate higher order thoughts. Even if one didn't subscribe to higher order theory as an account of a mental state being conscious, one would surely subscribe to the view that having higher order thoughts is an interesting form of consciousness. So I think hypnosis should play a more prominent role in consciousness science than it currently does!

“ I think hypnosis should play a more prominent role in consciousness science than it currently does! ”

Just as hypnosis may essentially be a meta-cognitive phenomenon, so is mindfulness. Mindfulness is a matter of having certain sorts of higher order states. One Pali sutta compares mindfulness to a surgeon's probe that is used to explore tissue so that the surgeon knows how to use the knife. A probe is used to show things as they are so that one can act appropriately. Thus, one aspect of mindfulness is accurate awareness of mental states. In this way, there is a tension between being mindful and hypnotic responding, because my view of hypnotic response is that it is a response in which one is (strategically) not mindful of the corresponding intention, as I discussed above. Thus, mindfulness also intrinsically relates to a major theory of consciousness, namely higher order theory.

“ Just as hypnosis may essentially be a meta-cognitive phenomenon, so is mindfulness. ”

Buddhist mindfulness also involves as its first foundation training awareness of one's body, including proprioception and interoception. Why was this regarded as a practice conducive to flourishing? Part of the answer to possible beneficial effects may relate to current theories in consciousness science, especially those using the predictive processing framework, placing importance on interoceptive awareness in, for example, constituting emotion (Seth and Critchley, 2016). But how this works has yet to be spelled out. One phenomenon provides an interesting challenge to predictive processing theories (to be discussed below): Attention to action in a deliberate way may decrease the sense it is volitional (a point Martin & Pacherie, 2019, use as a predictive processing theory of hypnosis), but attention to breath (as in many types of meditation) increases the sense of voluntary control. We return to this issue below.

Do you think that the notion of *altered state of consciousness* is a useful notion in the context of hypnosis and mindfulness?

It is a useful concept in both cases simply because it is part of phenomena claimed to exist; and thus, the nature of any putative altered state is something we need to settle one way or the other. An altered state of consciousness means there is some systematic change in how consciousness as a whole functions. For example, being in one emotion rather than another involves altering the state of consciousness, because there are systematic changes in how attention works, in motivation, and so on. The altered state often involves facilitating or inhibiting specific cognitive actions; maybe for example, being happy facilitates broad attentional focus, use of stereotypes and so on. So interesting altered states have causal properties.

“ The nature of any putative altered state in hypnosis or meditation is something we need to settle one way or the other. ”

Now, historically there have been two phenomena claimed to define hypnosis: First, there is the claim that there are hypnotic responses, namely suggested alterations in conscious experience, as I discussed above. This claim I take to be solid. Second, there is the claim that hypnosis is an altered state of consciousness that facilitates such hypnotic response. There is still debate about this. Highly hypnotisable people do experience broad phenomenological changes when “hypnotized” (Pekala & Kumar, 2007). One explanation is that these experiences are suggested effects; in other words, this phenomenon is just a specific case of the first phenomenon, namely hypnotic response. If the experience of an altered state is just another hypnotic response, then the altered state would have no causal role in facilitating response to

further suggestions. In fact, hypnotic inductions do increase the rate of hypnotic response. But on average by a tiny amount. They also increase the expectation of successfully responding. And maybe that is all there is to it: Increase expectations or motivation slightly and you increase response a bit, without the need to postulate a special causal altered state (Braffman & Kirsch, 1999). I personally side with this way of looking at the role of altered states in hypnosis because it is simplest. The one case I know of where an induction massively increased hypnotic response is the suggested delusional belief that one's reflection in the mirror is a stranger; Connors et al. (2012) found a response rate of 70% after an induction and 22% without. This may be a causal effect of induction reducing critical thinking; or it may be due to expectations.

Meditation has of course also been claimed to be an altered state. Historically, in the experimental academic literature, these claims have related to the sort of meditation that aims to promote deep absorption in a simple mental state, so the normal complexity of mental life falls away. While such concentration involves mindfulness, mindfulness does not necessitate such concentration. Indeed, the aim of much mindfulness meditation is to maintain a requisite level of richness in order to be aware of what is actually going on in one's mental life, and to do so to an extent that mindfulness generalizes to everyday life. The Buddhist claim is that one would then be in a globally different state (see Boyle, 2015, for interviews with meditation teachers about their experiences along these lines). Further, the Buddhist claim is that when one is fully mindful of one's mental states there is an awareness that no "I" exists beyond the mental states themselves and their causal flow. If one felt this experientially, it would be an altered state of consciousness (Berkovich-Ohana et al., 2013). My own research says little about this; but whatever altered state is involved with mindfulness, it would be, for the reasons discussed above, a rather different one from that involved with hypnosis.

While I think hypnosis and mindfulness are constitutively different, that is not to say phenomena that come under the heading of each in practice are really different. That is, I think it is an open question how much of the altered states described as arising in meditation may actually be suggested phenomena experienced hypnotically—so are not involving mindfulness fully, but rather hypnosis (Dienes et al., 2016). For example, in absorption meditation one goes through a set of prescribed stages of experience, an increasing depth of an altered state, as for example bodily pleasures arise and fade. I plan to investigate how much this could be suggested.

Do we have an idea of the neurocognitive mechanisms sustaining the action of hypnosis and mindfulness?

First we need a theory at the cognitive level of each phenomenon, then we can start to relate the theoretical processes to the neural basis. One starting point is the higher order theory of consciousness. Higher order states are types of meta-cognitive states, and one theoretical claim is that hypnosis and mindfulness are both essentially meta-cognitive, as discussed above. Then the neural basis of metacognition should be involved in both hypnosis and mindfulness, and there is some evidence for this. For example, the dorsolateral prefrontal cortex has been shown relevant to having accurate higher order thoughts, and Dienes and Hutton (2013) showed rTMS disrupting the left dorsolateral prefrontal cortex (DLPFC) increased hypnotic response (by assumption, because it was harder to have accurate higher order thoughts). (Coltheart et al., 2018, in a preregistered replication found the effect, albeit only on the right hand side: This could still be consistent with a metacognitive story because the lateralization of metacognition is not settled.) While the metacognitive explanation predicts involvement of specifically metacognitively-relevant areas of the prefrontal cortex in hypnotic versus non-hypnotic response, the overall fMRI literature is rather noisy and inconsistent; in a meta-analysis Landry et al. (2017) found only a visual area came out in a hypnotic versus non-hypnotic contrast over fMRI studies (presumably because hypnotic responding often involves imagery). McGeown (2016) in reviewing functional connectivity studies finds that while hypnosis may (or may not) be involved with reduced activation of the DLPFC, meditation was more consistently associated with increased activation. While the results are intriguing, as McGeown discusses, the DLPFC is involved in a broad executive network and determining what psychological role it actually played in these comparisons (or in the rTMS studies) is far from straight forward. By contrast, reading tea leaves is very easy to do.

“ The neural basis of metacognition should be involved in both hypnosis and mindfulness. ”

An approach to getting a handle on neurocognitive mechanisms involved with hypnosis and meditation is to start with a general theory of neural mechanisms. Predictive processing is an up-and-coming account of how cognition may be implemented in the brain (e.g. Clark, 2016). Let me characterize the predictive processing framework by a series of apparent paradoxes, such as, ‘perception is controlled hallucination’ (said by Max Clowes of Sussex¹) and similarly ‘thinking is controlled delusion’ (though that control can be fairly bad, witness reviewer 2 of

¹ Thanks to Ron Chrisley for pointing this out to me, and that it was said by Max back in 1971.

your last paper). It should thus be possible by changing control parameters to create hallucinations and delusions. These aphorisms make perception appear active, the next two portray action as perceptive, and thus seemingly passive: ‘action is well predicted proprioception’, and ‘voluntary action is poorly perceived movement.’ That is, voluntary actions are accompanied by sensory attenuation. Thus, the involuntary experience of hypnotic movements may be due to simply paying close attention to proprioceptive signals, reducing attenuation (a theory developed by Jean-Remy Martin & Elisabeth Pacherie 2019). Training in accurate proprioception, such as is done in traditional mindfulness meditation (e.g. mindful walking), may recalibrate the expected level of sensory attenuation for voluntary action, and thus reduce hypnotic response. This account gives a contrasting perspective from the metacognitive theory for why meditators are low in hypnotisability: According to the meta-cognitive theory, meditators have particularly accurate higher order thoughts of intending, and thus find it difficult to be unaware of intentions; according to Martin et al.’s predictive processing account, meditators have more accurate expectations of strength of proprioceptive signals under conditions of slow attentional movement, and so know attenuation is less under those conditions. We are in the process of testing these accounts, both of which postulate a tension between mindfulness and hypnotic response.

Hypnosis is a well-established method as a psychotherapeutic and analgesic method, does mindfulness have similar clinical benefits? Do they work the same way in this case?

Both hypnosis and mindfulness can be used to deal with pain. Both are psychological therapies, involving regulation of attention and attitudes. But that doesn’t mean they affect pain processing by the same underlying mechanisms. With a hypnotic analgesia suggestion, a counterfactual is considered: For example, the arm is like a block of wood and so doesn’t feel the pain inflicted on it. Conversely, in mindfulness, one holds the pain in awareness, trying to see it as it is: One sees the body state as it is, the unpleasant feeling as it is, the overall state of the mind as it is, and puts it all in context. Despite the different approach at the psychological level, in outcome both hypnosis and mindfulness can lead to important reductions in both sensory and affective pain (e.g. Zeidan & Grant, 2016). The similar outcome may be produced by common or different mechanisms. A possible common mechanism is expectation.

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Both hypnosis and mindfulness can be used to deal with pain. Both are psychological therapies, involving regulation of attention and attitudes. But that doesn’t mean they

affect pain processing by the same underlying mechanisms. ”

As postulated by Irving Kirsch, maybe hypnotic response is directly produced by a response expectancy, just as placebo analgesia is directly produced by the expectation of pain relief. Expectations are rarely if ever shown to be equivalent between mindfulness and active control interventions; maybe expectation is at work here too. This explanation of the effectiveness of hypnosis and mindfulness in reducing pain is so simple it should be given considerable prior plausibility. There is a striking and curious fact to consider, however: When placebo analgesia is based on verbal suggestion (without prior conditioning to a particular class of active analgesics), blocking opioid pathways with Naloxone substantially reduces (and perhaps completely removes) placebo analgesia. On the other hand, Naloxone leaves hypnotic analgesia substantially in place (perhaps doesn't touch it at all). So the underlying mechanism for hypnotic analgesia appears not to be opioid based, quite unlike placebo analgesia. The evidence for mindfulness is not yet clear, but is consistent with an expectation-component based on opioids—and something else. According to a metacognitive theory of hypnosis, hypnotic analgesia may involve strategies such as may be used in cognitive behavioural therapy, CBT (distraction, re-interpretation) but without being aware of engaging in strategies. Mindfulness involves the opposite strategies. Proper work disentangling the different pain pathways, the opioid and others, by differentially blocking them in the case of placebo, hypnosis, mindfulness and CBT is needed. Gyorgy Moga in my lab has started doing just that. So we will hopefully find out the extent to which hypnosis and mindfulness have the same or different psychophysiological mechanisms.

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Psychedelics and Sociality

Probing the diversity of cognition beyond individuals

An interview with
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Abstract

In this interview, we discuss how beyond the tremendous therapeutic opportunities offered by psychedelics, they also provide a unique opportunity to investigate social cognition in a causal way and thus increase our mechanistic understanding of it. We argue this basic research is necessary to understand the underlying mechanisms and assure their clinical efficacy. However, revealing this potential requires a great deal of education for clinicians and researchers. This includes scientific rigor both in terms of how administration of psychedelic substances is completed and how psychedelic-assisted therapy is conducted. We also argue that important synergies of recent tools (VR, hyperscanning) in lab experiments can bring more naturalistic settings and thus increase relevance for real-world applications. We finally review recent results demonstrating how altered state of consciousness induced by psychedelics can result from thalamic gating deficits and alterations in information processing of internal and external stimuli within cortico-striato-thalamo-cortical (CSTC) feedback loops. We finish the exchange on the most important challenges for future research, including funding, sample size, and ethics.

keywords: neuropharmacology, psychedelic-assisted therapy, psychiatry, social cognition.

Can you introduce yourself and explain what brought you to psychedelic research?

I am a neuropsychologist by training, and received my Msc at University of Konstanz in Germany. I had been fascinated by how neurochemistry shapes our behavior and emotions, as well as by neuroimaging. This interest led me to complete my PhD at University of Zurich in addiction research investigating the long-term neurobiological consequences of substance use. While I consider this research field to be fundamental for improving the treatment and prevention of addiction disorders, I also strived to perform causal inference on the underlying neuropharmacological processes. Conducting pharmacological challenge studies

with psychedelics offers a way to investigate a range of phenomena critical for human every-day lives as well as for psychiatric patients. For me, working with psychedelics really opened the doors to create insight into human neuropharmacology and therefore to understanding our brains, their potential, as well as their shortcomings.

What can psychedelic research bring to our understanding of the basic mechanisms underlying human sociality?

Subjectively, I am sure that a lot of people have experienced that psychedelics acutely (and maybe long-lastingly) change their perception of connection with the environment as well as with other human beings after a psychedelic experience. We have now shown that also in a controlled lab-environment, psychedelics belong to the very small group of pharmacological agents that are able to modulate social perception, interaction, and behavior (Pokorny, Preller, Kometer, Dziobek, & Vollenweider, 2017; Preller et al., 2016, 2018). For everyone who works in the field of social neuroscience, this has to be exciting! First, we found a compound that modulates—at least certain aspects of—social cognition, second it is a compound which has a rather well-known and circumscribed receptor pharmacology, and third, it can be administered safely. By (temporarily) altering certain social processes, psychedelics render them accessible for investigation. Psychedelics therefore offer the opportunity to investigate social cognition in a causal way and thus increase our mechanistic understanding of social cognition. On the one hand, this information is critical for the rational development of novel therapeutics targeting trans-diagnostic impairments in social cognition in psychiatric and neurological illnesses. On the other hand, these studies are important to fully capture the clinical potential of psychedelics considering that the therapeutic process is in general a social one.

My impression is, that we are currently still in the process of discussing the right treatment approach for psychedelic-assisted therapy. To my knowledge, there are no studies currently going on that scientifically investigate the most effective way to treat people before, during, and after the psychedelic session. The results we obtained so far might be adding a puzzle piece to this discussion: We showed that psilocybin increases empathy and decreases the feeling of social rejection and the processing of negative stimuli in general (Pokorny et al., 2017). It might be particularly important to leverage this effect of psilocybin to benefit the patient-therapist relationship. On the other hand, we and others have also shown that LSD also increases suggestibility (at least to opinions which are not too different from the participants' own; Carhart-Harris et al., 2015; Preller, Schilbach, Duerler, Pokorny, & Vollenweider, 2018). This is something psychedelic therapists and sitters should be aware of. However, there is still a lot that we do not know yet. For

example, long-term effects on social perception and, importantly, behavior have not been investigated yet.

“ To my knowledge, there are no studies currently going on that scientifically investigate the most effective way to treat people before, during, and after the psychedelic session. ”

How can we better operationalize translational efforts in psychiatry?

The challenges for psychedelic science are mostly similar to other basic science programs. However, psychedelic science additionally struggles because of the cultural baggage from the 1960's, the resulting taboo surrounding these substances, and the classification as Schedule I drugs. We therefore need to be extra rigorous in our research to be able to produce data that will convince other researchers, clinicians, regulatory authorities, and the public of clinical efficacy (if the data indeed show clinical efficacy). This means, we should collect and analyze our data in the most rigorous and transparent way, utilize sample sizes that allow for proper statistical inferences, build upon theoretical frameworks or integrate results into those, and not oversell our results (be they clinical or preclinical). Furthermore, I do not think that just showing that a particular substance is improving psychiatric symptoms is going to be enough in the future. Psychiatric pharmacological research in the past has made the mistake of testing new compounds for efficacy but at the same time not making enough effort to find out how exactly they work. Considering the stagnation in development of new treatments in psychiatry and the often unsatisfying treatment results, we should learn from this, conduct clinical and mechanistic studies, and create a research and treatment program that is sustainable and enables future innovation regarding pharmacological treatments and their interplay with non-pharmacological approaches.

Furthermore, we should educate clinicians and researchers outside the field. But we need to do this based on the results obtained and in a scientific manner. There is still a lot of misconception about the effects of psychedelics, for example regarding addictive potential. But I don't think that selling psychedelics as new miracle drugs will help, if we haven't shown this scientifically.

Lastly, as I already mentioned before, beyond the administration of a psychedelic substance, there is still a lot of discussion about how psychedelic-assisted therapy is supposed to be conducted. Considering the effects of psychedelics, I predict that the

non-pharmacological part of the therapeutic process will be key for clinical efficacy. We should intensify our efforts into studying the interplay of non-pharmacological and pharmacological aspects of psychedelic-assisted therapy to increase the clinical potential of these compounds.

“ We should intensify our efforts into studying the interplay of non-pharmacological and pharmacological aspects of psychedelic-assisted therapy to increase the clinical potential of these compounds. ”

Both social neuroscience and psychedelic research are facing methodological challenges, from data mining and quantified self to laboratory setting, how can we resolve the dialectic between generalization (sample size, ecological setting) and rigor (experimental control)?

It will be critical to eventually combine controlled laboratory experiments with “real-life” data. Leveraging technological advancements such as the availability of smartphones or internet data-bases for example puts us in a great position to reach this goal. Both, lab experiments as well as more naturalistic data provide valuable insight—but each with their own strengths and limitations. Both are of course biased, but bringing them together may provide important synergies. Additionally, in particular social neuroscience can benefit a lot from investing more effort into the development of more ecologically valid, preferably two-person approaches. Making use of rather novel techniques and technologies like hyperscanning or VR may help to tackle some of the challenges of lab environments and increase relevance for real-world applications.

Right now, it seems like some people as well as funding agencies think that because we are now conducting the first modern clinical trials, that basic science is not necessary anymore. Why is basic research valuable for the field?

Psychedelics may indeed represent promising new treatments. However, we should not underestimate the knowledge that can be gained via basic science studies. Two areas are particularly important: First, manipulating emotional and cognitive processes is key for investigating them. Psychedelics are able to manipulate processes such as self-experience which are otherwise almost non-reachable for scientific investigation. Second, clinical trials with psychedelics so far only included a limited number of patients. To fully capture their clinical potential and therefore increase the chances that psychedelics will help more diverse patient groups in larger studies or, if registered as medication, in a non-research setting, I think it is necessary to

understand the biological and psychological mechanisms underlying their clinical efficacy. This will help to optimize therapy and move psychiatry away from the rather unsatisfying trial-and-error approach.

There is a current debate between the teams of Vollenweider and Carhart-Harris regarding the hypo- or hyper-activation of anterior neural structures during psychedelic experience, and especially in how this discrepancy may be linked to different imaging modalities. Can you explain the situation?

I would not necessarily call it a debate between two teams. We and other groups in Switzerland, the UK, Spain, the Czech Republic, and Brazil have recently published human neuroimaging data collected under the influence of psychedelics. And not all of these results overlap completely. But who would expect that putting a few people in the scanner and giving them a psychedelic will clarify all questions about how psychologically and physiologically complex substances like these work in the brain?! Like in any other scientific discipline, it's highly unlikely to establish a ground truth with just a few studies and therefore limited data points. In particular, since the results of these studies are dependent on the methods used and, most importantly, on the questions asked and hypotheses tested, it would be foolish to expect that when we are using different methods in different samples with different substances and additionally ask different questions, that we'll end up with exactly the same results. On a topic as complex as consciousness and psychedelics, we are all currently just adding puzzle pieces to the picture. This is not a matter of being right or wrong or believing in one theory or another, this a matter of collecting more data, objectively and unbiasedly testing more hypotheses, and integrating the results. That's what the scientific process is like—I don't think there are any shortcuts to this. I am sure that when we collect more samples, analyze them rigorously, communicate about and evolve our methodological approaches, we'll at one point be able to integrate the findings into a coherent, complementary picture.

“ On a topic as complex as consciousness and psychedelics, we are all currently just adding puzzle pieces to the picture. ”

Which theoretical frameworks are you the most following on the topic of consciousness?

The ones making testable empirical and therefore falsifiable predictions and that recognize the importance of mind-environment interaction.

This is a very reasonable and pragmatic perspective! You recently published a paper with Friston's team (Preller et al., 2019), but the collaboration was more at the methodological level (Dynamic Causal Modeling), can you describe how it connects to your previous work and if it has also theoretical insights?

In this paper we test the predictions of a model proposed by Vollenweider & Geyer (2001), which suggests that the altered state of consciousness induced by psychedelics results from thalamic gating deficits and alterations in information processing of internal and external stimuli within cortico–striato–thalamo–cortical (CSTC) feedback loops. This CSTC model is highlighting the thalamus as the structure controlling or gating information to the cortex and thereby being critically involved in the regulation of consciousness. Alterations of thalamic gating capacity are suggested to result in an information overload of the cortex, with excessive exteroceptive and interoceptive stimuli that may ultimately cause the sensory flooding, cognitive disruptions, and ego dissolution present in both naturally occurring psychoses and drug-induced altered states of consciousness.

We now tested this model empirically by analyzing our resting-state data collected under the influence of LSD using the spectral Dynamic Causal Modeling approach developed at the Wellcome Centre for Human Neuroimaging in London. This allowed us to investigate directed (effective) connectivity changes within key regions of the CSTC model, which is key for testing its predictions. We found that LSD does indeed alter connectivity between brain regions mostly in line with the CSTC model: We also found decreased connectivity from the ventral striatum to the thalamus and increased connectivity from the thalamus to the posterior cingulate cortex. However, connectivity to another cortical area, the temporal cortex, was reduced. We therefore conclude that while the thalamus indeed decreases information gating and increases “bottom-up” information flow to certain cortical areas, LSD does not cause an undifferentiated cortical inundation as first hypothesized in the model. This might explain the often reported paradoxical subjective effects in psychedelic-induced altered states of consciousness, e.g., impaired cognition but at the same time reported perceived mental clarity, and psychosis-like effects combined with blissful experiences (Carhart-Harris et al., 2016).

What could be the most important challenges for future research?

Convincing funding agencies that 1) research on psychedelics is offering important insights into the way our brains work, 2) we need to pursue clinical as well as basic science avenues to make progress, and 3) larger sample sizes are needed. Furthermore, as in every discipline, we need to train people who are entering the field as junior researchers to become good and responsible scientists and clinicians.

“ As in every discipline, we need to train people who are entering the field as junior researchers to become good and responsible scientists and clinicians. ”

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The evolutionary neuroanthropology of consciousness

Exploring the diversity of conscious states across cultures

An interview with
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Abstract

In this interview, Michael Winkelman and Martin Fortier discuss the extent to which consciousness is grounded in deep evolutionary mechanisms and can be enculturated. First, the main tenets of two neuroanthropological approaches to consciousness and culture are outlined. Next, the upsides and downsides of evolutionary psychology are examined; the fruitfulness of this approach in the study of cultural phenomena such as shamanism is debated. The authors then discuss the promises of the “big data” approach to the study of religion as well as evolutionary puzzles about religion. Turning to issues bearing on the taxonomy of consciousness, the interview explores how consciousness should be individuated and especially how many “modes” of consciousness should be identified based on what we know of the biology and phenomenology of altered consciousness. Winkelman’s concepts of the “integrative mode of consciousness” and “psychointegrators” are subsequently examined. Next, the interview addresses both how alterations of consciousness are universally similar (the perennialist view) and can also be enculturated (the constructivist view). Finally, the authors discuss issues around the cultural use of hallucinogens (a.k.a. visionary plants): what is the best method to study them? And for how long have humans used them?

keywords: altered states of consciousness, enculturation, evolutionary neuroanthropology, hallucinogens, shamanism.

Your work is very multidisciplinary and spans several fields (at least the following: cultural anthropology, neuroanthropology, neurotheology, cognitive science of religion, evolutionary anthropology, medical anthropology and evolutionary psychology). What was your training like? Who were the most important inspirational figures in your intellectual development?

I wandered from psychology to anthropology to cross-cultural psychology and cross-cultural studies (ethnology, holocultural studies) to Buddhist psychology, then the neurosciences and neurophenomenology and evolutionary psychology in the search

of a method for understanding the biological bases of spiritual phenomena. My training was eclectic, largely self-driven; I went to graduate school at the School of Social Sciences, University of California, but most of my coursework was independent study. I was in search of the next paradigm, so the current paradigms seemed little relevant. But there were some important figures along the way. Intellectually, I was inspired by the work of Charles Laughlin, especially his co-authored *Brain, Symbol and Experience* (Laughlin, McManus, & D'Aquili, 1990) which set the foundation for the neurophenomenological approaches. Unfortunately, I did not grasp the full significance of Laughlin's co-authored *The Spectrum of Ritual* (D'Aquili, Laughlin, & McManus, 1979) when I first read it, but this too eventually influenced my work.

Most of your research work tackles topics in neuroanthropology. Importantly, the field of neuroanthropology is split, as it were, between two distinct schools. The first coincides with the *biogenetic structuralist* approach as defined by the seminal work of Charles Laughlin and colleagues (Laughlin & D'Aquili, 1974; Laughlin et al., 1990). According to this school, the brain is endowed with many innate and universal neural (or "neurognostic") structures that explain behaviors and beliefs observed across the world. The second school is more recent and is best epitomized by the volume edited by Daniel Lende & Greg Downey (2012), *The encultured brain*, and by work in cultural neuroscience conducted by Joan Chiao and colleagues (2016). The work of Andreas Roepstorff and coworkers (2010) also belongs to this approach. In contrast to the first school of neuroanthropology, the second one stresses the plasticity of the brain and argues that many neural structures can be shaped and influenced by idiosyncratic cultural patterns.

It seems that your own work belongs to the first school of neuroanthropology. What makes you think the human brain is best described as endowed with innate and fixed structures rather than plastic ones? Your writings speak very highly of the biogenetic structuralist school, but what is your view on the "culturalist" school of neuroanthropology? Is your theoretical approach completely at odds with the latter or do you share at least some of their views?

First I would say that the cross-cultural principles, even universals, of magico-religious practices, especially shamanism, speak to some underlying biological factors that produce these similarities. Certainly the physical and social environment provide influences, but I think the notion of cross-culturally distributed principles of shamanism, religion, meditation and spirituality speaks strongly to the underlying biological bases as the structural foundations.

In terms of the neuroanthropology traditions, my work has been largely focused within the first school, understanding religious and spiritual universals within the biogenetic structuralist and neurognostic approaches. But I also think it abundantly clear that the brain is a highly plastic organ. At the same time, what is subject to

plasticity are the innate tendencies, the extent to which they are elicited, suppressed or developed. So to me they are not opposing ideas, but different points of departure. The innate modular structures are part of our deep primate heritage, their slow manifestations across the primate and hominid and hominin lines speaks to accretion.

While I have primarily focused on the first neuroanthropology approach as a tool to explain universals, my own work has also addressed this notion of cultural and social effects on plasticity. This is exemplified in my research (for a summary, see: Winkelman, 2018b) on the sociophysiological and psychological dynamics of possession states. In this context I have made my clearest statements regarding the roles of social circumstances in shaping plasticity of the brain into a very specific alteration of consciousness found cross-culturally and subsumed under various forms of possession. Some of my earliest research reflects concerns with the social effects on plasticity of innate responses. In a study of the effects of formal education on extra sensory perception and of the effects of socialization on the manifestations of psi (Winkelman, 1982), I address issues related to how socialization affects experience and awareness of the world, very much concerned with the plasticity of innate capacities.

So this plasticity is why cultural spiritual traditions are so important. They can take various disturbances in life, such as illness, injury, abandonment, being orphaned, etc. and shape the body-mind response, using the consequences of these disturbances to alter the overall normal cognitive-emotional developmental trajectory of the person. Such disturbances, especially illness, are used in the traditions of shamanism and meditation, taking the disturbance in normal development to enable one to engage our innate structures and develop and associate them in different ways than that normally intended by the unfolding of our nature and the cultural evolution of our varied capacities. The shaman is a master in engaging, combining, integrating the various modular structures, while the meditator is adept at stimulating, totally isolating and disenabling innate mental structures, leading to experiences of pure light, love and joy, or void/nothingness.

A good example of your biogenetic structuralist take on various cultural phenomena is your theory of shamanism. According to you, the main features of shamanism are to be understood in terms of innate neurobiological structures ("neurognostic structures") present in every human: "The cross-cultural manifestations of basic experiences related to shamanism (e.g., soul flight, death-and-rebirth, animal identities) illustrates that these practices are not strictly cultural but are structured by underlying, biologically inherent structures. These are neurobiological structures of knowing that provide the universal aspects of the human brain/mind" (Winkelman, 2010a, p. 38; and also: Winkelman, 2002b, 2002a). Yet, drawing upon Åke Hultkrantz's work you also acknowledge that shamanism arises out of environmental adaptations: "The worldwide

similarity in shamans derives from the psychobiological bases of human consciousness and its adaptation to social and ecological conditions of hunter-gatherer societies" (Winkelman, 2010a, p. 64).

Regarding the study of shamanism, is the model you endorse one in which neurognostic structures directly cause specific cultural traits to emerge, or one with an interactionist twist where cultural traits emerge from the interplay of neurognostic and environmental constraints?

All of genetics and innate capacities unfold in interaction with the environment. I see the foraging band structure with a fission-fusion dynamic as the environment in which shamanism emerged, something deep in hominin prehistory (Winkelman, 2010b). These ideas about the commonalities in chimp and hominin rituals emerged in my work circa with the second edition of *Shamanism* (2010a). These ancient ritual structures reflect what is at issue in the first statements you review.

The second issue about the effects of foraging environments on the manifestation of shamanism is more related to the contrast with other kinds of magico-religious practitioners (Winkelman, 1990). I think that many of these same capacities at the core of shamanism are manifested in the experiences and behavior of possession cult mediums, whose distinctive features emerged from the formative influences exerted by the oppressive societal dynamics of social stratification and political integration, probably exacerbated by patrilineal social structures and compromised nutrition.

So I think that the traits emerge both from the innate tendencies, as well as environmental provocation. For instance, the altered state of consciousness (ASC) associated with extreme fasting also emerge "naturally" from the effects of food shortage and short-term starvation. I think the evidence indicates that out-of-body experiences can be provoked by many stressors, including accidents, long-distance running, etc. I emphasize these in the sense of a neurognostic structure, something innate about how we perceive the world. The *cultural* part is what we believe about these experiences. Such cultural beliefs may have many sources apart from the neurognostic dynamics produced by the innate dynamics of these experiences.

“ I think that the traits emerge both from the innate tendencies, as well as environmental provocation. ”

This distinction of neurognostic versus cultural structures raises the question of the extent to which shamanic traditions depend on culture. Clearly cultural loss leads to loss of shamanic practices, but whether this is simply the consequence of some loss of “knowledge” or some broader consequences of cultural disintegration is not

clear. To me, the remarkable similarities of shamanic practices in societies around the world speaks to something innate about the fundamental dynamic of shamanism, something that can emerge from innate cognitive, social and emotional tendencies rather than something sustained primarily through cultural belief; this is supported by converging evidence from ethology, neuropsychology and cross-cultural studies (Winkelman, 2010c). However, when these tendencies are provoked in the modern world, their sequela and consequences are quite different from that seen under conditions of foraging societies because the formative social influences (and cultural beliefs) are dramatically different. The environment is also a factor here, where animals are clearly central to adaptation and survival, whether as food or predators, or even as sentinels. I think that a core part of shamanism was a relationship with the world of animals on so many levels. This gets reduced to cows and chickens and later dogs and cats. Not as complex animal-based environmental relations that creates identities and powers and channels into nature typical of foraging societies.

According to you, shamanic concepts such as the belief in a “traveling soul” or in “soul flight” are to be explained by *innate modules* (Winkelman, 2002b, 2002a, 2010a, 2017b). The concept of a module has been largely debated and what is meant by it in Fodor’s seminal piece (Fodor, 1983) is very different from what is meant in contemporary evolutionary psychology (C. Barrett & Kurzban, 2006).

What definition of a module do you endorse? For example, do you take automaticity and informational encapsulation to be definitional of what a module is? Moreover, do you think with Fodor that the modularity of the mind is restricted to perception and does not concern cognition (reasoning, concepts, etc.); or, along with Tooby & Cosmides (1992), Sperber (1996a) and others, do you champion the massive modularity hypothesis (the view that the mind is modular throughout)?

My conceptualization of innate modules is primarily informed by Gardner’s work, as well as the broader concept of innate operators used by d’Aquili to conceptualize universals of spiritual experience. These innate modules or operators are far more than perceptual devices, but engage full-blown cognitive processes providing the basis for innate intelligences. I see shamanism as exploiting a variety of these innate intelligences, and furthermore using ritual processes to combine innate intelligences, for instance in animal allies that combine the interpersonal and naturalistic intelligences. This integration of (1) *interpersonal intelligence*—a capacity for a “theory of mind” to infer others’ mental processes and to work effectively with others through an understanding of their motivations and intentions; with (2) the *naturalist intelligence* that provides “expertise in the recognition and classification of the numerous species—the flora and fauna—of his or her environment” (Gardner, 2000, p. 36). This cross-modular integration is in contrast to the normal isolated function of modules. It also provides a new capacity

by taking the ability to assign identity to/recognize a species and to identify relations between and among species and create a new form and level of symbolic thought for personal and social differentiation (i.e., totemism).

I would endorse a massive modularity concept, one that would include the notion of several innate forms of self, following the concepts of Damasio; I think that these kinds of innate conceptual structures not only underlie the body self-experienced in out-of-body experiences, but various concepts of embodied spirits, ancestor spirits, and external spirit entities (see Winkelman, 2018a you discuss below).

I think these innate intelligences may constitute forms of narrative production, such as Gardner's concepts of:

-A *spiritual intelligence*, manifested in “a desire to know about experiences and cosmic entities that are not readily apprehended in a material sense” (Gardner, 2000, p. 40) and engaging with spiritual, noetic and transcendent experiences, inducing charisma, and using it to instill a quest for this spiritual awareness; and

-An *existential intelligence* that reflects the cognitive aspects manifested in the spiritual intelligence, “an ability to locate oneself with respect to the furthest reaches of the cosmos [...] the significance of life, the meaning of death [...] a concern with cosmic issues” (Gardner, 2000, p. 44).

When you discuss the belief in soul flight the output of the modules you are referring to is *experiential*—rather than *conceptual* or *doxastic*: it consists of out-of-body experiences, near death experiences, astral projection experiences, etc. (e.g., Winkelman, 2010a, p. 117). Now, you argue that these *experiences* somewhat automatically trigger *beliefs* whose content largely depends on the content of experience. This line of reasoning looks very much like that of Tylor (1871) when he suggests that beliefs in souls are triggered by altered states of consciousness such as dreaming. Yet, the relationship between experience and beliefs (or concepts) is far from simple and obvious. Unless one endorses the view that perceiving is believing—this view seems wrong to me, since one can perceive things without taking them to be real (Dokic & Martin, 2012; Fortier, 2018a, 2018b)—it is obvious that some dissociation is to be found between experience and belief: (1) some people will believe in soul flight without experiencing any out-of-body experience; (2) and some will experience out-of-body experiences without believing in soul flights. Let me illustrate both (1) and (2).

(1) During my fieldwork in the Middle Ucayali (Peruvian Amazon), a Shipibo friend of mine once told me about the experience he had of losing his soul (*kaya*). While my friend was quietly paddling, his canoe suddenly capsized and he fell into the river. He managed to put the canoe back in its straight position and came back home but noticed he was feeling strange: he was feeling very depressed. Intriguingly, he interpreted this feeling as his soul being gone. As a side note, it should be stressed that according to the Shipibo-Konibo model of the person, when your soul is gone, you do not become a zombie or an

unconscious corpse; you still have some components active in your body—like *shinan* (thought and emotion) or *bero yoshin* (the spirit of the eye)—that enable you to feel and think. My friend then talked to a shaman and they decided to organize an ayahuasca ceremony. During that ceremony, the shaman asked my friend's soul to come back. The day after, when my friend woke up, he was not feeling depressed anymore. He took it to mean that his soul had eventually come back in his body (*yora*). This anecdote is very interesting because it nicely illustrates how the belief in soul travel may have nothing to do with out-of-body experiences—or indeed any anomalous experience. It can merely be a matter of feeling depressed or a bit strange.

(2) If at least some people in the world seem to believe in soul flight without associating it with altered states of consciousness, conversely, some people experience altered states of consciousness without believing in soul flight. A good example of this is provided by volunteers who participate in experiments where neuroscientists purposely induce out-of-body experiences (e.g., Blanke, Landis, Spinelli, & Seeck, 2004). Importantly, in spite of having those out-of-body experiences, participants are mostly secular Westerners who do not believe in soul flight neither before nor after the experience. The out-of-body “module” is indeed triggered but no belief in soul flight is formed as a result of it.

As these two examples demonstrate, it is not obvious that religious beliefs or concepts can be explained strictly by the activation of modules whose output is experiential: such beliefs *can be held without the module being activated; and the module can be triggered without such beliefs being formed*. What is your take on this? How do you conceive of the relationship between experiential modules and beliefs?

I think that it is important to make the distinction between, on one hand, the structural and functional aspects of the experience, and on the other hand the explanatory, epistemic and metaphysical constructs to provide an account of the experience. The former is where we see the innate structures manifested; the latter metaphysical concepts may be very neurognostic (Winkelman, 2013) or they may be formed by a variety of cultural traditions and assumptions. This would include the assumptions of modern medicine and reductionist biology that view certain aspects of experience as illusory because they hold deep metaphysical conflicts with the assumptions of biomedicine (for the cultural aspects of biomedicine see: Winkelman, 2009, Chapter 5).

I think that Tylor was addressing the obvious in attributing the origins of supernatural beliefs to experiences of dreams, especially various forms of lucid and precognitive dreams. Humans have experiences manifested cross-culturally because they have something to do with how our biology operates—or malfunctions. There are certainly many experiences humans have that imply a dualistic reality, especially those involving out-of-body experiences (OBEs) that can be occasioned by diverse means. The fact that OBEs can be caused by such diverse conditions—various medical ailments, psychological manipulation, various drugs, drumming, long-

distance running, etc.—indicates we are seeing something about the structural features of the organism's perceptual/conceptual capacities. I see in the OBE first the disassembling of the normal integration of different modular structures—visual field, body sense, egoic identity—and then subsequently the emergence of a deep and ancient self-structure, perhaps related to the mimetic mind (Winkelman, 2017b) or one of the non-verbal forms of self identified by Damasio.

How we understand—even perceive and relate to—these experiences depends on our prior orientation. In the context of an animistic pre-modern worldview the spiritual dimensions and explanations of these experiences is natural and predominant. When you take post-modern science students into a lab, of course their explanations will be different. But furthermore don't think for a moment that those who "participate in experiments where neuroscientists purposely induce out-of-body experiences" are really experiencing the same thing as a shaman who just collapsed after drumming and dancing for six hours, or someone lost in an ayahuasca journey, or someone clinically dead and laying on the side of the rode with paramedics working to stimulate a heartbeat. There are many dimensions to the dynamics of the OBE besides some simple phenomenological descriptions about body and self-awareness and identity.

It is not entirely clear to me what the explanatory gain is to resort to psycho-evolutionary accounts of cognitive/cultural phenomena. To illustrate my skepticism, let me take the example of a psycho-evolutionary account of the fusiform face area (FFA). The FFA has been discussed in evolutionary terms both by yourself (Winkelman, 2018a, p. 6) and by other evolutionary psychologists/cognitive anthropologists (Sperber & Hirschfeld, 2004, pp. 40–42). Specifically, in "An ontology of psychedelic entity experiences in evolutionary psychology and neurophenomenology," you propose that the reason why people hallucinate many eyes and faces under the effect of psychedelic compounds is that their FFA becomes hyper-activated (Winkelman, 2018a, p. 7). But what is the actual "added value" of arguing that the FFA has been evolutionarily-shaped? Some evidence suggests the FFA is in fact not evolutionarily shaped, but depends on expertise: it is an expertise-dedicated area (Gauthier & Nelson, 2001). This explains why experts in nonface objects (e.g., cars) have the FFA activated by objects other than faces. If Gauthier's theory of the FFA is correct, this means that those who have the FFA being activated by faces are "face experts" and that their FFA "module" has been shaped by expertise rather evolution. The point worth stressing is that one can still say (a) "hallucinations featuring multiple faces correlate with the hyper-activity of the FFA," even if the FFA turns out to be shaped through development—rather than through evolution. This is what I mean when I say that evolutionary explanations bring no "explanatory added value." Another way to put this objection would be to take the example of cars. Gauthier has shown that the FFA could become a "module" specialized in car detection. Now, no one would claim that we have a car module that has been shaped through evolution because obviously cars did not exist in the Pleistocene. Yet, it is still possible to propose that (b) "hallucinations

featuring multiple cars correlate with the hyper-activity of the FFA (or any other brain area(s) specialized in the detection of cars)." At the end of the day, it seems that the explanatory merit of statements such as (a) or (b) lie not in the appeal to some putative evolutionary origin—neither (a) nor (b) do such a thing—but simply in *reducing* phenomenology to some brain function. In other words, the explanatory added-value of such statements comes from reducing cognitive functions to brain activity.

What is true of the FFA is true of most—if not of all—modules. Their evolutionary origin is very controversial and some authors have shown that modules can be accounted for by developmental mechanisms rather than evolution (Elman et al., 1996; Karmiloff-Smith, 1992, 2009). When you argue that the "social cognition module," the "biological module," the "physical module," etc. explain crucial aspects of shamanism, the claim seems to be that your evolutionary account sheds some light on the phenomenon at hand. But it can be objected that the same could be said even if all our modules have been shaped by development and have nothing to do with evolution. For example, you can say "people anthropomorphize their surroundings because of the social cognition module", even if it turns out this module is not an adapted function (i.e., is not shaped by evolution); even if evolutionary processes are not involved, it will always remain that we have cognitive functions specialized in processing social stimuli and that anthropomorphism can always be attributed to them. In short, according to you, what is the real explanatory gain of evolutionary accounts of cultural phenomena?

I think that the evolution of function is what is the focus of selection, and that this always happens through repurposing old hardware. So the FFA undoubtedly faced many selective pressures, one of which is its detection of faces. The point here about the innate modules is that they were designed to provide a certain functional response. My approach is not to say that the responses are just about the brain—obviously they are stimulated by social and environmental context. New function can emerge out of new connections rather than new hardware.

The importance of the innate modules and evolved psychology approaches is the following. When we find recurrent patterns of experience or behavior across cultures, the traditional cultural explanation of religious or spiritual beliefs offers no explanatory power. Why is an out-of-body experience reported around the world? Not because cultures believe this, but because of innate dispositions. When we encounter universals or highly repeated phenomena across cultures, there must be a biological reason. Now notably we do not have people from cultures around the world reporting the presence of cars, not even cars staring at them (which one might even expect since the two headlights are like eyes and the grill like a big mouthed grin!). So is it as you say "[T]he explanatory added-value of such statements comes from reducing cognitive functions to brain activity"? To me, that is a basic function of neurognostic approaches in explaining religious universals. It has to do with how our brain operates. Of course there is the added question of how it is that religious,

ritual and spiritual activities have the strong tendency to stimulate these innate cognitive tendencies. More to come but see: Winkelman, 2017b, 2018a.

“ The importance of the innate modules and evolved psychology approaches is the following. When we find recurrent patterns of experience or behavior across cultures, the traditional cultural explanation of religious or spiritual beliefs offers no explanatory power. ”

If cultural phenomena studied by anthropologists—e.g., animistic and totemistic beliefs/practices—are in fact underpinned by universal adapted functions, one may then wonder how psycho-evolutionary explanations can make sense of the heterogeneous distribution of these phenomena. Indeed, humans are not animists or totemists everywhere in the world and to the same degree (e.g., Descola, 2013; Ingold, 2000; Testart, 2012). If cognitive adapted functions—such as the social cognition module—are universal, and if these cognitive adaptations underlie cultural phenomena such as animism and totemism (Winkelman, 2002a), then why is it that animism and totemism are not found everywhere across the world (Descola, 2013, Epilogue)?

The degree and nature of manifestation of innate capacities are subject to socialization. This is very clear in the area of culture bound syndromes or culture reactive syndromes, where, for instance, innate tendencies such as the startle response may be extremely activated in some cultures to the point it creates a culturally induced illness. The manifestation of innate capacities is quite variable, but inevitable in some form or degree.

Animism is variable, but as Guthrie (1993) has shown very convincingly, people everywhere are animist. Depending on your concept of totemism—but let's take “thinking in terms of animal metaphors”—people everywhere are also totemist. Animism is not expressed only in religious ideation, but in concepts of everyday life, expressed in why our cars have problems, why the computer doesn't work, why the machine works sometimes and sometimes not. Innate modules do not mean that the capacity is expressed in everyone and everywhere to the same degree. Obviously social circumstances can elicit or repress certain tendencies. But is there a culture with no animist beliefs? Are there cultures with no animal metaphors to express emotions, tendencies, social relations? I don't think so. Show me. ☺

However, our metaphysical world is less animist and totemist, etc. than many pre-modern cultures. Why so? Many answers, but one basic one is the social environment. When you live in a culture where the traditions of your ancestors still

organize your day to day, monthly and seasonal activities, such as in agriculture, the compulsion to follow your ancestors' advice is very strong and probably adaptive. Ancestor worship is an adaptive way of maintaining vital traditions and mediumistic communication with them to get advice on how to address problems is probably an adaptation for accessing the knowledge of our collective memories. But when we live in cultures where the traditions of our ancestors, including their work skills, habits and beliefs, are totally irrelevant to our day to day adaptations, small surprise that ancestor worship is not important.

Ditto for animism. I think that it is not possible to fully experience nature and perceive its animistic qualities unless one is immersed in it, solely and far from civilization. When we live in intimate relations with nature, our sense of animism also must shift. After all there are all kinds of non-human living things and natural forces to be experienced in nature.

So the ways in which the innate modules are elicited, their cross-entrainments with other modules and cognitive process, and their roles in culture produce a lot of variation. Shamanism provided traditions for engaging and elevating certain aspects of consciousness adaptive for our foraging ancestors and their relations to nature. Back to the plasticity issue.

“ [T]he ways in which the innate modules are elicited, their cross-entrainments with other modules and cognitive process, and their roles in culture produce a lot of variation. Shamanism provided traditions for engaging and elevating certain aspects of consciousness adaptive for our foraging ancestors and their relations to nature. ”

You have been a pioneer in using databases to address big anthropological questions. In particular, you have investigated the relationship between economic systems, social structures, and types of magico-religious practitioners (priests, shamans, healers, etc.). Rather than theorizing about these variables on the basis of a single fieldwork, as many anthropologists do, you looked at the Human Relations Area Files (HRAF), gathered the relevant data, and resorted to statistical tools to answer the questions you were interested in. This led to some groundbreaking findings (Winkelman, 1986, 1992).

In recent years, several large projects have similarly tried to address big questions about religion by resorting to databases. The two most significant of them are certainly the SESHAT database (seshatdatabank.info) and the Database of Religious History (religiondatabase.org). What do you think of those recent projects?

Strikingly, the questions tackled by recent dataset-based research programs completely overlook the topic of altered states of consciousness. Do you think big data could significantly help shed new light on altered states of consciousness or are there intrinsic limitations to this method? In your recent work, you do not use databases anymore; but are you planning to use such tools again in the future?

While I used some data from the HRAF for my research, my research was based on a subsample from the Standard Cross-cultural Sample. There are some subtle differences between them. I feel that it is unfortunate that anthropologists and other social scientists don't rely more on cross-cultural data to address questions regarding social and cultural universals and social evolution of phenomena, religious or otherwise. Such data is essential for more valid generalizations. So it is good to see new data sets being developed to bring empirical data to address questions about the cultural evolution of religion. Eventually we will need both synchronic and diachronic data sets, and the significance of having a pinpointed culture and time for valid synchronic analysis may not be incorporated into some efforts. How we can incorporate such different info into a single data set is challenging.

From some of the earliest cross-cultural research on magico-religious practitioners (e.g., Bourguignon & Evascu, 1977), the cross-cultural variation in the alteration of consciousness has been a significant area of research and theory. Briefly, Bourguignon was the first to report empirical data on the association of possession ASC with more complex societies. My subsequent research, building on her concepts, has shown that possession appears as the predominant socially recognized ASC under conditions of political complexity and the associated conditions of oppression of females. To me, this is one of the important contributions of cross-cultural research in general, and specifically with respect to the issue of innate modules. One of the arguments against a cross-cultural shamanism is that ASC are not expressed the same everywhere. True. But what explains the patterns of variation? This is where cross-cultural research can help us understand how a set of innate capacities, in this case for alterations of consciousness, may be expressed in a variety of forms, depending on local circumstance.

My cross-cultural data base on magico-religious practitioners and altered states of consciousness is a bit of a paradox. On one hand, its initial formulation provided the basis for my dissertation, *Shamans, Priests and Witches*, a variety of articles, and most importantly my career of developing concepts regarding the universal biological bases of shamanism. After I finished my dissertation, I received a National Science Foundation Dissertation Improvement Grant and I completely reformulated the variables based on the experience of the dissertation, recoded the data, and did coding reliability checks. This new database was never analyzed (but is available from HRAF and on researchgate.net). For a variety of reasons my career

took some different directions (neurotheology, cross-cultural relations, medical anthropology, psychedelics) and I never returned to analyze the new data, or for that matter, many of the obvious questions suggested by the original data set.

Will I return to analyze the data? I think about it from time to time, but I generally feel like I am too old to want to go learn how to use another statistical package. I hope someone will discover this unanalyzed data and do something with it.

Principal areas that might be addressed? (1) the evolution of priesthoods. What are the origins in ancestor worship and what are the factors that contribute to their emergence as dominant ritual structures of society epitomizing the features of religions and priests? (2) ASC and healing: Are different types of ASCs associated with different illness ideologies?; How does this data set relate to Murdock's data on Theories of Illness (Murdock, Wilson, & Frederick, 1980)?

The Cognitive Science of Religion (J. L. Barrett, 2000, 2007; Pyysiänen, 2013) is one of the most ambitious programs of naturalization of religion. Although this research program has made some important findings, it has consistently overlooked the role experience—and especially altered consciousness—plays in religion. For example, it has been argued that conscious experience is uninteresting because it has no effect on religious concepts. That is, the same religious concepts will be formed whether or not altered states of consciousness are experienced (e.g., Boyer, 2001, Chapter 9; Cohen, 2007).

In your HRAF-based work on magico-religious practitioners, you have demonstrated that the type of practitioner found in a culture largely depends on modes of consciousness entertained in that culture (Winkelman, 1986, 1992). Namely, the “integrative mode of consciousness” is only found in cultures where magico-religious practitioners are shamans, healers, and mediums but not in cultures where these practitioners are sorcerers, witches, or priests. This finding seems to provide a strong argument in favor of the view that religious concepts are to a certain extent shaped by conscious experience.

However, this argument works only if we can establish what the direction of causality is between magico-religious practitioner types and the integrative mode of consciousness. A first possibility is that most of the traits defining shamans, healers, and mediums are determined by the integrative mode of consciousness. But a second possibility is that most of their traits coalesce as a result of other factors (e.g., biosocial or socioeconomic factors) and subsequently cause the emergence of rituals inducing the integrative mode of consciousness. According to this account, the integrative mode of consciousness would be the effect and not the cause of the traits defining shamans, healers, and mediums and their idiosyncratic beliefs.

Which of these accounts do you think is the most accurate? More broadly, your work on magico-religious practitioners posits three main variables: the biosocial function, the mode of consciousness (which is sometimes described as a biosocial function) and the

socioeconomic condition. But what is the causal role of each of these variables in bringing about specific magico-religious practitioner types?

Three bases of magico-religious practice reflect the fundamental impulses underlying religious life. The cross-cultural distribution of these institutionalized practices reveals that the fundamental forms of religious life are not arbitrary or simply cultural, but derived from biogenetic human impulses that are manifested across cultures and time, albeit modified in their manifestations by the reigning subsistence, social and political conditions.

These cross-cultural commonalities are also manifested in the configurations of magico-religious practitioners. Societies in the sample had specific typical patterns of co-occurrence of practitioner types.

1. Practitioner: Shaman or other Healer Complex (Shaman/Healer or Healer)
2. Practitioners: Priest and Healer Complex or Medium (1 society with two Healer Complex)
3. Practitioners: Priest, Healer Complex, and Medium or Sorcerer/Witch
4. Practitioners: Priest, Healer, Medium and Sorcerer/Witch

In order to reveal these underlying biogenetic functions, entailment analyses were used to identify the relationship between the formal functions of these magico-religious practitioner types and the processes for practitioner role selection (Winkelman, 1986). This revealed three major relationships between selection processes and magico-religious activities, notably the former entailing the latter rather than vice-versa.

(1) Alteration of Consciousness and Healing. If there is selection for the role by (a) signs from the spirits, involuntary illness or spontaneous visions or deliberate vision quests, then (b) there is further training involving alterations of consciousness, and (c) professional activities of healing and divination. These features were typically characteristic of the practitioners of the Healer Complex (all Shamans and Shaman/Healers and some of the Healers) and the Mediums. This is a human universal, manifested and utilized differently in different types of societies and traditions. So your statement above that the integrative mode of consciousness is not found in cultures where there are Sorcerer/Witches or Priests is mistaken. All societies, including those with Priests and Sorcerer/Witches, have the integrative mode of consciousness manifested in Shamans, Shaman/Healers, Healers or Mediums. All societies have one of these shamanistic healers that exploit the potentials of the integrative mode of consciousness.

(2) Political Succession and Agriculture Rites and Propitiation. If there was selection for the role through (a) some form of social succession (typically father to son) or some form of political action (i.e., political negotiations or war), then (b) the practitioner exercised political, legislative and judicial power, and (c) engaged in seasonal rituals of agricultural fertility, as well as ritual activities for propitiation of collective spirits and protection. These features were characteristic of the practitioners labeled as Priests. This capacity may have its deep roots in ancestor cults, but the predominant social role of Priests is found in politically integrated societies. Additional unpublished analyses implicate warfare in the decline of shamanism, and war powers implicate priestly roles, suggesting that warfare may be the real causal factor in the transformation of magico-religious practitioners.

(3) Social Labeling and Malevolent Activities. If there was selection for the role on the basis of (a) negative social labeling alleging a biological inheritance of the role, or other forms of unwanted attribution then (b) the practitioner has an exclusively malevolent role characterization involving activities such as (c) causing illness, death and misfortune. These features were characteristic of the practitioners labeled Sorcerers/Witches. This negative dimension of the supernatural is produced through the persecutions carried out primarily by Priests and Healers, who designate people as being a Sorcerer/Witch.

In your work, you often argue that religious practices and institutions (e.g., shamanic healing rituals) are deeply adaptive (Winkelman, 2009, Chapter 7 and 9, 2010a, Chapter 6; Winkelman & Baker, 2010, Chapters 5, 6 and 11). Now, some cognitive scientists of religion have argued that religious practices and institutions consist mainly of spandrels and not of adaptations (e.g., Atran, 2002; Boyer, 2001; on the debate between adaptationism and spandrelism: Sosis, 2009). What are your main arguments in favor of the adaptationist account of religion and main objections against the spandrelist account?

I have three chapters in an upcoming book *The Super-Natural after the Neuroturn* that I summarize in the following paragraphs. The simple evidence against the spandrel arguments is the many different functional and adaptive advantages of the diverse components of religious thought, as well as its group level effects. It is very easy to show the powerful social effects of supernatural assumptions, costly displays, ingroup cognition, etc. Similarly, the psychological benefits from enhanced endorphins, anti-depressive effects, enhanced social support, etc. speak to a lot of components of religious thought that facilitate human adaptation. Whether these are strictly biological or emerge in cultural-gene-environment interactions is really immaterial. The cognitive, social and physical environment is always part of the expression of genetic capabilities.

So why consider religion adaptive?

When primatologists study animal ritual they don't debate whether or not the rituals have adaptive functions. Why change the tune when we come to humans? Rituals exercise a variety of adaptive functions in moderating emotions, psychological and social relations and cognitive processes. Human's supernatural behaviors involve exaptations of the functions of primates' ritualized displays that were used to expand mechanisms for social communication and coordination as part of human innate psychosocial processes and cognitive structures. The communicative and integrative displays among primates, particularly the ritualized behaviors for group unification among great apes, provide a framework for understanding the origins of ritual behavior in activities that enhanced social integration. The concept of costly displays provides a framework for identifying the forces that led to the shamanic expansion out of the hominid ritual capacity, using drumming, singing and dancing to expand social integration function provided by mimesis. Shamanism emerged in this expansion of the mimetic capacity and its associated suite of expressive capacities that extended the social coordination functions of displays. Shamanic rituals expanded as adaptations involving increased capacities for ritual bonding of communities and the associated enhanced endorphin and placebo healing responses.

The varied ways in which diverse alterations of consciousness contribute to healing attests to basic biological functions of this mode of consciousness. Shamanic alterations of consciousness reflect the physiological effects of ritual practices in stimulating the modulatory neurotransmitter systems of serotonin, dopamine and the endocannabinoids, as well as the endogenous opioid system. These provide the biological bases for these experiences in an enhancement of the functioning of neurotransmitter systems that enhance access to evolutionarily early strata of the brain. These brain areas provide the special cognitive qualities of consciousness that underlie perceptions of the supernatural. Ritual practices induce supernatural experiences through disrupting higher order information integration and top-down cognitive control, permitting emergence of cognitive processes related to ancient brain structures and primary process levels of cognition, identity and awareness. Shamanic alterations of consciousness provide adaptations that enhance cognition through expanded access to unconscious mental processes and the ability to integrate the global brain dynamics, rather than just the habitual networks (i.e., default mode network). The effects of psychedelics on global brain dynamics shows an enhanced global connectivity and increased connectivity between areas that are not normally connected. This illustrates how ASCs provide adaptive benefits by increasing access to novel information and cognitive processes.

“ The effects of psychedelics on global brain dynamics shows an enhanced global connectivity and increased connectivity between areas that are not normally connected. This illustrates how ASC provide adaptive benefits by increasing access to novel information and cognitive processes. ”

It is not entirely clear to me whether you endorse a pluralist or unified account of altered states of consciousness. First, let me mention for the readers who are not familiar with your work that you distinguish between *states of consciousness* and *modes of consciousness* (Winkelman, 2010a, p. 127 et sq.). Your definition of modes of consciousness is close to that proposed by Tim Bayne and colleagues (Bayne & Hohwy, 2016; Bayne, Hohwy, & Owen, 2016)—your definition might be even broader (hyperonymic) than theirs. On the other hand, *states of consciousness* are to be understood as a more restricted hyponymic category. For example, according to you, soul flight and near-death-experiences are two distinct *states of consciousness* that belong to the same *mode of consciousness*, that you call the “integrative mode.” Furthermore, in *Shamanism*, when you introduce the three main conscious types of states belonging to the integrative mode—the shamanistic type, the mystical type and the mediumistic type—you define them as *patterns* (Winkelman, 2010a, p. 127). Therefore, it seems that what we have is a three-level taxonomy of consciousness. For a reconstruction of this three-level taxonomy, see *Figure 1* (note that this tree is not exhaustive: several conscious modes, conscious patterns and conscious states are not mentioned).

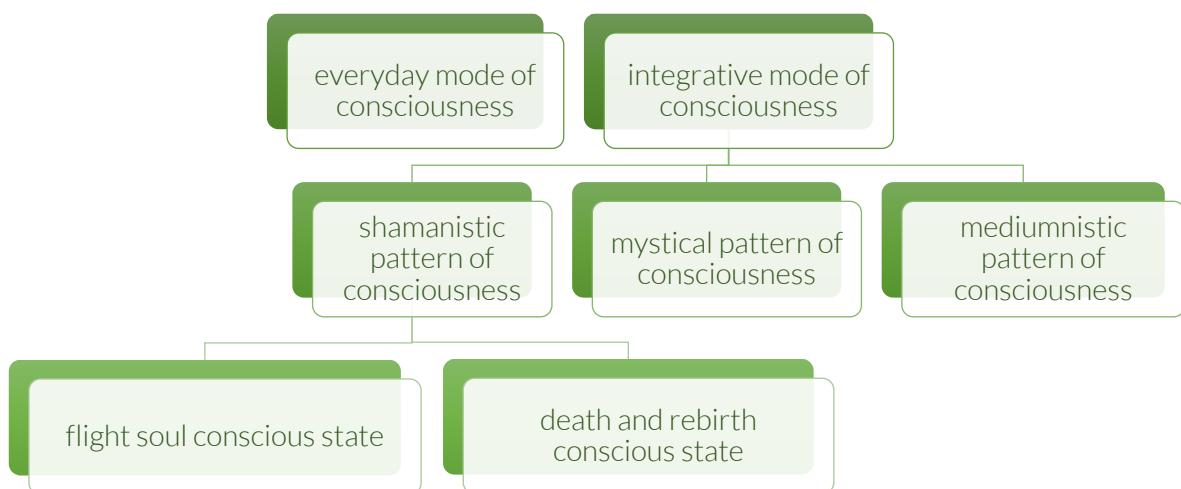


Figure 1: A reconstruction of the three-level taxonomic structure of consciousness proposed in Shamanism: A Biopsychosocial Paradigm of Consciousness and Healing

Now that these different concepts have been clarified, I can introduce the key idea of your neuroanthropological model of consciousness. According to you, no more than four modes of consciousness can be identified (Winkelman, 2010a, p. 22, 2011, p. 29):

- (1) Waking mode of consciousness.
- (2) Deep sleep mode of consciousness.
- (3) Dreaming mode of consciousness (REM sleep).
- (4) Integrative (spiritual and transpersonal) mode of consciousness (IMC, for short).

A first question I have is: do you consider the dreaming mode as distinct from the integrative mode? Indeed, some passages of your work suggests the dreaming and the integrative modes may actually be closer than what your quadripartite taxonomy suggests. For example, you note that “[b]ecause of [...] similarities [between] REM and the IMC, shamans explicitly sought to integrate dream processes within ritual to induce alterations of consciousness” (Winkelman, 2010a, p. 136). Somewhere else, you say that the *integrative* mode is an extremely broad category including states as different as those induced by “hallucinogens, amphetamines, cocaine, marijuana, polypeptide opiates, long-distance running, hunger, thirst, sleep loss, auditory stimuli such as drumming and chanting, sensory deprivation, *dream states*, meditation, and a variety of psychophysiological imbalances or sensitivities resulting from injury, trauma, disease, or hereditarily transmitted nervous system conditions” (Winkelman, 2011, p. 31, my emphasis). Why classify “*dream states*” within the *integrative* mode of consciousness if, as previously stated, oniric states are purported to form an independent mode of consciousness? Why, in the first place, consider that the *integrative* mode (e.g., psychedelic experience or meditation) are different from dreaming? It is not clear to me why the taxonomic distance between dreaming and psychedelic experience is held to be greater than the distance between psychedelic experience and long-distance running, shamanic trance, meditation, hypnosis, etc. In fact, it seems to me that dreaming and psychedelic experience have much more in common (Kraehenmann, 2017; Kraehenmann et al., 2017) than psychedelic experience and amphetamine-induced arousal (Fink, 1969; Sanz, Zamberlan, Erowid, Erowid, & Tagliazucchi, 2018). And yet, if I understand it correctly, your quadripartite taxonomy of conscious modes suggests otherwise!

I think that the general physiological shift from extreme autonomous nervous system activation (either branch, especially sympathetic) to the rebound into a strong parasympathetic state provides a disengagement from the waking mode that enables access to many different structures of consciousness. So here a generalist model of ASCs; from there, however, intention, cognitive activity, exogenous influences (music, drums, drugs) can lead the person to a variety of states of consciousness.

The literature on the persuasiveness of dreaming in mammalian species make it easy to see it is something separate from what I want to conceptualize in the integrative mode of consciousness. This is not to say that dream states are unrelated—indeed the whole concept of lucid dreaming provides a perspective on how a specific kind of awareness allows one to shift from the dream mode to an aspect of the integrative mode that includes self-awareness. So, integration of self-awareness (a waking mode capacity) into the dream mode may be sufficient to produce the integrative mode of consciousness, and extraordinary (but not ordinary) dream states may be one of the original platforms for selection for shamanic ASC. But clearly there are other ways to get into the ASCs of the integrative mode of consciousness, in particular by breaking down the coping mechanisms of the waking mode of consciousness—drugs, sleep deprivation, extreme pain, exhaustion, fasting, long-distance running—these all lead to a breakdown of the waking mode and allow for new discrete states of consciousness to emerge.

I would not necessarily insist on only 4 modes, what is lumped within the integrative mode of consciousness may ultimately be shown to involve several different modes (i.e., sympathetic predominant versus parasympathetic predominant). I would see my last sentence here as my answer to your whole next question. Lead the way into more modes. But we have to be clear on what constitutes a mode of consciousness. I think a functional system is a good starting point. What can be done within a specific set of parameters of consciousness?

Before going further, it might be useful to dwell a bit longer on your definition of what counts as a *mode of consciousness*. Your model draws its inspiration from Arnold Mandell's (1980) psychobiological model of consciousness. Mandell "suggested that physiological mechanisms underlying "transcendent states" are based in a common underlying neurobiochemical pathway" (Winkelman, 2010a, p. 25, my emphasis). Critical, then, is the idea that different phenomenological states may be underlain by a single neurobiological final pathway. The problem with this definition is that it remains rather vague as to how modes of consciousness should be parsed. In another passage, you point out that "modes of consciousness are revealed in the recurrent patterns of systemic neurophysiological functioning and their homologies with the major differences in experience" (Winkelman, 2010a, p. 22). So, to summarize, from what I understand, modes of consciousness are (i) underpinned by some basic organismic mechanisms—some basic "biological functions and organismic functions and needs" (Winkelman, 2011, p. 29)—and, (ii) these mechanisms give rise to various altered states of consciousness. Importantly, modes of consciousness are more encompassing than states of consciousness because modes refer to the underlying neurobiological pathways that have the potential of generating a large range of altered states (i.e., there is a one-to-many mapping between each mode and its characteristic states).

We are now in a position to examine your proposal that there are exactly four modes of consciousness. More specifically, I would like to look at the third conscious mode:

dreaming. Given what your definition of a conscious mode is, it could be argued that it would only make sense to distinguish between the non-dreaming deep sleep mode and the dreaming REM sleep mode if it were true that REM sleep and dreaming were perfectly overlapping with one another. However, as has been abundantly demonstrated within the last decades, a great deal of dreaming is in fact going on outside of REM sleep (Foulkes, 1962; Nir & Tononi, 2010; Siclari et al., 2017; Stickgold, Malia, Fosse, Propper, & Hobson, 2001). As a consequence, it seems that we are faced with a dilemma: (1) either we consider that dreaming as a whole constitutes a mode, but then the claim that there is a single neurobiological pathway underlying each mode will be violated because at least two pathways—REM sleep and non-REM sleep—will be recognized as generating dreaming; (2) or, we split dreaming in two—REM sleep and non-REM sleep—but then we are led to posit the existence in total of at least five modes of consciousness (the third one defined above being now split into two distinct modes). In sum, either the definition of what a mode of consciousness is should be revised or there are actually more modes of consciousness than previously recognized. Do you think the line of reasoning just sketched is sound? If so, which option would you be tempted to choose: revising the definition of modes of consciousness or recognizing the existence of more modes than initially proposed?

Certainly there are more modes to be identified, and the integrative mode of consciousness may be too inclusive, requiring differentiation into biologically distinct functions of consciousness.

It seems that the remarks just made about the dreaming mode of consciousness could also be made about the integrative mode of consciousness. In your work, you have identified many key phenomenological and neurobiological differences between various states belonging to the integrative mode. To cite a few examples:

- *Parasympathetic vs. sympathetic spiritual states*: “While dominant meditative traditions emphasize the direct approach to parasympathetic dominant states, there are traditions that also engage the route of sympathetic stimulation, such as in the dancing of the Islamic mystics, the whirling dervishes.” (Winkelman, 2010a, p. 131)
- *Meditation vs. shamanism*: “[Meditators’] typical activities contrast with shamans in terms of more self-control and concentration, lower arousal, a sense of calm and emotional detachment, a loss of sense of self, a greater awareness, and contentless experience.” (Winkelman, 2010a, p. 132)
- *Shamanism vs. possession*: “Harner (1982) emphasized the shaman’s remembering what happened during the soul journey as a characteristic of the shaman’s SoC. Winkelman’s (1986b, 1992) research supports the contention made by Eliade (1964) that this experience is not one in which the shaman is possessed by spirits, but, rather, one in which the shaman exercises a control over the spirits.” (Winkelman, 2010a, p. 133) “A difference between shamanic flight and spirit possession is found in the association of the latter with amnesia. Although memory does occur in some situations of possession, amnesia does not occur with soul flight, and in the cross-cultural data, all

cases of ASCs with amnesia are associated with possession." (Winkelman, 2010a, p. 173)

All these differences seem to support a pluralist account of the integrative mode of consciousness. Indeed, the unity of this mode is arguably illusory and various "integrative" constructs should accordingly be identified. Thus, either more modes of consciousness should be recognized, or, alternatively, the same number of conscious modes could be retained, but then the definition of conscious modes should be drastically revised. What is your view on this dilemma?

I would say that the question of the number of modes should be a question answered by empirical data. You have made the point about the need for a greater number of modes. Research by Fox et al. (2016) would support the expanded mode concept, even for meditation. Fox et al. found different patterns of brain activation and deactivation associated with different styles of meditation (focused attention, mantra recitation, open monitoring, and compassion/loving-kindness), as well as some similarities across most major meditation styles. Among their central findings was that the different categories of meditation had both unique psychological features as well as distinct patterns of activation and deactivation of different regions of the brain.

A similarity across different forms of meditation involves effects on mental-physical processes that can be progressively developed through practice, engaging an ability to regulate physiological and mental activities, including involuntary processes. Different meditation techniques also recruited similar areas of the brain including: the insular cortex; the pre/supplementary motor cortices; the dorsal anterior cingulate cortex (involved in the regulation of attention and emotion); and the frontopolar cortex. Fox et al. reported that the primary meditation practices (except the loving-kindness/compassion technique) had effects on the posterior dorsolateral prefrontal, premotor and supplementary motor cortices.

Fox et al.'s meta-analysis showed that practices of focused attention meditation produced significant activation both in prefrontal, premotor and dorsal anterior cingulate cortices, as well as slightly sub-threshold activation in the posterior dorsolateral prefrontal cortex and left mid insula. The focused attention meditation practices also resulted in a deactivation of two major default mode network hubs, the posterior cingulate cortex and the posterior inferior parietal lobule.

Fox et al.'s meta-analysis of studies on open monitoring meditation techniques revealed significant activation in the insula, left inferior frontal gyrus, pre-supplementary and supplementary motor area, and premotor cortex, as well as posterior dorsolateral region of the prefrontal cortex and the dorsal anterior cingulate cortex.

So this kind of specific brain system differences is the kind of evidence that would support breaking down into further modes of consciousness. But this would have to be on functional grounds too that I discuss below.

The reason why you call the integrative mode of consciousness integrative is that this mode is characterized by the integration of distinct informational units of the brain that do not usually communicate with one another (or do so to a much lesser degree). In your own words, this conscious mode “produce[s] an integration of information processing between the R-complex [the reptilian brain] and the limbic system, between the limbic system and the frontal cortex, and between the hemispheres of the cortex” (Winkelman, 2011, p. 38). Overlapping with the concept of integration is the concept of *psychointegrator*. The latter refers to any chemical compound having the propensity to cause integration in the brain and in particular to “provoke limbic discharge patterns that produce enhanced interhemispheric synchronization and increased communicative interaction between frontal hemispheres, and between the lower brain areas and frontal cortex” (Winkelman, 2001, p. 220). In other words, “psychointegrator” is a less pejorative and more technical way to speak of “serotonergic hallucinogens” (LSD, mescaline, psilocybin, DMT, etc.) (Winkelman, 1996, 2001, 2007). Now, what is the evidence in favor of the view that serotonergic hallucinogens have a psychointegrative effect?

Let us look first at the EEG data. One central characteristic of the integrative mode of consciousness is that it is dominated by highly synchronized and coherent brain waves. In particular, we would expect the EEG signal to be dominated by the high-frequency gamma and low-frequency theta rhythms (e.g., Winkelman, 2010a, p. 35, 2011, p. 30). Do psychointegrators effectively induce such states? The answer seems to be no. There is now a plethora of EEG studies available on serotonergic hallucinogens, but none of them describe the gamma rhythm as being particularly increased by the intake of a psychedelic compound. To my knowledge, the only exception to the rule is Eduardo Schenberg et al.’s (2015) EEG study of ayahuasca. However, this increase in gamma was restricted to the second half of the experience, and importantly, it was mainly interpreted by the authors as being caused by harmaline (Schenberg et al., 2015, pp. 20–21), which is not a serotonergic hallucinogen (i.e., a psychointegrator) and whose activity probably stems chiefly from anticholinesterasic mechanisms (Yang et al., 2015; Zhao et al., 2013; Zheng et al., 2009). As regards the increase in slow rhythms—and theta in particular—again, to my knowledge, this electrophysiological change does not typically characterize psychointegrators (e.g., Muthukumaraswamy et al., 2013); instead, it is typical of antimuscarinic hallucinogens (Ebert, Grossmann, Oertel, Gramatté, & Kirch, 2001; Itil, 1966; Itil & Fink, 1966; Osipova et al., 2003), whose phenomenology and neurophysiology is completely different from that of serotonergic hallucinogens (Fortier, 2018a, 2019; Gyermek, 1998; Ketchum, Sidell, Crowell, Aghajanian, & Hayes, 1973). So, looking at the EEG data, it could be objected that typical “integrative rhythms” are *not* present in psychointegrator-induced states. What is your take on this matter?

The measurement of brain waves and their various forms of coordination and coherence is beyond my expertise. I think that nonetheless, the idea that ASC in general, and psychedelics included, reduce the overall brain wave frequencies is supported by diverse forms of evidence. I note you refer to “plethora of EEG studies available on serotonergic hallucinogens” but I did not see references.

Here, let me quote at length some already published material where I directly address these issues (Winkelman, 2017a, 2017b, 2018a):

In spite of the diversity of entheogenic species and the broad range of psychoactive substances, the principal psychedelics share similarities as tryptamines and indole alkaloids, which are sources of DMT and similar neurochemicals that function as agonists stimulating the serotonergic system. Serotonin has been considered the primary neurotransmitter system affected by psychedelics, especially through their effects at 5-HT_{2A} receptors; action on other serotonin (5-HT) receptors is also established, as well as a wide range of other neurotransmitter systems.

The phasic effects of psychedelics first stimulate and enhance serotonin; secondly, saturate and overload the serotonin system; and thirdly, release the habitual serotonin repression of the dopaminergic system. Psychedelics' resistance to normal reuptake mechanisms locks out serotonergic transmitter sites, habituating the receptors and reducing the regulatory processes of the serotonergic system. This results in a release of the dopamine system normally repressed by serotonin, causing a variety of visionary experiences (hallucinations, dreams, psychosis) and modifying control and coordination among the major brain subsystems. Psychedelics compromise the serotonergic inhibition of the ascending flow of information and emotional responses, resulting in the release of information from ancient levels of the brain that is normally inhibited by serotonin. These effects are typified by psychedelics' interruption of cortico-striato-thalamo-cortical loops that inhibit the lower brain structures' sensory gating systems, providing an enhanced availability of information managed by these brain areas (Vollenweider, 1998; Vollenweider & Geyer, 2001).

These psychedelic effects in altering consciousness are illustrated by Vollenweider's (1998) research on the mechanisms of action of psychedelics on the major cortical loops. The frontal-subcortical circuits provide one of the principal organizational networks of the brain involving neuronal linkages and feedback loops of the cortical areas of the frontal brain with the thalamus of the brain stem region. Vollenweider's attributes the consciousness-altering properties of psychedelics to their selective effects on

the brain's cortico-striato-thalamo-cortical feedback loops that link the information gating systems of lower levels of the brain with the frontal cortex. The typical action of psychedelics interrupt the cortico-striato-thalamo-cortical loops that inhibit the lower brain structures' sensory gating systems that reduce the flow of information to the frontal areas of the brain (Vollenweider & Geyer, 2001). Psychedelic interruption of serotonergic inhibition of thalamic screening results in a flood of information from these ancient levels of the brain. This overwhelms the processing capacities of the frontal cortex and leads to alteration of experience of self, other, environment and produces a focus on the internal world of psychological structures and projections.

The inhibition of dopamine release by serotonin is central to neurochemical balance in the brain, with the serotonergic and noradrenergic systems of the right hemisphere inhibiting the dopamine system and the left hemisphere (Previc, 2009). This blockage of serotonin's inhibitory functions results in the disinhibition of the dopaminergic system, releasing a flood of information that is normally inhibited by serotonin. The reduction of serotonergic and noradrenergic modulation (control) results in the ascendance of the dopaminergic and acetylcholine systems that produce a variety of notable visual syndromes, especially hallucinations and dreaming (Hobson, 2001).

Psychedelics and other alteration of consciousness share common effects on the brain's perceptual mechanisms and representational capacities through a temporary deregulation of the prefrontal cortex (PFC). Common effects of this disruption are manifested in the loss of the roles of the frontal lobes and prefrontal cortex involving higher cognitive functions. This disruption of the PFC results in the loss of various capacities—capacity for willful action, deliberate direction of attention, and aspects of self-awareness, as well as the capacities for abstract thought, creativity and planning. When these higher level brain functions of the cortical regions and the PFC are down regulated, this allows for the manifestation of lower brain structures usually repressed by the PFC. This means the emergence of information and aspects of identity that are related to our more ancient brain regions.

Psychedelic disruption of the DMN permits the operation of a more fluid and dynamic brain lacking its usual top-down principles of control. Psychedelics such as LSD, psilocybin and ayahuasca cause decreases in DMN brain activity (Carhart-Harris et al., 2012; Carhart-Harris et al., 2014; Carhart-Harris et al., 2016; Palhano-Fontes et al., 2015) and the disintegration of normal DMN functions. This is the consequence of a reduction in the connectivity of the frontal cortex with lower brain areas (Alonso, Romero, Mañanas, & Riba,

2015) and the reduction in oscillatory activity and power in posterior and frontal association cortices (Muthukumaraswamy et al., 2013). This involves a decrease in the functional coupling of the frontal cortex with the medial temporal lobe, as well as of the medial prefrontal cortex with the posterior cingulate cortex. Consequently, the lower brain dynamics involving ascending circuitry are released, providing a strong input to the frontal cortex from the ancient brain systems. This dynamic is hypothesized as the mechanism that releases the innate modules and promotes their manifestations in consciousness (also see Winkelman, 2017b).

A principal effect of psychedelics involves production of hypersynchronous ascending slow wave brain discharges in the hippocampal-septal-reticular-raphe circuit that impose impulses from the ancient lower stratum of the brain on the frontal areas (Mandell, 1980). This pattern of psychedelic action on the brain is shared by many other agents and conditions that alter consciousness (Winkelman, 2011). Alterations of consciousness produced by behavioral and physiological conditions, as well as pharmacological agents, causes a reduction in the serotonin inhibition to the hippocampal cells, which results in an increase in slow-wave EEG activity in the hippocampal-septal region.

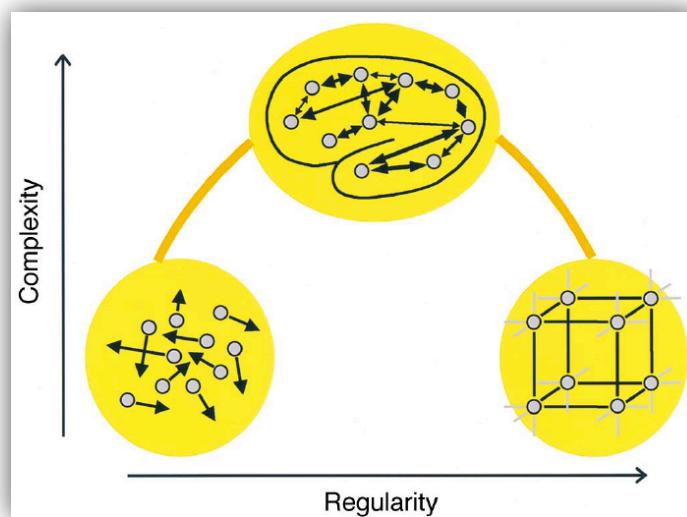
Research on the mechanisms of action of psychedelics on the major cortical loops (Vollenweider & Geyer, 2001) illustrates these effects. Psychedelic effects on the cortico-striato-thalamo-cortical (CSTC) feedback loops and their regulatory effects on the gating systems of lower levels of the brain alter consciousness. This psychedelic interruption of the CSTC loops and their inhibitory function release the lower brain structures' sensory gating and enhance the flow of information to the frontal areas of the brain. Psychedelics interruption of thalamic screening results in a flood of information from these ancient levels of the brain.

Alonso et al. (2015) confirmed this psychedelic enhancement of a bottom-up information dynamic by psychedelics with ayahuasca. They assessed ayahuasca-induced changes in directionality of information flow in the brain, with changes in the connectivity of brain oscillations. These changes involved a disruption of the normal coupling between anterior and posterior areas of the brain that resulted from reduction in the influence of frontal brain areas over the posterior areas. This reduction was accompanied by increases in the influence of posterior brain regions on the frontal anterior areas. "These results suggest that psychedelics induce a temporary disruption of neural hierarchies by reducing top-down control and increasing bottom-up information transfer in the human brain" (Alonso et al. 2015, p. i).

The release of these lower brain areas is the likely cause of the enhanced operation of the innate modular operators of the brain. These operators reflect unconscious cognitive processes that were acquired deep in evolution, with some apparently widely shared by other primates and mammals. These ancient roots of these operators suggest that they are associated with the function of our ancient brain structures. Winkelman (2010a) has detailed how many features of shamanic alterations of consciousness can be explained by reference to the operation of these ancient brain structures, particularly the paleomammalian brain.

Regardless of the question of knowing which electrophysiological rhythm underlies the integrative mode of consciousness one might be tempted to challenge the view that such a mode is indeed *integrative*. In your initial definition, what you meant by integration was that different parts of the brain that are usually disconnected suddenly become connected. An obvious way to measure such (dis)connectivity in the brain is to look at functional connectivity (Friston, 2011). Fortunately, in recent years, several studies have looked at this dimension of the psychedelic experience. By and large, the pattern of finding is that functional connectivity is locally decreased but globally increased, a point that you duly acknowledge and nicely discuss in your recent work (Winkelman, 2017b, pp. 7–8). For example, it has been shown that within the default mode network, connectivity is weakened, but conversely different areas of this network start talking to other areas and networks from which they are usually disconnected (Carhart-Harris et al., 2014). Moreover, in some cases, the large-scale connectivity between networks can even be decreased: e.g., with psilocybin, the connectivity between visual and sensorimotor areas is weakened (Roseman, Leech, Feilding, Nutt, & Carhart-Harris, 2014). The key lesson is that *overall psychointegrators do not maximize connectivity*.

At this point of the discussion, it will be useful to introduce two concepts: complexity and neural criticality. The first concept was developed by Giulio Tononi (Tononi, Edelman, & Sporns, 1998; Tononi, Sporns, & Edelman, 1996). It is a measure combining two indexes: segregation and integration. If areas of the brain are excessively segregated, complexity will be low and this will result in a lack of conscious experience (Boly et al., 2012; Tagliazucchi et al., 2013) (see bottom right circle in *Figure 2*). On the other hand, if areas of the brain turn out to be excessively integrated, complexity will also be too low for consciousness to emerge (Arthuis et al., 2009; Blumenfeld, 2012) (see bottom left circle in *Figure 2*). Complexity is the highest when segregation and integration are optimally balanced. This is typically the case in the everyday waking state.



*Figure 2. Three combinations of brain segregation and integration
(from: Tononi et al., 1998, p. 478)*

Another concept, criticality, has many points in common with that of complexity (Tagliazucchi & Chialvo, 2013; Timme et al., 2016). It refers to power-law distributed physical phenomena that often take place in phase transition. The study of neuronal avalanches in the brain has also revealed the presence of such power-law distributed firing of neurons (Beggs & Plenz, 2003; Chialvo, Balenzuela, & Fraiman, 2008). Interestingly, critical states largely overlap with complex states; furthermore, Tononi's excessively segregated states share many properties of sub-critical states and excessively integrated states with super-critical states.

Now, recent research conducted mainly at Imperial College has demonstrated that psychedelic states are very close to criticality—in fact, even closer than normal waking states (Atasoy et al., 2017; Carhart-Harris, 2018; Carhart-Harris et al., 2014). This is consistent with the aforementioned findings to the effect that serotonergic hallucinogens do not increase connectivity *simpliciter* but rather do so in a very balanced way (connectivity is rearranged through both increase and decrease of connectivity patterns). It appears, then, that psychedelics are not properly speaking psychointegrators. A true psychointegrator would be a compound able to trigger states with the highest integration and the lowest segregation possible (bottom left circle in Figure 2). It seems that this is not what serotonergic hallucinogens do; instead, this is what epileptic seizures do (Arthuis et al., 2009; Meisel, Storch, Hallmeyer-Elgner, Bullmore, & Gross, 2012; Priesemann, Valderrama, Wibral, & Le Van Quyen, 2013). Therefore, don't you think that only epileptic seizures should deserve the title of “integrative mode of consciousness” (i.e., “supercritical mode of consciousness”)? And don't you think that serotonergic hallucinogens should rather be called “psychocomplexifiers” or “psychocriticalizers” and the mode of consciousness they induce the “complex or critical mode of consciousness?”

Well any integration implies a deafferentiation or separation from something else. So what is being integrated? Good evidence that a shared functional feature of ASC is the enhanced integration of lower brain structures and activity, the ascending stimulation of the cortico-striato-thalamo-cortical loops and the serotonergic hippocampal-septal system. So that is what is being integrated, lower brain processes into the frontal brain.

There are certainly other aspects of global integration that occur as well that you mentioned in the first part above, the globally increased functional connectivity and increased connectivity of areas and networks from which they are usually disconnected. So I would say this new generation of research is supporting the notion of some forms of enhanced connectivity, albeit at the expense of breakdown of the normal connectivity networks of the default mode network and prefrontal cortex.

There is arguably another reason for thinking that psychedelics are not genuine psychointegrators. According to you, the integrative mode of consciousness coincides with a “loss of hippocampal CA3 modulation *removes regulatory input from the environment, leaving the ‘inside world’ dominant*” (Winkelman, 2010a, p. 26, my emphasis). In another passage you also argue that “[t]he highly integrated internal visionary states of the shaman involve a reduction of other inputs, in essence *a reduction of external sensory information and bodily input*” (Winkelman, 2010a, p. 32, my emphasis). In sum, in the integrative mode of consciousness, the central nervous system becomes less sensitive to the “external world” and more sensitive to the “internal world” (i.e., to itself). If so, then, it does not seem that serotonergic hallucinogens are psychointegrators, because like any (near) critical state, they induce an *increased* sensitivity to stimuli from the external world (Atasoy et al., 2017; Carhart-Harris, 2018). As Enzo Tagliazucchi puts it, “physical systems at criticality present a maximal susceptibility, i.e. a maximal response to external perturbations” (2017, p. 145). In other words, it appears that psychedelics do the contrary to what a psychointegrator is purported to do: they increase—rather than decrease—responses to the external world. Don’t you think this supports the view that psychointegrators (a.k.a. psychedelics) would be better described as psychocriticalizers?

Since the earliest studies of the psychedelics in the context of psychiatry it was recognized that the primary determinants of the effects are from set and setting, the individual’s expectations and the influences in the environment. So there is a lot of variation in terms of what psychedelics can produce. Some cultures used ayahuasca as preparation for headhunting and warfare, dancing for hours before leaving during the night to carry out raids. Other cultures use ayahuasca for journeying across the cosmos or healing. The same substance can produce diverse outcomes, depending on how you engage with it. There is also some confusion promoted in recent brain research from a failure to pay attention to the mode of administration of

psilocybin—whether it is drunk or injected. It makes a big difference whether you chew coca leaves or inject cocaine, we should expect the same for psilocybin.

You have endorsed a strong perennialist approach in your work on the contents of the integrative mode of consciousness. For example, according to you, mystical and psychedelic states are very similar because they both tap into the same evolutionary mechanisms: “The relationships among natural and drug-induced alterations of consciousness must be understood from an evolutionary perspective. This reveals altered consciousness to be related to endogenous mechanisms that are triggered by both ancient evolutionary adaptations and more recently acquired propensities to use exogenous sources of substances to alter consciousness” (Winkelman, 2010a, p. 27). All integrative states seem to share common themes, images, and features. As you note, “[t]he apparent similarities in psychedelic entities and various other types of entity experiences found across cultures, time, and diverse conditions for altering consciousness suggest that an explanation be sought within innate functions of the human brain” (Winkelman, 2018a, p. 3). Such a view echoes the Jungian theory of archetypes according to which the cognitive and perceptual features that are universally found across cultures are to be explained in terms of underlying unconscious archetypes (Laughlin, 2011, Chapter 10; Laughlin et al., 1990, p. 134; Winkelman, 2010a, p. 220, 2018a, p. 7; Winkelman & Baker, 2010, pp. 194–198). Your perennialist evolutionary approach raises two questions: (1) why should universal cognitive features be necessarily explained in evolutionary terms?; and, (2) what is the actual evidence in favor of perennialism?

Let me start by examining the first question. Is it true that universality is a cue to innateness? Well, if it is, it could be argued that it is a very inaccurate cue. There are plenty of cognitive and perceptual phenomena that are universal and probably not innate. For example, all humans have the prior expectation encoded in their visual system that light is coming from above (Sun & Perona, 1998). Among other things, the famous concave/convex circle illusion is explained by this prior. Given the pervasiveness of such a prior one may expect it to be innate. But it seems that it is not since it can be changed by experience (Adams, Graf, & Ernst, 2004). The universality of the light-from-above prior appears to be learned. However, given that the structure of the environment is everywhere the same (i.e., light always comes from above in non-artificial environments), in this case, learning (absence of innateness) coincides with universality. As students of natural scene statistics have amply demonstrated, many universal features of the perceptual system and of perceptual experience can be explained by non-innate learning mechanisms combined with stable environmental structures (Geisler & Kersten, 2002; Geisler, 2008).

Another problem with the view that universality can be used as a cue to innateness is that it overlooks the possibility of diffusion phenomena. For instance, many apparently universal features of myths can be thoroughly explained by cultural diffusion. To take a specific example, some authors have proposed evolutionary accounts of the widespread dragon motif—both in iconography and myths and legends (Jones, 2016; Sperber, 1996b; Wengrow, 2013). If this motif is so pervasive, it is argued, it is because our brain is structured in such a way that it easily triggers and encodes chimeric

creatures. But such an explanation sounds way too *ad hoc*. As a matter of fact, it has been shown that the distribution of the mythological dragon motif can be accounted for merely in diffusionist terms (d'Huy, 2013, 2014, 2016). The phylogeny of cultural representations reveals how the dragon motif has been gradually modified and updated from its earliest versions (in African cultures) to its latest versions (in Amerindian cultures). More generally, as demonstrated by population genetics, the phylogeny of myths seems to largely overlap with prehistoric human migrations (Korotayev & Khaltourina, 2011). This overlap provides strong evidence in favor of the pervasiveness of diffusion phenomena. As a result, many universal traits of human culture can be explained by resorting to the prehistory of migrations and borrowings rather than by positing cognitive adaptive functions.

In sum, it seems that the burden of proof is on the proponent of psycho-evolutionary and nativist explanations. For example, when you write that “[t]he widespread manifestation of these visual elements under diverse circumstances attests to the elicitation of these innate mechanisms in producing these characteristic psychedelic experiences” (Winkelman, 2017b, p. 9), it could be objected that pinpointing the universal distribution of a trait is not enough to demonstrate its evolutionary origin. In fact, some evolutionary psychologists have even called for a thorough dissociation between being an innate adaptive function and being universal (e.g., Apicella & Barrett, 2016; C. Barrett & Kurzban, 2006). What is your view on this issue?

“Why should universal cognitive features be necessarily explained in evolutionary terms?” Well if you really have a more compelling line of explanation besides the innate tendencies and their adaptive potentials, then offer it. I think the combination of the cross-cultural manifestations in religion and their various putatively adaptive functions is the most compelling argument. What would you propose?

Let me now turn to the second question: what is the actual evidence for perennialism? First, it should be said that Jung, one of the main inspirations of neuroanthropological perennialism, based his theory on a somewhat biased ethnographic database: he misinterpreted several ethnographic cases and carefully ignored numerous counter-examples which refute the theory of archetypes (Le Quellec, 2013, Chapters 8–9). But rather than focusing on the details of Jung’s theory it is more interesting to examine what the evidence for perennialism is in the specific case of hallucinogenic experiences.

According to you, hallucinogens offer a pharmacological model of mysticism whose relevance goes far beyond drug-induced mystical states:

Similarities in psychedelic-induced visionary experiences and those produced by practices such as meditation and hypnosis and pathological conditions such as epilepsy indicate the need for a general model explaining visionary experiences. (Winkelman, 2017b, p. 1)

The fundamental similarities of psychedelic-induced and naturally-induced mystical experiences (Smith, 2000; Yaden et al., 2017) support the classic

perennialist view of fundamental commonalities to mystical experiences across cultures and their independence of the mode of induction. (Winkelman, 2017b, p. 5)

It seems that the conflation of hallucinogenic states and other states like epileptic seizures and meditation could be resisted on several grounds. First, as we have seen before, from a brain-system perspective, epileptic seizures are very different from serotonergic-induced states: the former are supercritical whereas the latter are (near) critical. By the same token, although meditation and serotonergic-induced states have certainly many things in common, they nevertheless exhibit striking neurophysiological differences (Millière, Carhart-Harris, Roseman, Trautwein, & Berkovich-Ohana, 2018). Even without looking at the differences between hallucinogenic and non-hallucinogenic altered states and focusing only on hallucinogenic experiences, perennialism does not seem very compelling. Namely, when looking at the diversity of hallucinogenic experiences, it is difficult to see what kind of phenomenological feature truly fit with the theory of perennialism.

Before further elaborating on this anti-perennialist argument, it will be helpful to clarify what is meant here by “hallucinogens.” In your article on psychointegrators you put forward the following definition:

Classification as a hallucinogen (or psychedelic) has not been based upon specific chemistry or physiology, but upon effects on human experience, producing visions, voices and effects upon perception, mood, and thought *in non-toxic doses* (Siegel, 1984). This distinguishes them from substances that produce hallucinations because of toxicity. (Winkelman, 2001, p. 220, my emphasis)

Thus, according to this definition, hallucinogens and psychedelics are synonymous. This is no surprise given that you cite serotonergic hallucinogens (e.g., LSD, mescaline, psilocybin) as prototypical examples of hallucinogens (a.k.a. psychedelics). What is less clear is why you suggest hallucinogens should be restricted to compounds whose “mechanisms of action involv[e] intervention in serotonin pathways” (Winkelman, 2001, p. 220). Why not also include other classes of hallucinogens whose mechanisms are not serotonergic? Following the above definition of hallucinogens, it seems that other neuropharmacological classes should also be included: notably, κ -opioid hallucinogens (e.g., salvia divinorum), antiglutamatergic hallucinogens (e.g., ketamine), antihistaminergic hallucinogens (e.g., diphenhydramine), antimuscarinic hallucinogens (e.g., scopolamine), and hybrid hallucinogens (e.g., ibogaine). As we can see, there are various classes of hallucinogens and all of them fulfill the definitional criteria that you put forward in the above passage—including, it must be stressed, antimuscarinic hallucinogens, which can indeed be toxic at high doses (Winkelman, 2001, p. 232, f.n. 1), but which remain quite safe at hallucinogenic doses: as a matter of fact, the hallucinogenic threshold of these compounds is much lower than the toxicity threshold (Gyermek, 1998, pp. 352–353). For example, in the experiments at Edgewood Arsenal, the highest doses of BZ (3-Quinuclidinyl benzilate) given to participants were never higher than 10% of the LD₅₀ (the median lethal dose). Most of the time, doses that were administered did not exceed 3% of the LD₅₀ and yet copious hallucinations were already

observed at such doses (Panel on Anticholinesterase Chemicals, Panel on Anticholinergic Chemicals, Committee on Toxicology, Board on Toxicology and Environmental Health Hazards, & Assembly of Life Sciences, 1982, p. 61).

Now, the objection that could be raised against any perennialist account of hallucinogens would go like this: you argue that the phenomenology of hallucinogens support perennialism (the view that all hallucinogenic experiences—and other non-chemically-induced altered states—share a common phenomenological core), but this is because you take only serotonergic hallucinogens into account; if you were to include in your analysis other classes of hallucinogens, you would then realize that massive differences exist between these compounds, and as a result, you would acknowledge that perennialism does not hold water.

Let me flesh out this anti-perennialist objection with three concrete examples. It is very common for people to find themselves transformed into artefacts under the effect of *salvia divinorum* (they are typically metamorphosed into wheels or pieces of furniture surrounding them); by contrast, this is never reported in serotonergic-induced trips (Fortier, In preparation, Chapter 4). Similarly, antimuscarinics strikingly differ from serotonergics in their effects. While the latter often induce extraordinary hallucinations (spirits, anthropomorphic entities, chimeras, etc.) the former only induce hallucinations of very ordinary and mundane objects (humans, animals, everyday artefacts, etc.) (Fortier, In preparation, Chapter 4, 2018a, 2018b, 2019; Ketchum, 2006; Ketchum et al., 1973). Even entoptic hallucinations (Billock & Tsou, 2012; Klüver, 1966; Lewis-Williams & Dowson, 1988), which are often taken to be a universal feature of hallucinogenic experiences, are completely absent from antihistaminergic- and antimuscarinic-induced hallucinations (Fortier, In preparation, Chapter 4).

After having examined the outstanding diversity of features induced by each class of hallucinogens, it is very difficult to see what kind of phenomenological feature could be argued to constitute the common perennial core of these experiences. Importantly, if this criticism of perennialism is correct, then hallucinogens (as defined above) cannot be said to form a single mode of consciousness anymore. Moreover, the contents of these hallucinogenic experiences cannot be said to share a common core with other nonchemically-induced mystical states because what is meant by “hallucinogenic experience” covers very heterogeneous experiences with no identifiable common core.

Is this line of criticism of perennialism sound to you? If so, do you think that the evolutionary perennialist account of hallucinogenic experiences can nonetheless be salvaged from this anti-perennialist objection?

“What is the actual evidence in favor of perennialism?” The universal features of religious and spiritual belief and practice, the cross-cultural variation in such patterns as a function of social complexity, the cross-cultural features of shamans, the universal manifestations of shamanistic healers, the fundamental similarity in many forms of meditative experience across diverse and disparate traditions, the

similarity in mystical phenomenology across cultures and time, similarities in the structures and functions of ASCs induced by diverse mechanisms, etc.

Here again, let me quote some published material where I directly address these issues (Winkelman, 2017a, 2017b, 2018a):

5-HT_{2A} has been considered the primary neurotransmitter system affected by psychedelics such as LSD but action on other serotonin receptors and other receptor systems has also been established (Halberstadt & Geyer, 2011; Ray, 2010, 2013, 2016). This is not to say that psychedelics only share common effects, they also have distinctive effects, neurologically as well as phenomenologically (see: Ray, 2010, 2016). In assessing the different profiles of neurotransmitter interactions by various types of psychedelics, Ray (2016, p. 49) noted that “[m]ost of the drugs studied interact with multiple receptors, and most of the receptors studied interact with multiple drugs” This leads Ray (2010, 2012) to challenge the dominant theory of psychedelic action as being primarily mediated by effects at the 5-HT₂ receptors. Examination of the relative affinity of various psychedelics for a wide range of receptors (Ray 2010, p. 22 and 41) found that “LSD has the strongest interaction collectively with the five dopamine receptors [...] [and] DMT has the strongest interaction with any single dopamine receptor.

Rolland and colleagues (2014) noted that hallucinations—or perhaps less pejoratively “visionary experiences”—may be induced by a variety pharmacological mechanisms, including the hyperactivation of dopamine receptors, such as that caused by psychostimulants; stimulation of serotonin 5HT_{2A} receptors targeted by psychedelics; and the blockage of glutamate NMDA receptors caused by dissociative anesthetics. They proposed that these different pharmacological systems might share common neurobiological pathways involving integrated neurobiological circuits that when compromised can produce hallucinations. And they hypothesized that diverse mechanisms, including dopamine and serotonin activation and NMDAR blockage, can disrupt the thalamic gating functions and cortico-striato-thalamo-cortical loops, resulting in a disorganization of the brains basic filtering processes, and consequently leading to visionary experiences.

Previc (2009) also proposes that diverse visionary alterations of consciousness are a function of the dopamine system, which is directly stimulated by many different neurotransmitters and drugs and indirectly through effects on other neurotransmitter systems. Previc (2006, 2009) reviews evidence indicating a common underlying mechanisms for diverse methods of altering consciousness involving a disinhibition of dopaminergic extrapersonal brain

systems, particularly those in the ventral cortex and the limbic circuit. Independent of the specific neurotransmitters involved, diverse processes producing visionary experiences may share common underlying mechanisms in a thalamic sensory overload, the common pathway resulting in a disruption of cortico-subcortical processing (Vollenweider, 2001).

This common pathway can carry a variety of different features of experience produced by the distinctive qualities of the various psychedelic substances. Ray (2012, 2016) proposes that the diversity in the phenomenology of psychedelic experiences is a consequence of the distinctly different neurotransmitter receptor profiles that each substance engages. Each neurotransmitter system (i.e., the various serotonin receptor subtypes, beta receptors, dopamine, histamine-1, imidazoline-1, kappa, mu, sigma, and cannabinoid receptors) elicits a specific profile of effects that Ray calls a mental organ. Each psychedelic drug has effects on a range of neurotransmitter systems that results in its characteristic effects on neuronal activity and on consciousness. His idea is akin to innate modules and modes of consciousness, but with a highly individualistic twist—each neurotransmitter is a distinct state at least, but a mode of consciousness?

I would doubt that every neurotransmitter or receptor would each constitute separate modes, but they could. But the fact that each transmitter can affect different kinds of neurotransmitter systems undermines that possibility of a pure serotonin effect, for instance.

I do not think that the individual neurotransmitters are really the best level of analysis for differences in consciousness. There are major global contrasts with the waking mode of consciousness that allows us to provide a generalized profile that can be induced by diverse mechanisms. It is these generalities that characterize ASC—parasympathetic dominance, internal focus of attention, visual experience, emotional and egoic activation, right hemisphere dominance, etc. that provide commonalities for diverse states of the integrative mode of consciousness. If you enter into a parasympathetic visionary state, the functional dynamics of that state are generally the same whether or not you got there by LSD or ibogaine or ayahuasca or some dopaminergic or GABA action.

“

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So this gets back to how many modes do we need. Perhaps the answer is in terms of access. Most people can't access the dreaming mode directly from waking consciousness and vice versa, although some dream events do produce a rapid transition or warp between modes—as well as states. But you can't easily go directly from one mode to another unless you have special training, like in lucid dreaming. So how to apply this to the differentiation of modes and meditative states? How many modes do we need to explain meditative experiences? The first criteria ought to be access. Can you go willingly from void to bliss? If so, then to me the notion of different states of consciousness in the integrative mode of consciousness holds. If you can't go from one state of consciousness to another and they are functionally different in terms of what they can do, then different modes are involved.

I suspect that much of this has been worked out in various Hindu and Buddhist traditions. I must confess my original notion of modes of consciousness came from some unremembered scholar of meditation. Certainly many Hindi scholars have proposed concepts similar to my modes of consciousness in the recognition of deep sleep, dream, waking and one or more transcendental forms of consciousness. These scholars may well have worked out this question of modes for us on the basis of phenomenology and function.

Much of your research conducted in the last two decades was dedicated to the study of hallucinogens. While it is very common in the field of psychedelic studies to endorse a non-naturalistic framework positing that hallucinogenic entities have some kind of objective reality (e.g., Luke, 2017; Strassman, Wojtowicz, Luna, & Frecska, 2008), you have played a key role in defending and promoting a naturalistic account of these experiences (other accounts following this path notably include: Kent, 2010; Lethaby, 2016, Chapter 4).

In a recent paper, you have very explicitly advocated this naturalistic approach:

[...] we need an academic study of entity encounters that offers a thorough examination of the similarities in independent reports by identifying the recurrent characteristics common to these experiences. (Winkelman, 2018a, p. 6)

[...] if we simply accept the phenomenological experiences of entities as transcendent realities, we commit an error of epistemological naivety. (Winkelman, 2018a, p. 5)

In your view, what are the key requirements that any proper naturalistic and scientific account of psychedelic experiences should satisfy? And what are the pitfalls that it should thoroughly avoid?

Requirements for a mature psychedelic science must grapple with on one hand, a recognition of a unitary basis for all kinds of knowing and believing, while on the other hand recognizing what is the distinctive manner of knowing opened by psychedelics. So we need a perspective that combines unity and diversity in knowledge, and I think that means a necessary engagement with metaphysical dualism. What we need to avoid is ontological and metaphysical naivety. ☺

“ Requirements for a mature psychedelic science must grapple with, on one hand, a recognition of a unitary basis for all kinds of knowing and believing, while on the other hand recognizing what is the distinctive manner of knowing opened by psychedelics. [...] I think that means a necessary engagement with metaphysical dualism. ,”

It is often assumed that hallucinogenic use is very ancient and widespread cross-culturally. Let us call this view the “archaic hallucinogenic use hypothesis.” In some passages, you seem to endorse this hypothesis. For example, you note that “[p]sychedelics are associated with pre-modern religious forms and the early history of the current major world religions” (Winkelman, 2017b, p. 2).

Now, it would be too long to review the ethnographic and archeological data about hallucinogenic use through history and across cultures, but the example of the Americas should suffice to illustrate why the archaic hallucinogenic use hypothesis is arguably misleading. The New World is generally taken to be the continent where hallucinogenic use has been the most widespread (La Barre, 1964, 1970). So, if the archaic hallucinogenic use hypothesis is accurate, then it should at least be borne out in the Americas; conversely, if it does not accurately depict the Amerindian data, then it is probably wrong everywhere.

So, what is the evidence? In South America, we know that ayahuasca use (Brabec de Mori, 2011; Gow, 1992; Shepard, 2014) and jurema use (Samorini, 2018) are relatively recent: probably no more than three or four centuries old. (Note that, following most authors, by “ayahuasca,” here, I am referring to the hyperonymic category made of at least *Banisteriopsis caapi* plus a serotonergic plant (*Psychotria viridis* or *Diplopterys cabrerana*) and not to the hyponymic category made of *Banisteriopsis caapi* alone: the use of the latter is probably more ancient than the use of the former (Miller, Albarracín-Jordan, Moore, & Capriles, 2019)). We also know that the use of anadenanthera is ancient and was quite widespread in the Caribbean as well as in the Amazon and

Orinoco basins at the time of the arrival of the Europeans (Torres & Repke, 2006). As regards the oldest use of hallucinogenic snuff, archeological data show that it was confined to very circumscribed places of the central Andes where rather complex cultures have flourished (e.g., Aschero & Yacobaccio, 1998; Fernández Distel, 1980). San Pedro also has a long history of use both on the Peruvian coast and in the Andes, but there is no hard archeological data (e.g., chemical analyses) demonstrating that the use of San Pedro is as old as that of *anadenanthera* (Sharon, 1972). The same goes for *brugmansia* (toé): it was used in some places in the Andes and in the lowlands, but its use is probably not as old as that of *anadenanthera* (Gayton, 1928). What about Mesoamerica? The Spanish chroniclers and proto-ethnographers have documented the use of several hallucinogens including various serotonergic mushrooms and peyote (de la Garza, 1990; Heim & Wasson, 1958, Chapter 1). However, as far as I know, there is no first hand description by any chronicler or proto-ethnographer of any use of these hallucinogenic substances at the East of the Isthmus of Tehuantepec (i.e., in the Mayan lands) (de la Garza, 1990, Chapter 3). All that we have at the East of the Isthmus are somewhat far-fetched interpretations inferring hallucinogenic use from the shape of stones (de Borhegyi, 1961); but no *hard* evidence whatsoever (Brown, 1984). Moreover, it should be noted that a culture may worship a plant or a mushroom and produce some iconography related to this plant or mushroom without necessarily consuming it or consuming it but at sub-hallucinogenic doses. If we go North, there is evidence of probably several-century-old use of *datura* in the Southwest (e.g., Stevenson, 1915) but first and foremost in South and Central California (Kroeber, 1976). Nothing more in North America. Admittedly, mescal beans (Troike, 1962) and the “black drink” (Hudson, 1979) were used in the Southern Plains and in the Southeast of North America; however, these substances are psychoactive but *not* hallucinogenic. Peyote use famously spread from the North of Mexico throughout the Great Plains up to Canada, but this started only at the end of the 19th century (La Barre, 1989). Therefore, it is a very recent phenomenon. Wasson (1979) has argued that some hallucinogens were used in subarctic shamanism. But the only proof he has of it is that today some shamans use *Amanita muscaria* as a hallucinogen in their rituals. It is quite telling that no proto-ethnographer or explorer has ever reported the use of this mushroom in subarctic Amerindian cultures. It is even more telling that today *A. muscaria* use among the Ojibwa remains restricted to few shamans and is very controversial (Navet, 2010). All these features betray a recent introduction and use of the fly agaric mushroom. Finally, it must be noted that tobacco has been used in most regions of the Americas—including in the subarctic and circumpolar areas (Winter, 2000b, pp. 9–14)—but only in South America do we find some *hallucinogenic* use of this plant (Wilbert, 1987). Elsewhere, it was only used at sub-hallucinogenic doses mainly for recreational and psychostimulant purposes (Bollwerk & Tushingham, 2016; Winter, 2000a).

What can be learned from this very sketchy map of hallucinogenic use in the Americas? Well, it looks like hundreds—if not thousands—of Amerindian cultures have *not* traditionally used any hallucinogens. This is true of almost all cultures of North America (with the exception of some cultures of California and the Southwest) and of all cultures of the South Cone (most notably the Fuegians). It appears that many cultures of the

New World did not know hallucinogens, or knew them but were not using them hallucinogenically. This seems to be a problem for the archaic hallucinogenic use hypothesis. By contrast, this is quite consistent with the view advocated by John Cooper (1949) and Johannes Wilbert (1987) according to which hallucinogenic use is closely related to horticultural practices.

Do you do endorse a full-fledged version of the “archaic hallucinogenic use hypothesis” or only a weaker version? How do you explain that so many cultures, even in the Americas, have apparently never used hallucinogens? Finally, regarding the etiology of hallucinogenic use, do you side with La Barre (1970) and consider that hallucinogenic use belongs to hunting-based cultures? Or do you alternatively side with Cooper and Wilbert and consider that hallucinogenic use belongs first and foremost to horticulture-based cultures?

Well, there is some evidence that visionary substances—I will use this term instead of hallucinogen—increase in importance with horticultural societies. This may reflect increased knowledge, trade networks, etc. or an increased need to adjust to sociocultural change. But just because there is an increase in evidence for the use of visionary plants during periods of social change does not imply that is when the use first started.

Where visionary plants are used around the world, they are typically the purview of specialists and often constitute sacred and guarded knowledge. Much of tradition will not be passed on with cultural disintegration—or even development—as may be the case with the famous soma of India. Sometimes the best evidence we have of the ancient entheogenic use of a plant are the local names which involve metaphors alluding to their effects.

As to the “hard evidence” for the use of visionary substances in the past, I have pointed to the evidence of enhanced binding of psychedelics with the human serotonergic system (as opposed to other mammals). This is the hard evidence that psychedelics influenced our evolution. Psilocybin-containing mushrooms are the most likely and prevalent psychedelic use in pre-history for a variety of reasons (see my forthcoming “Introduction” to the special issue of the *Journal of Psychedelic Studies* on “Psychedelics in History and World Religions”). Mushrooms do not leave “hard” evidence unless it is placed into stone or ceramic or metal. And that is indeed what we find around the world, especially throughout Mesoamerica and South America. The presence and placement of mushroom effigies and fungiform representations is too widespread and strategic to ignore their message. Humans everywhere discovered religiosity and spiritual experiences via the impulses that came from psilocybin-containing mushrooms. This is our human spiritual legacy, a deep history of mushroom inspired entheogenic experiences. This impulse has risen

and withered many times, but the innate potentials of our brain are always disposed to respond when there is the need and the stimulation.

“ Humans everywhere discovered religiosity and spiritual experiences via the impulses that came from psilocybin-containing mushrooms. [...]. This impulse has risen and withered many times, but the innate potentials of our brain are always disposed to respond when there is the need and the stimulation. ”

Some scientists study altered states of consciousness in a purely theoretical fashion without exploring those states by themselves. Other scientists care a great deal about having first-hand knowledge of those states before studying them in a third-person fashion. You seem to belong to the second category of scientists. What do you think scientists—and in particular anthropologists—can specifically learn from first-person experience that they cannot learn through third-personal means?

The ineffability of mystical and psychedelic experiences is renown. There are things experienced that cannot be completely expressed. It is important to know these kinds of experiences to expand our database and points of reference. Psychedelic experiences are also very personal; the insights obtained are of a personal nature. This kind of knowledge can help us better understand what may and may not be revealed in third person studies.

“ Science as we know it is largely an ordinary reality construct, a waking mode of consciousness way of ascertaining information about the universe. Psychedelics and other ASCs provide a different epistemic approach [...]. ”

But I think the ultimately most important reason for directly experiencing these substances is what Charles Tart (1972) referred to as “state-specific sciences.” Science as we know it is largely an ordinary reality construct, a waking mode of consciousness way of ascertaining information about the universe. Psychedelics and other ASCs provide a different epistemic approach, different ontologies and metaphysics that emerge from the neurophenomenological effects of the substances. We need a science of altered states of consciousness founded in the opportunities

for knowledge provided by these experiences. Western science is a long way from accomplishing such understandings.

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