Psychedelic ontogenesis: A philosophy of psychedelic experience via Simondon, Deleuze and Guattari

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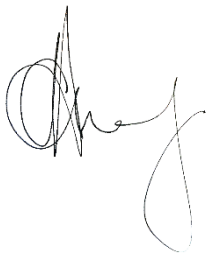
Declaration

I, Aragorn Eloff, declare that this dissertation titled “Psychedelic ontogenesis: A philosophy of psychedelic experience via Simondon, Deleuze and Guattari”, submitted to the North-West University for the degree “Doctor of Philosophy in Philosophy”, has not been previously submitted for any other degree or at any other institution of higher education. I furthermore declare that this is solely my work, and any work that is not mine has been credited and included in the reference list.

Signed  Date: 25 November 2024

Dedication

For all those who have accompanied me on my journeys across solitude. For all the underground therapists, plant medicine healers, clandestine chemists, entheogen enthusiasts and wild-eyed visionaries who have, sometimes at great risk, fought for and dreamed of a world in which psychedelics are accepted as legitimate technologies for healing, exploration and cultural communion. For the indigenous cultures whose longstanding relationships with psychotropic plants are rendered ever-more precarious by capitalist and neocolonial predation. For my fellow street philosophers, whose trajectories of learning have not always passed through the strictures of a university education. For all those who, deterritorialising too rapidly, in sets and settings not always of their choosing, forgot their refrains and lost sight of the paths back home. In memory of Demian, and with infinite gratitude to my circle of fifths.

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Abstract

In this dissertation I examine the profoundly subjectively transformative experiences afforded by psychedelic plants and chemicals. Beginning with a broad overview of the long histories of use of these substances in myriad diverse contexts, I observe that a surprisingly consistent set of core features of the psychedelic experience has been elaborated in very different times and places. These features include an understanding of psychedelics as agents of death, rebirth and transformation, whether this is construed as a return to the *fons et origo* (the source of being), as drug-induced ego death, as a journey into metastable hyperreality or as the individuation of a pre-individual field into new expressions of being. I trace this core notion of psychedelic rebirth, along with several other key salient features of the psychedelic experience, from several thousand years BCE to the 1960s, paying specific attention to the ways in which such experiences have been thought about philosophically. I then turn to the current wave of interest in psychedelics unfolding in scientific research laboratories. I examine, and in some instances critique, various models of psychedelic experience that seek to ground themselves in, or explain the findings of, cutting-edge neuroscience, and I show how in many cases these models reiterate much older views on the relationship between psychedelics, consciousness and subjectivity. I also show how dominant models of the mind – and of psychedelic experiences by extension – view it as an emergent and chaotic expression of multiple interacting neurobiological dynamics at various scales of organisational complexity, from neurochemistry to the complex spatiotemporal patterns exhibited by whole brain activity. Such views challenge reductionist approaches to understanding the connection between brains and minds and call for a different approach to the slippery subject of consciousness. Here I turn to the enactivist critique of still dominant functionalist, computationalist and representationalist models of cognition. I argue that understanding minds as expressions of complex, precarious entanglements of living systems affords us a much more realistic view in this regard, with consequences for how we think about the contexts within which psychedelic experiences take place – contexts that can dramatically affect the course of such experiences. Finally, I turn to Gilbert Simondon, Gilles Deleuze and Félix Guattari to develop a sustained philosophical account of the transformative nature of psychedelic experiences as a form of what Simondon calls *individuation* and what Deleuze and Guattari call *becoming*. I argue here that these philosophies, grounded as they are in the primacy of process, individuation and ontogenesis, allow us to better understand the dynamics of subjective dissolution and transformation wrought by psychedelics; dynamics that can, if we understand them well enough, be employed for, among other things, healing, insight and creativity.

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Keywords

psychedelics, individuation, enactivism, neuroscience, complex systems theory, Deleuze, Simondon

Chapter 1

Introduction

> [N]o one mystifies me except for those guys [Deleuze and Guattari]. I don't know how they derive their knowledge. They must *trip*. (DeLanda 1992: 46)

1.1 Background

The consumption of psychedelic substances and the construction of complex cultural practices around this consumption stretches back over at least several millennia (Labate, De Rose and Dos Santos 2009). From the precolonial use of plants like *banisteriopsis caapi* and *psychotria viridis* (the primary ingredients in ayahuasca, a powerful psychoactive brew consumed by various Amazon basin cultures) for ritual and shamanic purposes, to the long histories of use of *psilocybin* mushrooms, *ibogaine*, *amanita muscaria* and *mescaline* cacti in places as far afield as Gabon, Mexico, Siberia and North America, the use of psychedelic plants has been a perennial component of systems of collective and individual meaning-making across myriad indigenous cultural contexts (Saldanha 2007). Despite this long and global history, broad public awareness of psychedelics only emerged within Western culture in the 1960s with the advent of the hippie counterculture and the popularisation of LSD (Shlain and Lee 1994).

While LSD, or *lysergic acid diethylamide*, had first been synthesised in the late 1930s, and was already the subject of numerous scientific research projects exploring its potential utility in treating everything from addiction and schizophrenia to depression and childhood autism, as well as its potential role in aiding creativity, by the end of the 1960s it had profoundly impacted Western culture, resulting in the dramatic criminalisation of psychedelics and shutting down of myriad promising research programmes (Hofmann 2017).

Now, fifty years later, there is a prominent new wave of interest in psychedelics (Langlitz 2012; Pollen 2018, 2021). Bolstered by cutting-edge developments in neuroscience and grounded in more rigorous research methodologies than were the norm in the mid-20th century, numerous scientists, psychotherapists, clinicians and other interested parties have undertaken groundbreaking work that has substantially increased our understanding of the neurochemical underpinnings of the effects psychedelics have on the brain, making rapid progress along a number of the research avenues that were only tentatively explored during the 1960s. Based on these results, psychedelic neuroscience and psychedelic-assisted

psychotherapy have emerged as legitimate and potentially fruitful fields of medico-scientific inquiry, which has in turn motivated a drive to reconsider the criminalisation of these substances, which are often conflated with addictive narcotics like cocaine and heroin.

From the vantage point of late 2024, it seems increasingly clear that the acute subjective transformations facilitated by mind-altering substances like psilocybin, LSD, MDMA (ecstasy), mescaline and DMT (the primary psychoactive alkaloid in ayahuasca) can provide insight into, and possibly ways of overcoming, forms of human suffering ranging from depression to PTSD to end-life anxiety. On a broader view, these results are unsurprising, oftentimes reiterating in the language of contemporary peer-reviewed medico-scientific research what underground psychedelic therapists have been describing since the 1950s and what various indigenous cultures have understood, albeit in conceptually heterogeneous ways, for millennia.

Given all this, it appears that psychedelics are poised to become a more prominent feature of contemporary society than ever before and reflecting on the individual and social impacts of their use thus seems apposite. Numerous scholars, whose work is slowly coalescing into fields like *psychedelic humanities* and *critical psychedelic studies*, have taken up this challenge of exploring the broad consequences of this renewed psychedelic enthusiasm, reflected in everything from Beny Shanon's groundbreaking phenomenology of the ayahuasca experience (2002), to various critical engagements from the perspectives of feminism (Hewitt 2019), gender studies (Labate, Belsner and Cavnar 2022) and decolonial ethics (Cavnar and Labate 2021). However, while substantial ground has been covered in exploring the *social* impacts of the second wave of psychedelics, less has been done to examine the psychedelic experience *itself*, i.e., the profound impacts these substances have on consciousness, which in turn is what constitutes their potential therapeutic import.

This task, which entails grappling with slippery notions of subjectivity, identity and so forth, is a quintessentially *philosophical* one. While, as I will show, various philosophers, from Plato to William James to Sartre to Foucault (Sjöstedt-Hughes 2016; Wade 2019), have explored, discussed, or at least alluded to the effects of mind-altering substances, and while important but tentative scholarship has been produced by notable researchers (e.g., Letheby 2021; Hauskeller and Sjöstedt-Hughes 2022; Sjöstedt Hughes 2023), we lack a sustained account in this regard. The dearth of engagement here is fascinating given that the psychedelic experience, which is quintessentially mind-altering and thus potentially mind-*revealing*, is situated at a uniquely salient juncture of foundational philosophical – and scientific – questions concerning the relation between perception and reality, the nature of consciousness and what gives rise to subjective experience and phenomenal selfhood. In short, while there is much promising scholarship within the various sub-fields of psychedelic studies, there remains a

lack of sustained philosophical discussion of the psychedelic experience in a way that seems simultaneously theoretically and scientifically rigorous.

1.2 Motivation for this study

This dissertation is a way to bridge this perceived gap; in this regard, I argue that the French philosophers, Gilles Deleuze and Félix Guattari provide the best materials with which to construct this bridge. My project here is thus to apply Deleuze and Guattari's philosophy in the development of a provisional account of the psychedelic experience. The former is a philosophy premised upon *individuation*, which emphasises the primacy of process, becoming, differentiation and transformation – rather than an understanding of substantive or fully-formed Being. Psychedelic experiences are, for their part, and as I will elaborate on at length, quintessentially transformative at every scale, from the neurochemical to the existential[1]. Indeed, the existential consequences of psychedelics – the ways in which they profoundly perturb our consciousness and our sense of self – call out for a renewed reckoning with themes of identity, subjectivity and ontology, as well as the myriad ways in which philosophy has historically sought to ground all of these. Psychedelics, in short, are of import for philosophy and are, in fact, subtly woven through the history of philosophical thought. That being said, given that this is a field unfamiliar to most people, I take a necessarily broad historical and theoretical view on the topic, the following chapters tracing a long but necessary path to reach Deleuze and Guattari, building up the technical and conceptual resources required to meaningfully explain the ideas of ontogenesis and individuation to apply this to the psychedelic experience.

1.3 Chapter division

1.3.1 Chapter 2

In the second chapter, I provide a cursory history of psychedelics use, beginning with the archaeological record and the earliest accounts we have of the use of entheogens – a frequently-used neologism for psychedelics that means, loosely, "generating the god within" – by numerous indigenous cultures. I examine how, in these cultures, the psychedelic experience is most frequently described as *ontogenetic*; specifically as a process of death, rebirth and transformation. This fundamental process is the common thread that I used to

[1] I will define the term *individuation* as we proceed. The term comes from the work of Simondon and should not, although there is some broad family resemblance, be confused with the Jungian notion; nor is the term synonymous with its use in analytic philosophy, where it is a way of circumscribing a well-defined identity. For now, individuation can be provisionally construed as connoting "coming to be".

weave a variety of disparate ideas about psychedelics together. I then turn to ancient Greece and the Eleusinian mystery rites, which are commonly believed to have been psychedelic ceremonies and which are discussed in a number of Greek philosophical works, including those of Plato himself. Here too we see the ontogenetic account recapitulated within the context of Greek mythology.

After this, I turn to the 19th century and to early Western encounters with indigenous psychedelic practices, again with a focus on the proto-*philosophical* implications of these encounters. This leads up to what is usually described as the "first wave" of psychedelics research that followed the discovery of LSD in 1943, which produced an outpouring of research in psychology, psychology and neurology over the next two decades until the substances in question escaped the laboratory and made their way into the hippie counterculture. This part of the history of psychedelics is often told as a specifically Anglophone phenomenon focusing on the US and the UK, and on notorious figures like Timothy Leary. I show, however, that there was serious philosophical grappling with the psychedelic experience by figures like Aldous Huxley and religious scholar Alan Watts, and that, outside of the Anglophone world, numerous other thinkers, including Henri Michaux to Antonin Artaud, both of whom influenced the work of Deleuze and Guattari. In all of these cases, we again see a focus on describing the psychedelic experience as *individuative*, i.e., as entailing a philosophy of process and transformation that seeks to understand things in their becoming-other-than-they-are. Nowhere is this more explicit than in the work of John C. Lilly, a second-order cybernetician and psychedelics researcher who developed the most rigorous practical account of psychedelic ontogenesis within the first wave. In closing the chapter, I discuss Terence and Dennis McKenna, whose remarkable psychedelic and philosophical adventures offer a fragile mycelial and metaphysical thread linking the first wave with the second.

1.3.2 Chapter 3

In the third chapter I examine the second and current wave of interest in psychedelic substances. While the scientific research within the first wave was frequently overshadowed by unbridled cultural enthusiasm, this new engagement with psychedelics is largely unfolding within highly-regarded medico-scientific research laboratories and makes use of cutting-edge scientific technologies and methodologies, from fMRI scans to sophisticated mathematical formalisms and, notably, dynamic systems theoretic approaches. I provide a brief grounding in the findings of psychedelic neuroscience, beginning on the level of molecular biology and then moving rapidly upwards to explore the emergent dynamics and whole-brain properties that are increasingly seen as crucial aspects of both psychedelic experiences and

consciousness more broadly. This emergence has been explored using numerous conceptual models, from chaos mathematics and complex systems theory to the new field of connectome harmonics. In each of these instances, the view is that brains exhibit complex, nonlinear behaviour across multiple scales of emergent order and that neuroscientific reductionism – on the level of receptor sites and neurochemical distributions, for instance – does not provide anywhere near the full picture of how mind comes to be and how it comes to be transformed. Brain-minds, as I will show, are close-to-criticality chaotic systems – specifically what I will describe as *homeochaotic* systems – rich in nested spatiotemporal dynamics. Once I have described the current situation, I undertake a brief discussion of the notion of the self, i.e., the emergent of the ego or unified sense of subjectivity that is the ostensible target of psychedelics, which are in turn seen as facilitating drug-induced ego death (cheekily acronymised as DIED).

After this, I shift my focus to examine the most popular contemporary account of psychedelic action on the brain-mind: REBUS, or RElaxed Beliefs Under pSychedelics, a less successful acronym that is also, I argue, not entirely successful as a model of psychedelic experience. One main reason for me arguing this is that REBUS is grounded in what is known as the free energy principle (FEP) and the associated field of active inference which, in turn, are instances of what have come to be described as Bayesian brain models, of which predictive coding is perhaps the most well-known and philosophically employed variant. I argue that Bayesian models import too much from first-order cybernetics in that they view systems – including brains – as essentially *homeostatic*, i.e., self-regulating free energy minimisers, and that this is a poor way of typifying non-ergodic, open-ended living, thinking beings (beings that, as will become clear when discussing Simondon, are better conceived of as *metastable* than stable). While REBUS arguably fails as a model for psychedelic experience, it does, however, underscore (as do the other findings in contemporary psychedelic neuroscience – almost all of which see an increase in turbulent, complex, chaotic, bottom-up emergent brain dynamics) the sense that psychedelic experiences are frequently experiences of death, rebirth and transformation, i.e., *ontogenetic*.

1.3.3 Chapter 4

In the fourth chapter, I continue to expand the scope of inquiry to explore how cognition – and brain-minds more broadly – are embodied, embedded, extended and, most importantly, *enactive* imbrications of systems and environments. In particular, the focus is on how what has come to be known as the “enactive view of cognition” affords a serious challenge to the cybernetic and computationalist logic that underpins Bayesian brain models (as well as the

closely related and equally untenable functionalism and representationalism most such models continue to suffer from).

I trace the roots of enactivism back to the Chilean school of biology and the work of Francisco Varela and Humberto Maturana, who are most famous for developing the concept of *autopoiesis* or self-making. I examine how this concept has evolved over the decades to encompass the precarious, adaptive relations of ongoing sense-making that reciprocally give rise to autonomous agents and their worlds and the ways in which we are always entangled with – structurally open to – various flows and processes beyond the borders of our skin. This has profound philosophical implications for notions of self and, more broadly, identity and ontology. I explore some of these and show how enactivism is also, in this regard, more in line with the findings of contemporary life sciences than is the disembodied abstract computationalism of mainstream cognitive science.

Finally, I gesture towards the ways in which enactivism itself is beginning to transform towards a wider and more foundational view of the role of individuation in the emergence of subjectivity. While this chapter is the least explicitly "psychedelic", it holds important implications for how we conceive of the psychedelic experience: if we are not just brains in skulls in bodies interacting with an ontologically discrete exterior world through processes of abstract computational symbol manipulation and concept construction, but instead co-imbricated, nested, reciprocal becomings of systems and environments – enactive bodies straddling the organic, sensorimotor and intersubjective-linguistic – then how do we philosophically reconceive of the *locus classicus* of psychedelic therapy, set and setting? These terms, which traditionally refer to the mental "set" of the psychedelic subject (their "state of mind", in common parlance) and the environmental "setting" or context within which psychedelic experiences take place, are clearly insufficient if set and setting are in fact entangled co-constituents at the intersections of which subjectivity, as ongoing precarious coupling of complex adaptive processes, arises. I therefore provide a provisional account of an enactive set and setting, although for reasons of scope, a full exploration of this fascinating topic necessarily awaits future work.

1.3.4 Chapter 5

In the fifth and final chapter, I zoom out even further, expanding the scope to the whole of being not just *qua* being but in terms of how being comes to be: I move, in other words, from ontology to ontogenesis. This begins with a discussion of contemporary systems or process biology, along with Susan Oyama's developmental systems theory, which interrogates precisely the question of how living systems express ongoing creative dynamisms and how

these dynamisms necessarily entail an open field of flows and processes as ontogenetically primary to the ontologically discrete beings we usually regard as the inhabitants of the world.

I then introduce the work of Gilbert Simondon, a mid-20th century philosopher of science who is a crucial interlocutor in the account I am developing. Simondon offers the most substantial account of ontogenesis in his work on individuation – indeed, these terms are largely synonymous for him, with individuation simply being the manner in which ontogenesis unfolds. Simondon's work is immensely complex and philosophically novel and I thus spend some time outlining the basics, including his crucial and complexly inter-related notions of the pre-individual field, disparation, transduction and metastability, before turning to a Simondonian discussion of *psychedelic* individuation. An implicit secondary task in this section is to demonstrate how Simondon anticipates many later moves in fields like spatiotemporal neuroscience, enactivism and systems biology, thus underscoring his importance in developing a unified account of psychedelic experience that is adequate to contemporary science as well as philosophically rigorous. Following this, I turn to the work of Deleuze and Guattari, for whom Simondon was a crucial influence. I begin by presenting an outline of the conceptual architecture of Deleuze's masterwork, *Difference and Repetition* (1994), which develops Simondon's account of individuation into a philosophy of difference and which understands being as arising through a complex process of what Deleuze describes as *indi-drama-different/ciation* – an admittedly unwieldy term that I elucidate at some length. Having provided this important contextualisation, the focus shifts to Deleuze's collaborative work with Guattari, which naturalises some of the work on "transcendental empiricism" undertaken in *Difference and Repetition*. Transcendental empiricism is the attempt to determine the conditions by which the given is given in a way that does not circularly determine these conditions via the given (i.e., trace the transcendental from the empirical), but retains the key conceptual notion of being as the result of more fundamental processes of different/ciation. Thus, in joint works like *A Thousand Plateaus* (1987), this is discussed in more readily graspable terms like *becoming* and the *Body without Organs*, the latter of which serves as my entry-point for applying Deleuze and Guattari to a philosophy of psychedelic ontogenesis.

Drawing Deleuze, Guattari and Simondon together with the various other disparate threads covered in the previous chapters, including enaction, chaos and complexity theory, spatiotemporal neuroscience and process biology, I turn to the dynamic systems theory (DST) formalisation of Deleuzian ontology. The latter has become increasingly popular in Deleuze and Guattari studies and is also employed in almost all the other fields of inquiry discussed in previous chapters. I show how this formalism affords us heuristic traction on conceptually abstruse notions like Deleuze's *virtual* and *intensity*, and how, with some small modifications,

DST can serve as a framework for thinking about psychedelic experiences. Here, I briefly turn to Alicia Juarrero's work as offering a compelling way forward to think philosophically about the kind of causation suggested by taking the kinds of emergent dynamisms DST models ontologically seriously. Specifically, the focus is on what she calls *emergent constraint regimes*: a hypothetical but scientifically tenable form of higher-order, top-down quasi-causation which, she argues, is entailed in any sufficient understanding of complex, nonlinear systems and which is aimed at complementing and partly replacing the notion of efficient – and reductionist – causation that is often understood to be the sole vehicle through which ontological effects can take place.

1.3.5 Chapter 6

In closing the chapter, I offer a final *individuation* of a psychedelic experience that reflects, in its form, the philosophical convictions and *content* developed across the past few chapters. This allows me, finally, to briefly reflect on the implications of thinking about psychedelics in this way and to offer further summative thoughts in the conclusion, in which I reiterate the connections between the various fields I have traversed.

1.3.6 Conclusion

In closing, and before launching into this admittedly ambitious project, it is fair to say that psychedelics have been with us for longer than we care to imagine. As agents of some of the most profound transformations of consciousness imaginable, they have, as the more liminal aspects of philosophical and psychedelic history I trace in my first chapter show, at least as much philosophical import as any other domain of human experience. It is also the case that the genie is now conclusively out of the bottle: psychedelics are unlikely to disappear from our shared realities anytime soon, whatever future "wars against some drugs" may be waged. We thus need to begin to take them seriously, philosophically, scientifically, therapeutically, socially and politically. This dissertation is a tiny, cautious step in that direction.

Chapter 2

The first wave and the long histories of psychedelics

2.1 Introduction

> This other world, where everything is brighter and clearer and more real than in our world, is a vision of blessed beholders. (Plato, The Faedo CIT)

> Philosophy itself often arrives as a mind-altering experience, a new mode of perception unto our cosmos, at times so radical as to be hazardous. Thus can philosophy be seen as a psychoactive substance – yet the place of psychoactive substances in philosophy is not apparent. (Sjöstedt-Hughes 2016)

In this chapter I examine the various ways psychedelics – in particular the effects they have on consciousness – have been thought about across the labyrinthine history of our interaction with these substances. The history of psychedelic research is a sprawling field and innumerable books have been written on the subject. I will thus limit my focus to those aspects of this history that have *philosophical* import. For similar reasons of scope, I pay attention mostly to the contemporary Western field explicitly known as *psychedelic research*, as opposed to providing a full historical and anthropological account of the use of these substances. While psychedelics have been used – and thought about – across myriad cultural contexts throughout human history, a full reckoning with the varied, multifarious ways in which these substances are imbricated with the life worlds, epistemologies, ontologies, initiatory and healing practices, and so on of cultures across the globe would take me very far afield of my core concern and would require a great deal of attention given to each cultural context so as not to subsume it within a particular modern Western philosophico-scientific episteme. While I thus offer a brief account of the longer histories of psychedelic substance use – histories that stretch back at least several thousand years – I leave a full engagement with these histories to other scholars.

Literature on psychedelics is commonly divided into either two or three “waves” of interest in research into these substances. The two-wave approach refers to the period between Albert Hofmann’s discovery of the effects of LSD in 1943 and the draconian crackdown on psychedelics in the wake of the counterculture at the beginning of the 1970s as the first wave, while a second wave is constituted by the so-called “psychedelic renaissance” – the re-inception of research into psychedelics that began in the 1990s, although there were, as I will show, some subtle eddies of continuity between the two waves. The three-wave approach,

which has become more popular in recent years, posits the aforementioned as the second and third waves respectively, while a first wave of research specifically focused on the use of mescaline (the primary active alkaloid in peyote, a psychedelic cactus used by indigenous Native American cultures) is said to have begun either in the late 1800s or in distant prehistory. As most of the thinking about psychedelics that is of relevance for my project took place between the 1940s and today, and because there are in fact continuities between early mescaline research and the surge in interest generated by Hofmann's "problem child" LSD, I will make use of a broader two-wave model that divides psychedelics research into a so-called "classical period" (extending from as far back as necessary until around the middle of the 1970s) and a "contemporary period" (that gently overlaps with the classical period but comes into full bloom sometime between the late 1980s and early 1990s). The reasons for periodisation are relatively simple: on the one hand, while there are possibly enough continuities to warrant arguing for a single all-encompassing wave, there are also sufficient discontinuities to view the contemporary period as a distinct episteme[2]; on the other hand, it allows for a simple structuring device for the chapter.

In terms of this structure, I begin by baldly summarising, primarily to situate the conversation, the heterogeneous long histories of psychedelics use across different cultures over the past several thousand years, including the ancient Greek culture of the Eleusinian mystery rites that is sometimes argued to be the birthplace of Western philosophy. The intention here is merely to ground the conversation chronologically, lest it appear that human interaction with psychedelics sprang fully formed from the world 150-odd years ago[3]. I then turn to a discussion of the classical period. While this is frequently discussed in terms of famous Anglophone figures like Aldous Huxley, Alan Watts, Timothy Leary, John Lilly and so forth, I also draw some attention to figures not as commonly associated with psychedelics, including Henri Michaux, Antonin Artaud, Jean-Paul Sartre and Maurice Merleau-Ponty, an important task given how various forms of phenomenology and existentialism, whether explicitly declared or not, inflected the ways in which psychedelics were thought about during this period.

The Anglophone group tended to rely on an eclectic range of influences that included pragmatism, primarily via William James, as well as perennialism, Bergsonism and, most crucially for the current project, cybernetics and the cognitive scientific edifice it was

[2] In the Foucauldian sense. I will not argue this at length here, but it will become evident in my diagramming of the philosophical convictions of the two periods I have outlined.
[3] To reiterate, I cannot do justice to the profoundly complex anthropological, archaeological, paleontological and decolonial issues that underlie a sufficient reckoning with these issues.

instrumental in fomenting. While a somewhat cartoonish cybernetic view is evident in the work of Leary, it is John Lilly who develops the implications of cybernetics most fully in his influential account of metaprogramming in the human biocomputer (1972). Lilly is exemplary of the school of thought that I describe in a subsequent chapter as functionalist-computationalist-representationalist (FCR) and I thus spend a bit of time unpacking his arguments while also attempting to show how they are already, in some ways, implicitly prescient of some of the contemporary critiques of FCR. In presenting Lilly's work, I implicitly draw out a necessarily skeletal account of first-order and second-order cybernetics; it should be clear in this regard that psychedelics are a perhaps unacknowledged influence – via contexts like the Macy Conferences and Esalen – in nudging the more mechanistic self-regulatory ideas of the first-order towards the recursivity and self-reflection of the second-order. The above tasks, which occupy the bulk of the chapter, are undertaken in order to synthesise a core set of features of the psychedelic experience. While the selection of groups and individuals I have chosen as exemplary proponents of the description of this experience I present may seem arbitrary, they have been selected largely for the wide range of disparate contexts – intellectual, social and so forth – they represent.[4] My hope here is to demonstrate through this heterogeneous collection of voices a remarkable consistency in descriptions of the psychedelic experience – one that lends some weight to the model of psychedelic individuation I develop in later chapters.

As a bridge between the classical and contemporary periods, I close the chapter by examining the work of Stanislav Grof and that of the psychedelics advocate and philosopher[5] Terence McKenna (as well as his brother Dennis) – a well-known populariser of psilocybin and DMT use who, in his less hyperbolic and speculative moments, developed at least the prototype for a philosophy of psychedelics influenced by work in process philosophy, particularly that of Alfred North Whitehead. While McKenna's work, especially in his legendary "raps" – improv-style, meandering and profoundly lucid conversations about psychedelics, time, history, meaning, metaphysics and so forth – does sometimes lapse into broadly FCR territory, he also serves as a precursor for the post-FCR work in fields like enactivism I present in chapter 3 and his quasi-Whiteheadean views resonate somewhat with the Simondonian-Deleuzian-Guattarian account I develop in the chapter after that. Throughout the chapter I anticipate

[4] Heterogeneous, yet primarily white and male; this is an unfortunate fact of this era of psychedelic research. When turning to the second wave, a broader range of voices can luckily be heard.

[5] McKenna, like many of the figures discussed here, did not formally train as a philosopher. As very few "proper" philosophers engaged with psychedelics during the classical period (something that is still somewhat the case today), it is necessarily the work of so-called "street philosophers" like McKenna, Lilly, Leary and so forth that we must turn to in order to examine how people were thinking about the implications of psychedelics for our grappling with philosophical questions around metaphysics, ontology, epistemology and so forth during this time.

arguments that will follow in later chapters, introducing terms whose meaning will take time to become clear. This approach is purposeful and aims at applying the thematic of individuation that underlies this thesis to the form itself, albeit in a partial and modest fashion.

2.2 From the grasslands of Africa to the Temple at Demeter and beyond

> Seated on the ground in the darkness, seeing with her eyes closed, her thought travels within along the branching arteries of the bloodstream and without across the fields of existence. (Munn 1973: 97)

> A violent attack of nausea made [William] Burroughs collapse to the ground; “larval beings passed before my eyes in a blue haze, each one giving an obscene, mocking squawk”. He later realised this squawking was the croaking of frogs. (Rudgley 1993: 108)

2.2.1 At the dawn of psychedelic time

The long, tangled history of human beings and psychoactive substances probably stretches back over many millennia[6]. As Elisa Guerra-Doce notes, research into this history typically relies on one of four types of archaeological data: fossilised plants, the detection of alkaloids in artefacts and skeletal remains, residues and artistic depictions ostensibly of altered states of consciousness (2015). Collating these various data streams, Giorgio Samorini’s recent review of the archaeological and paleoethnobotanical evidence (2019), suggests that we have likely been consuming beer since 11 000 BC (Israel), san pedro (a mescaline containing cactus) since 8 600 BC, cannabis since 8 200 BC (Japan), psilocybin mushrooms since 6 000 BC (Sahara), *peganum harmala* (a powerful monoamine oxidase inhibitor[7] that contains harmaline, the same primary active alkaloid as *banisteriopsis caapi*, the primary ingredient in ayahuasca) since 4 000 BC (Caucasus and Egypt) and ololiuqui (a variety of morning glory that contains lysergic acide amide, a substance close to LSD) since 600 AD (Mexico).

[6] Seeking out intoxication more generally, as Siegel (1989) argues, appears to be an endemic feature of complex life – many animal species, including not just higher mammals but also possibly even some insects (Samorini 2002) appear to frequently, and frivolously, alter their consciousness. We should likewise recall in this regard that alcohol, tobacco and caffeine are also psychoactive substances, albeit not psychedelics.

[7] Monoamine oxidase inhibitors (MAOI’s) prevent the usual effects of monoamine oxidase enzymes, a class of compounds that in turn help break down or metabolise various substances in the body, including neurotransmitters. Most of the psychedelics I discuss in this dissertation are MAOI’s, as are, notably, a number of popular antidepressants.

The evidence is of varying quality[8]; while some cases seem reasonably conclusive, like the presence of *Anadenanthera* seeds and smoking pipes in Northwest Argentina (Torres 1995), shamanic ritual bundles containing dimethyltryptamine, harmine and bufotenine (Miller et al 2019) and toxicological analysis of hair samples from the Peruvian coast that show the presence of mescaline and possibly banisteriopsis caapi (Socha, Sykutera and Orefici 2022), others, such as inference from rock art (Akers, Ruiz, Piper, & Ruck 2011) and so-called 'mushroom stones' (e.g., Mayer 1977) seem more speculative. Reasonably unambiguous archaeological evidence was also recently located via human hair analysis indicating Bronze Age use of mind-altering substances – tropane alkaloids, which are typically regarded more as deliriants than as classic psychedelics but which are occasionally employed in psychedelic compounds like ayahuasca – in the Balearic Islands as far back as the first millennium BCE (Guerra-Doce *et al*. 2023). Alkaloid analysis furthermore situates archaeological specimens of peyote discovered in a cave in Texas as far back as 5 700 years ago (El-Seedi *et al.* 2005). While it is unlikely we will ever have an entirely conclusive view of ancient use of psychedelics[9], it seems highly likely that this usage is at least several millennia old and stretches across the globe.

Perhaps the most ambitious, far-reaching accounts, however, trace our use of psychedelic substances right back to the Palaeolithic era or to the dawn of modern human consciousness itself, in some cases even seeing our consumption of these substances as affecting hominin cognitive evolution and, by extension, the emergence of religion and various spiritual practices, notably shamanism[10] (e.g., de Rios 1974; Winkelman 2014, 2015, 2019). While

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[8] Typically, the evidence supporting ancient psychoactive substance use in Mesoamerica is more rigorous than elsewhere, and natural sources of all the classic tryptamine-containing psychedelics can be found in the region. This is unsurprising given the large number of psychoactive plants in the region.

[9] Our view, however, is becoming clearer. As Fitzpatrick and Merlin argue, recent advances in the natural sciences along with a host of innovative new technologies mean that "[a]rchaeologists are now able to ask questions regarding human health and behavior that would have been unthinkable even a decade ago. The ability to couple archaeological data with these new lines of scientific inquiry, along with existing ethnohistoric descriptions and ethnographic accounts, provides a powerful matrix of inquiry that is dramatically changing how we think of past human use of psychoactive substances through the ages" (2018).

[10] When discussing shamanism, Taussig's proviso should be borne in mind: "[s]hamanism is crucially a made-up, modern, western category, an artful reification of disparate practices, snatches of folklore and overarching folklorizations, residues of long-established myths intermingled with the politics of academic departments, curricula, conferences, journal juries and articles, funding agencies, and so forth, such that shamanism is seen not as our creation but real in a quite different sense, as existing out- side of our representations of it in, for instance, that truly wondrous and orgiastically cosmic location of the Originary" (1989: 43). As Bonhomme observes, there is an especially troubling relationship between some seminal Western psychedelics researchers and the cultivation of a form of "neo-shamanism" that overstates the role of psychedelic plants within shamanism understood more broadly:

there is no direct evidence for these kinds of provocative claims, Michael Winkelman and others have argued that given that psilocybin-containing species were endemic to various regions of the world for hundreds of millennia, and given the striking binding potential of psilocybin to serotonin receptor sites (where it has, by some measures, more binding affinity than endogenous serotonin itself), along with evidence from the archaeological record, it is probable that human beings have been exposed to psychedelic mushrooms since the dawn of humanity and by extension likely that some history of consumption longer than is attested to by current evidence is possible (Arce and Winkelman 2021). In this regard, Terence McKenna's argument in *Food of the Gods* is undoubtedly the most ambitious (1993b). Not only did our distant ancestors consume the psilocybin mushrooms that were ostensibly growing in various grassland areas of Southern Africa, McKenna claims, but it was said consumption – and the profoundly mind-altering experiences that ensued – that in fact gave rise to reflective consciousness itself, as well as increased visual acuity that aided in hunting, group cohesion via libidinal and convivial amplification, language development and the emergence of various other nascent forms of culture, as far back as the Paleolithic (ibid). While McKenna's so-called "stoned ape" theory is best viewed as a flight of fancy, it is worth pausing for a moment to consider why the idea is so appealing within psychedelic circles, even though it is at odds with numerous more credible theories about the evolution of human consciousness, theories that include the role of diet, bipedalism, intersubjective negotiation and various other factors. On the one hand, there is some intuitive appeal in arguing that the various ways in which psychedelics like psilocybin affect human consciousness – language use, conviviality, reflexive thought and so forth – in fact historically served to *cultivate* these aspects of consciousness. On the strongest version of this view, psychedelics affect us in the way they do in part because they *made us who we are*[11]. On the other hand, tracing the imbrication of human consciousness and psychedelics back to the dawn of humanity constitutes a significant appeal to nature, imbuing contemporary use of psychedelics with an ambiance of legitimacy as an inextricable and ancient aspect of our being in the world.

"New Age spirituality was fascinated by non-Western traditions and freely borrowed from Indigenous shamanism by scholars and authors who were highly controversial in their own academic fields, but widely referenced in New Age circles. These included Mircea Eliade and his work on the archaic techniques of ecstasy; Carlos Castañeda on peyote use in Mexico; and Michael Harner and Jeremy Narby on ayahuasca in the Amazon. Such reinterpretations of Indigenous shamanism gave birth to what is colloquially known as "neo-shamanism," in which hallucinogenic plants occupy a central role" (2023: 195).

[11] Hagen and Tushingham (2019) take a more modest view of this longstanding imbrication of psychotropics and human neurobiology, arguing from a broadly evolutionary biological perspective that what the archaeological record depicts is possibly just a long history of self-medication. This, of course, somewhat begs the question given the blurry line between "self-medication" and self-exploration. Phrasing. Does it really beg the question?

Such “ancient origin” narratives, although they have been somewhat tempered by contemporary research, and notwithstanding overlapping studies in archaic shamanic practices that were likely frequently psychedelically inflected (e.g., De Rios 1984, Winkelman 2002, 2009), have long been popular in psychedelic communities, as Andy Letcher observes (2007). Perhaps most notorious in this regard is the case of the so-called “mushroom shaman” – an ancient painting from a cave in Tassili-N-Ajjer, Algeria that is seldom seen in its original form but instead forms a stable visual artifact of the psychedelics community via a remarkably pareidolic contemporary artistic recreation by a psychedelics enthusiast. This version of the ancient painting exaggerates the mushroom-like qualities of what are in fact in the original relatively inchoate forms emerging from the body of a loosely drawn humanoid form. While such origin myths are arguably largely harmless, they also have potential ethical consequences. It is, after all, a short step from reifying ancient psychedelics use as a central feature of early human life to essentialising the various indigenous communities for whom psychedelics have long been part of their cultural practices, and from there flattening and homogenising such use under a monolithic Western interpretive lens while situating these cultures outside of time and history, not allowing for the possibility that what seems like “archaic practices” may in some cases be complex negotiations between cultural histories, colonial legacies and the uprooting of lifeways.[12] Richard Evans Schultes, popularly viewed as the father of ethnobotany and someone who spent a great deal of time doing research amongst communities using psychedelics crudely describes, for example, as late as 1979, the members of these communities as “peoples who have continued to live in archaic cultures, bound to ancient traditions and ways of life” (Schultes, Hofmann and Rätsch 1979: 9).

Therefore, while it is important to situate the ensuing discussion within a longer set of historical arcs, and while I present a short overview of various indigenous perspectives on psychedelic use, it should be kept in mind that psychedelic historiography is prone to both confirmation bias and a colonial gaze, oftentimes seeking, as do many contemporary practices of self-making, legitimacy in the misrepresented and exoticised practices of other cultures (Fotiou 2016: 156-7). Vilgiate notes a particularly egregious example of this in the famous “discovery” of magic mushroom use among the Mazatec people in Oaxaca, Mexico by the American banker R. Gordon Wasson. As Vilgiate argues, the *Life* magazine article in which Wasson popularised his experience of a Mazatec mushroom ceremony “emphasized their geographic

[12] And, ironically, such precolonial lifeways and their intersections with psychedelics were largely rendered invisible by colonialism. As Aaronson and Osmond observe in relation to traditional Mexican cultures, for instance, “It is not possible to say how far back the use of peyote, ololiuqui, or of psilocybe mexicana goes, for the records were destroyed by the Roman Catholic missionaries to the conquered people of Mexico in their zeal for the welfare of the souls of their charges.” (1970: CIT)

isolation while downplaying their decades of involvement in the coffee industry, their participation in the Mexican revolution, or their recent wave of migration to the US under the Bracero program" (2023: 168) – a far cry from the romantic image of a pure, precontact indigenous people practicing millennia-old rituals in isolation from modernity[13]. With this in mind, a cursory long view sees psychedelics use as emerging in varied contexts across the globe over a period of at least several thousands of years.

Briefly examining a handful of these contexts will underscore the heterogeneous ways in which psychedelics have been used and, more importantly for the task at hand, *thought about* in different times and places, while also perhaps suggesting some points of overlap that transcend the specificities of context in order to point out some remarkably enduring features of the experiences produced by ingestion of these substances. Shanon (2002) observes such overlaps in terms of the phenomenology of the ayahuasca experience, which he painstakingly maps out based on over 2 000 individual experience reports. It is these features that will be drawn out in later chapters in order to develop the philosophical account of psychedelic action on consciousness that is the central focus of this work.

2.2.2 Indigenous conceptualisations of psychedelics use

The Amazonian psychoactive brew that is commonly referred to as *ayahuasca* is undoubtedly the best-known "authentic" indigenous psychedelic compound. It most often contains a beta carboline (*banisteriopsis caapi*) and a tryptamine (*psychotria viridis*), with the N,N-dimethyltryptamine (DMT) of the latter being orally potentiated by the former, which serves as a powerful inhibitor of the monoamine oxidase inhibitors (MAOIs) that usually metabolise DMT before it enters the bloodstream. However, its invention is very possibly only several hundred years old, and its pattern of distribution around the Amazon region closely maps to colonial-era missionary and rubber routes (Torres 2018). Other forms of ingestion of DMT, such as insufflation, are several times older, and the complex imbrication of colonialism and cultural practices serves as a reminder that the supposedly timeless rituals of ancient cultures seen through the exoticising Western gaze are in some cases relatively recent adaptive pharmaceutical innovations in response to colonial encroachment or ecological dynamisms. It is also the case that there is no monolithic practice of ayahuasca consumption: patterns of usage vary widely among the roughly 160 different peoples for whom ayahuasca forms part

[13] As Vilgiate continues, simplistic "noble savage" style narratives about indigenous psychedelic use construct "a powerful guiding metanarrative for future explorers of lesser-known psychedelic plants by presenting them as tools for accessing closed-off worlds of ancient and timeless spiritual wisdom, part of a universal human heritage" (169).

of their social fabric (Tukano 2022)[14]. This notwithstanding, oral histories across various cultures in the region implicate the use of the caapi vine in various origin myths, suggesting relatively enduring if ever-transforming set of cultural practices. Torres notes, for instance, that "Tukano origin myths … describe the first inhabitants of the Earth descending from the Milky Way in a large anaconda canoe transporting a man and a woman with three plants: manioc, coca, and caapi" (ibid), while related stories depict the divine birth of a child that embodies the caapi vine and is subsequently divided up amongst the community (Reichel-Dolmatoff 1978: 3-4; cited in Torres 2018). On Ralph Metzner's reading,

> These origin myths tell us that from the beginning this plant medicine was associated with origins of language, culture, and the beginnings of humankind. Humans are said to have come from the cosmos, and *the vine of the soul was given to them as a way of staying in touch with cosmic and solar creative energies* (Metzner 2005: 11; my emphasis).

Contemporary discourses around ayahuasca vary between regions and traditions[15]. While the popular Western conception of the brew is that it is used for personal development – to heal from trauma or gain insight into oneself – its effects are employed for a wide range of purposes by ayahuascueros, from shamanic initiation, healing and divination to simple conviviality to witchcraft (ayahuasca sorcerers or *brujas* placing curses on enemies is a common feature within Amazonian ayahuasca cultures (see De Rios 1970; Hugh-Jones 1994: 35-39; Whitehead and Wright 2004). In some groups ayahuasca is also used "for locating game animals … in warfare and conflict, to see faraway places, and … [is] important in native art, cosmology and ethnoastronomy" (Fotiou 2016: 152).

Some of these practices are in turn grounded in an ontology and metaphysics starkly distinct from Western materialism. The ayahuasca-consuming Jivaro peoples of Peru and Ecuador, for instance, describe a reality that can only be perceived while under the influence of ayahuasca, and disparage the "normal" world, i.e., that which is inhabited outside of such moments of intoxication, as misleading or illusory (Harner 1973: 6). The reality perceived on psychedelics is, for the Jivaro, the *actual* reality, while similarly for the Shuar, "the true forces behind daily life are in the supernatural realm and can only be accessed through the psychedelic experience" (Fotiou 2016: 153). While this psychedelic reality is sometimes

[14] While broader community use of ayahuasca is common, in some cultures – many Pano-speaking indigenous communities, for instance – consumption is undertaken solely by healers, who occupy a specific role in diagnosing and treating the causes, oftentimes metaphysical, of other members of the community.

[15] Labate, MacRae and Goulart, for instance, underscore that, in the case of Brazil alone, ayahuasca is used in contexts ranging from cruanderismo (folk medicine) to several organised religions, including Santo Daime and União do Vegetal, both syncretic colonially inflected hybrids of traditional practices and Catholicism (2010).

characterised as a straightforward “spirit world” inhabited by ancestors, gods, demons and so forth, a less anthropocentric and more abstract, even philosophical, reading is also possible. Rudgley argues that “[g]eometric motifs (i.e. entoptic phenomena or phosphenes) permeate Tukano culture; the images, seen in their visions, embody important social principles … [the] Tukano do not consider these geometric motifs to be based on natural objects but rather the opposite, that the phosphenes influence the structure of both nature and culture” (1993: 54). He continues:

> The perception of phosphenes (circles, clusters of triangles, spirals, etc.) is based on the workings of the human neurological system and as such is not unique to the Tukano or any other one group. The figurative phase that follows these geometric visions involves the perception of culturally conditioned images (such as jaguars, snakes and mythical scenes). What is significant about the geometric images is that the Tukano use them to convey key concepts and values in their cultural code (62).

Rudgley also notes of the Tukano that the highest attainment while under the effects of ayahuasca is that of mystical union or “‘spiritual coitus’, a return to the cosmic uterus” (1973: 61). Importantly, the emergence of a figurative domain of cultural exchange out of abstract phenomenological experience, as well as the “return to the cosmic uterus” that is often a pretext for such experience, are themes that resonate with various indigenous psychedelic cosmologies as well as with some contemporary models of the psychedelic experience. The anthropologist Geraldo Reichel-Dolmatoff underscores that “the purpose of taking yagé is to return to the uterus, to the *fons et origo* of all things, where the individual “sees” the tribal divinities, the creation of the universe and humanity, the first human couple, the creation of the animals, and the establishment of the social order” (1972: 102). In later chapters I will return to this notion of a return to the *fons et origo*, which is closely analogous to what Simondon calls the *preindividual* and Deleuze the *virtual*.

For now, the sense that psychedelics have been viewed, by cultures with a long history of making use of them, as facilitating a return to an immanent[16] domain of creative pluripotence underlying and giving rise to the established order, should be borne in mind. The names given to various psychedelic plants by cultures that make use of them, vindicate such a reading. Examples of these names are “semen of the sun” [*virola*], “vines of the serpent” [*ipomoea*], “the tracks of the deer” [*lophophora wiliamsii*], “plant of the tomb” [*brugmansia sanguinea*],

[16] As Williams *et al.* note, reiterating the ontological turn in anthropology, indigenous ontologies often situate themselves in, or emerge from, land; this “place-based ontological immanence associated with Indigenous thought represents a profound challenge to the transcendence that seems to commonly frame the psychedelic experience in Western culture” (2022: 511). More generally, the authors argue that such indigenous modes of thought remain ill-understood by Eurocentric philosophical frameworks that “translate indigenous epistemes” into their own categories of “ontology, epistemology, methodology, and axiology… as well as subject-object, self-other, and human-nature” (ibid).

"vine of the soul" [*ayahuasca*], "mainstay of the heavens" [*Amanita muscaria*], "herb of divination" [*nadenanthera peregrina*], and "flesh of the gods" [*psilocybes*]" (Yensen 1989: 14; see also Schultes, Hofmann and Rätsch 2001)[17]. Similarly, we should bear in mind that contemporary scientific research into psychedelics also in some ways recapitulates such a view. Metzner (2005: 252) observes that "many features of the traditional and newly revived shamanic-animistic worldview appear to be quite compatible with the most recent, growing edge theories of postmodern science".

In the Central African country of Gabon we find a similar if heterogeneous focus on a return to the *fons et origo* in Bwiti, a syncretic blend of animism and hybridised, colonially-inflected spirituality practiced by the Punu, Fang and Mitsogo peoples. This practice is centred around the use of *tabernanthe iboga*, a plant whose root bark contains the powerfully psychoactive alkaloid ibogaine. Iboga is used in various cultural ceremonies, including for initiation into Bwiti and for healing purposes. James Fernandez details in his ethnography of Bwiti that the experience is described to initiates by practitioners as having "their heads broken open (*abing nlo*) and their understanding flooded with illuminations from the world beyond (*ndendang Zame*)" (1982: 307), and that based on their journey to this "world beyond", "[t]hey will come to the knowledge of how things really are, based on journeying to that world" (ibid). As part of this journey, iboga "acts to make the part which is the individual body and the individual animus of everyday life aware of the whole, the surpassing genealogical body and encompassing spirit" (1982: 493), and some practitioners also say that iboga:

> enables a man or woman to return to infancy and to birth – to the life in the womb. All the sins of life cause people to forget their origins and particularly their ultimate origins in *mang ay at*, the land of the dead beyond the sea. This is the land from which all spirits come to be incarnated and to which they return. (Fernandez 1982: 440)

[17] It is important not to conflate these kinds of origin myths with the narratives constructed around day-to-day practices of psychedelic consumption in indigenous cultures. As Bonhomme observes with relation to the West African iboga plant, for instance, to do so is to project a Western individualist framing and ontology onto these practices; for instance, "ibogaine visions centered around a form of 'regression': 'You will relive your childhood experiences to get to the root of your addictions.' The parent-child relationship was central to the experience, in line with the triangular nuclear family blueprint that Western psychoanalysis has placed at the heart of personal destiny. Its corresponding visionary experience was seen as an 'inner journey' into one's own memory. This idea was a departure from Gabonese Bwiti rituals: Bwiti Misoko initiates did not evoke childhood memories involving their parents; instead, they used iboga to find out what their relatives may have been plotting against them using witchcraft. The visions experienced by Gabonese initiates almost always revolved around the ties between kinship and witchcraft" (Bonhomme 2023: 207). On a loose reading, the Bwiti approach is in some ways closer to Deleuze and Guattari's practice of schizoanalysis, which opens the unconscious up to the socius by bringing together the flows of desire and production in a manner that largely bypasses the psychoanalytic focus on the familial (CIT).

Fernandez argues that Bwiti practitioners thus view iboga as “returning initiates to the uterine condition” and restoring “them to their own integrity – their pristine conditions” (1982: 491). This dynamic of a return to origins that are also, at death, a final destination, as well as being transindividual in the experienced shift from individual subject to the whole of life, is described by Fernandez as a “saving circularity”[18]. This term elicits the dynamic of individuation whereby a return to the preindividual is simultaneously the individuating of different set of possibilities – ones inherent in the present – for the future[19].

Turning to the southern part of North America, Henry Munn, a translator of Mazatec oral tradition, provides one of the most remarkable accounts of the dynamic of return and becoming I have been describing. Munn observes in this regard, in a discussion of psilocybin mushroom use within a traditional Mazatec setting, that “the mushrooms are merely the means, in interaction with the organism, the nervous system, and the brain, of producing an experience grounded in the ontological-existential possibilities of the human, irreducible to the properties of a mushroom” before continuing to describe the inherently communal nature of this experience (Munn 1973: 97). Employing an explicitly phenomenological register, Munn also suggests that the psychedelic experience, unless we regard it as straightforward delirium, cultivates “[a] modality of reason in which the logos of existence enunciates itself” (98) and argues that “such experiences are revelations of a primordial existential activity” (ibid)[20]. Munn rearticulates what has been said up until now in particularly lucid terms:

> One who eats the mushroom sinks into somnolence during the transition from one modality of consciousness to another, into a deep absorption, a reverie. Gradually colors begin to well up behind closed eyes. Consciousness becomes consciousness of irradiations and effulgences, of a flux of light patterns forming and unforming, of electric currents beaming forth from within the brain. At this initial moment of awakenment, experiencing the dawn of light in the midst of the night, the shaman evokes the illumination of the constellations at the genesis of the world. Mythopoetical descriptions of the creation of the world are constant themes of these creative experiences. From the beginning, the vision his words create is cosmological.

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[18] “One of the interesting things about Bwiti is the syncretic tension between the search for saving circularities' · of an older world view and a more modern commitment to the sequential transformation of religious experience which is not only assuaging to troubled states but redemptive – converting. The interplay between sequence and circularity is a basic dynamic, and it is not simply dialectical” (Fernandez 1982: 9).

[19] The resonance between “saving circularity” and the Nietzschean eternal return, or Deleuze’s repetition with difference, is also interesting to reflect on.

[20] Munn views these largely in terms of a renewed power of signification. The experience of enhanced language capacities when ingesting psilocybin is a common one, most famously discussed, in suitably pellucid yet playful prose, by Terence McKenna across his oeuvre. While this is an interesting feature of the psychedelic experience, I depart from Munn in seeing it as central – there are numerous non-linguistic, embodied, enactive, material aspects of psychedelic phenomenology that are equally salient (see Shanon 2002 for the most comprehensive phenomenological taxonomy of these, albeit focused solely on ayahuasca).

> Subjective phenomena are given correlates in the elemental, natural world. One is not inside, but outside. (Munn 1973: 106-7)

Munn goes on to suggest that, in a manner strikingly similar to what I have been discussing as individuation, this "exuberant welling up of forms is ceaseless, in this flux, this fountain, this energetic springing forth of life, the past is left behind for the future, all is renewed" (1973: 109)[21]. In entering this flux, Munn observes, Mazatec eaters of the mushroom do not see themselves as passive recipients of knowledge; far from simply contemplating the experience, they instead understand themselves as "creators engaged in an endeavour of ontological, existential disclosure … [for whom the] shamanistic condition provoked by the mushrooms is intuitionary, not hallucinatory" (122). This active, creative participation in ontological disclosure bears strong parallels with Merleau-Pontian phenomenology and the field of enactive cognitive science that it has deeply influenced, as will be seen in a subsequent chapter.

There are myriad other examples of long-standing indigenous psychedelic practices that could be examined, including Siberian shamanism's use of *amanita muscaria* mushrooms, Indian use of cannabinoids, Algonquin and Navajo use of deliriants like *datura stramonium* and Yanomami insufflation of *virola elongate*, a powerful source of DMT, but such an examination lies far outside of the scope of the current project. My intention is not to describe the broad range of ways in which psychedelics have been used across disparate cultural contexts or the metaphysical, ontological and existential worldviews that are recursively implicated in such use. Instead, my interest is instead in demonstrating, via these few brief examples, that psychedelics have a pronounced effect on the stable sense of individual selfhood that accompanies our default waking experience, perturbing this experience in ways that draw attention to some of its underlying productive dynamisms and affording the possibility of redistributing these dynamisms, whether this is interpreted through the lens of ancestors, archetypes, complexes or neurochemistry. If, as I argue in greater length in later chapters, this feature of psychedelics is experienced across widely diverse cultural contexts, then it resides at the interface of features that are largely homogeneous among homo sapiens: our neurobiological and biochemical makeup and our modes of embodiment, for instance, and the more heterogeneous minds that emerge from this. In other words, the perennial nature of these experiences, articulated in multiple cultural ways, suggests that a non-reductive materialist engagement with the psychedelic experience is better suited to developing a philosophical account of it than a merely culturally relativist or neurophilosophically reductionist one. Something about the psychedelic experience, in short, transcends cultural

[21] In fact, Munn alludes to Nietzsche and the gay science of the creative spirit in the passage directly after this.

specificity while remaining retrospectively entangled with it, just as something about consciousness in general shares this messy relationship with its situated forms of expression. If both a Jivaro shaman and a 21st century European psychonaut describe a psychedelic experience as involving a dissolution of normal waking consciousness and a return to a state of preindividual dynamisms inhabited by various memories, social forms, tensions, tendencies and possibilities experienced as a heightened – and partly malleable – architecture of meaningfulness, then a philosophy of such experience should bring together chemistry and consciousness, matter and mind, the social and the subjective, in as consistent a manner as possible.

2.2.3 Plato and the Kykeon

Before turning to a discussion of the classical period of the 19th and early-mid 20th centuries, in which the implications of the psychedelic experience were first explicitly philosophically explored in a manner amenable to contemporary inquiry, it is worth briefly mentioning several more hypothetical examples of ancient historical ingestion of ostensible psychedelic substances in a variety of early religious contexts. This includes the possible use of psychoactive plants in Vajrayāna Buddhism, in ancient Egypt and, in the Indo-Iranian region, a still-unidentified plant known as *soma* or *haoma* that is famously discussed in the Rig Veda as well as the Zoroastrian Avestas, and described in a manner that leaves little doubt that it was a profoundly mind-altering substance, although its exact nature has been fiercely debated for decades.

We also find a possible practice of consumption of psychedelics at what is commonly described as the birthplace of Western philosophy: ancient Greece. Here, for a period commonly thought to have lasted close to two thousand years (typically between around 1 600 BC and the 3rd century AD), which encompasses the period when some of the most canonical of all philosophers lived and thought, seasonal travel to the Temple at Demeter to imbibe a substance known as *kykeon* was a central feature of Greek life for those who participated in the popular goddess cults formed around the worship of Demeter and Persephone. As veteran psychedelic therapist Stanislav Grof observes in his introduction to Albert Hofmann's *LSD: My Problem Child*, "[m]any giants of Greek culture, including Plato, Aristotle, Alkibiades, Pindaros, and others were initiates in the Mediterranean mysteries of death and rebirth held in the names of Demeter and Persephone, Dionysus, Attis, Adonis, Orpheus, and others" (Hofmann XXX: CIT). In fact, although it is seldom commented on, Plato explicitly discusses this experience in several places in his work, something I turn to momentarily. Before I do, it is important to underscore that the Eleusinian mystery rites, as

they are known[22], reiterate many of the features of the psychedelic experience I described above. In part a ritual re-enactment of a staple of Greek mythology, Demeter's trip to the underworld to locate her daughter Persephone, who had been abducted by Hades, the themes of death, transfiguration and rebirth are, as Grof notes, central to an understanding of what took place at Eleusis. Indeed, Persephone is usually associated with resurrection, while Demeter is the goddess of cycles of life and death. The rite itself lasted several days and involved travel, feasting, singing, performances and, centrally, the consumption of *kykeon* in the *Telesterion* or great hall in which the actual re-enactment took place. At a pivotal moment in this latter part of the experience, participants experienced a shift from darkness to light, during which time the *hiera* or profound mystery of life was revealed, something which would, it was said, allow participants to reconcile themselves with mortality and the afterlife, but of which they were also sworn to secrecy under pain of severe consequences.

The descriptions of *kykeon* suggest probable psychedelic properties, but the exact nature of the substance, which was consumed as a liquid, remains unknown, undoubtedly in large part due to this strictly maintained secrecy. One possible candidate, popularised by Wasson, Hofmann and Ruck (1978; see Webster, Perrine and Ruck 2000 for an updated view) is *claviceps purpurea,* an ergot fungus that grows on various grains and which has been found in the dental cavity of at least one individual at an Eleusinian archaeological site (Juan-Stresserras and Matamala 2005). The sclerotium of this fungus contains high levels of the alkaloid ergotamine, which has powerful psychoactive properties and is used in the synthesis of lysergic acid, a precursor for LSD manufacture. While other candidates have been put forth (Bizzotto 2018), including various mushrooms, and while it is far from clear that any psychoactive substance at all was present in *kykeon,* it remains a significant possibility that either ergotamine, carefully extracted from the ergot fungus that would have been present on the grain crops[23], or something like it, was used by large numbers of Greek citizens for many centuries as part of a ritual practice of death and rebirth or, in the language I have been employed, individuation. As Carl Ruck describes,

> In this communion, they would have shared in the earth-mother's ancient passion, her loss of the maiden and the burial of the seed; with appropriate pageantry, as the candidates spent the Mystery night huddled together within the initiation hall, life was reclaimed from its chthonic captivity and they all shared in the joy of a rebirth that reconfirmed the metaphysical compact with the sources of life in the dark realm of death (Wasson, Hofmann and Ruck 1978: 117).

[22] The temple was in Eleusis, part of the modern-day Athens municipal region.
[23] Which are themselves symbolised in various artifacts associated with the mystery rites, and which would have been ready for harvest during September, the month during which the rites took place.

Importantly, within the Eleusinian mystery rites this metaphysical compact was an immanent compact. Albert Hofmann argues that, whereas “the Christian liturgy worships a godly power enthroned in heaven, that is a power outside of the individual”, with the consumption of *kykeon* “on the contrary, an alteration in the innermost being of the individual was striven for, a visionary experience of the ground of being” (1997: 39). Again, several of the philosophers at the very foundations of the Western canon, including Plato and Aristotle, participated in these rites[24]. Wasson, Hofmann and Ruck do not mince words in this regard when they observe, albeit in an unfortunately Western-centric manner, not only that “entheogens are autochthonous to Western society” but more so that “some of the formative minds of Western civilization, the ones that helped bring Democracy, Reason, Mathematics, Science, Philosophy, and Theater into the world, thought these entheogen-inspired Eleusinian Mysteries were the greatest experience of their lives” (1978: 6). On this view, provocatively expounded on by contemporary philosopher of psychedelics Peter Sjöstedt-Hughes (2016), the use of psychedelics is not only loosely correlated with the lives of seminal thinkers in the Western canon (as well as in myriad other philosophical, spiritual and ritual contexts), but may have made some causal contributions too. Gordon Wasson points out in pithily hyperbolic terms that “It is clear to me where Plato found his ‘Ideas’ … Plato had drunk of the potion in the Temple of Eleusis and had spent the night seeing the great Vision (Wasson, Hofmann and Ruck 1978: 19). Or, as Sjöstedt-Hughes even more provocatively asserts, “[w]e begin with a radical conjecture: western philosophy was triggered by the intake of psychedelics: Plato’s philosophy was inspired by psychedelic intake, and western philosophy was inspired by Plato” (2016). Here, however, as with the anthropological hermeneutics undertaken by ethno-psychopharmacological enthusiasts in their engagements with traditional cultural practices of psychedelics use, there is a tension between actual histories of use and speculation based on scattered evidence. While it is certainly the case that many cultures, including, ostensibly, Western cultures, have made use of these substances in various contexts, ranging from the spiritual to the ritual to the convivial to the bellicose, the motivation to retrospectively found contemporary usage of psychedelics in a mythic past in which all of its curative, metaphysical or otherwise profound features are already in evidence, remains a clear and present danger.

While the matter of ancient use thus remains a fascinating topic for archaeological and paleoethnobotanical researchers, I now turn to the contemporary record in order to develop a rigorous articulation of the complex relationship between thinking, psychedelics and philosophy.

[24] Plato explicitly mentions the rites at Eleusis.

2.3 The first wave

> How many of the current ideas of eternity, of heaven, of supernatural states are ultimately derived from the experiences of drug-takers? (Huxley 1977: 4)
>
> This was no evasive flight *from*, but a deep probe *into* reality. (Solomon 1977: viii)

2.3.1 Initial glimmers

In the popular imagination, the first wave of research into psychedelics is commonly thought to have begun in the early 1960s, and is strongly associated with countercultural figures like Timothy Leary and Richard Alpert, who sought to spread LSD across American society in order to effect a revolutionary transformation in consciousness and in politics, in the context of the Vietnam war that was then raging as well as the burgeoning civil rights struggle. However, even if we ignore the fact that research into altered states of consciousness more broadly has been a perennial feature of Western inquiry for hundreds of years – De Quincy's famous musings on opium, for instance, or the numerous poetic pronouncements on the hashish experience – it is the case that psychedelics were already being thought and spoken about in quite nuanced ways in the late 1800s[25]. More generally, the narrative of 1960s exceptionalism is "underpinned by the assumption that the Western engagement with drug experiences is shallow, dating no further back than the 1960s and that decade's countercultural embrace of transcendence and self-actualisation" (Jay 2023a: 14). A closer examination, however, "reveals that we are reigniting an enduring fascination with drugs and the mind that was a hallmark of Western modernity a century ago, but disappeared from our collective memory during the drug-averse twentieth century" (ibid.). This fascination revolved, at least in the 1800s, around the peyote cactus (containing the active alkaloid mescaline), which was in wide use in indigenous North Americans who were members of the Native American Church – a syncretic spiritual practice that combined elements of indigenous practice with, in some cases anyway, colonial theology.

In many instances, as was the case with psilocybin and various other psychotropic plants during European colonisation of South America[26], indigenous use of mescaline was frowned upon by the US church and state and associated with everything from moral failure and

[25] In this regard, as Breen observes, "Leary and his circle were part of a complex history of cross-cultural knowledge exchanges involving psychedelics. But this was a history they mostly ignored. In its place, they cultivated a new perception of psychedelic science as the product of a visionary group of researchers at Harvard University" (2024: CIT).
[26] "Calling it a 'widely introduced vice' that induced 'mental images, fantasies and hallucinations,' the Mexican Inquisition banned peyote in 1632" (Breen 2024: CIT).

addiction to madness or even demonic possession (Jay 2019)[27]. However, a small number of Western anthropologists, spiritual practitioners and other interested parties who gained direct access to peyote ceremonies gained a profoundly different sense of the dynamics of the experience undergone by members of the Native American Church, with its powerfully transformative and socially bonding effects. This in turn led some of the aforementioned individuals to successfully pressure the government to defend peyote use by enshrining it in law as a traditional spiritual practice (Jay 2019: 53-75). While this was playing out, a number of researchers began pursuing rigorous studies into the exact nature of the mescaline experience and what it could tell us about the brain, the mind, chemistry and visionary experience (see, for instance, Ellis 1897 and 1902; Heffter 1894; Klüver 1926 and 1928; Knauer and Maloney 1913; Lewin 1924; Prentiss and Morgan 1895; Schultes 1937).

Heinrich Klüver's work, much of which is summarised in 1928's *Mescal: The "Divine" Plant and Its Psychological Effects*, is especially interesting as an early attempt to map out a phenomenology of the mescaline experience in terms of various common visual, eidetic, somatic and existential features[28]. Klüver himself, in a later reflection, describes this work "as brave first attempts at describing and specifying the structure of our "subjective" world under a variety of conditions" and argues, in a manner similar to Husserl, that "such investigations are necessary and important on our road to recovery from the limitations of "objective" approaches" (1969:x). As Mike Jay summarises, "[w]ith the arrival of psychoanalysis and gestalt psychology, which aimed to study the mental processes that knitted perceptual data into a coherent consciousness, psychology took an inward turn, away from quantitative and analytic methods and towards subjective experience … [and] [m]escaline presented itself as a unique tool for accessing dimensions of mind that no brass instrument could measure" (2019: 132). The Polish artist-writer Stanisław Ignacy Witkiewicz, an avid experimenter with various substances, observed that due to this, mescaline became seen as "a metaphysical drug, producing a sense of the strangeness of existence" (Witkiewicz cited in Jay 2019: 153).

Generally, as Grof observes in his introduction to Albert Hofmann's *LSD: My Problem Child*, "[c]linical experiments conducted with this substance in the first three decades of the twentieth

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[27] As psychedelic chemist Alexander Shulgin once observed, "the prejudice against the use of consciousness-opening plants and drugs has the major part of its origin in racial intolerance and the accumulation of political power" (P/T CIT).

[28] "He discerned, for example, a characteristic sequence of stages: beginning with brightness and flashes of colour (the violet glow and green after-image across the white notebook page), evolving into geometric or kaleidoscopic shapes (the tapestries, Persian carpets and floral designs), then the appearance of objects (buildings, vases, filigreed metal armour) and finally – and only at higher doses – fantastical scenes and landscapes in which elements from all these stages meshed into a realistic panorama" (Jay 2019: 139).

century focused on the phenomenology of the mescaline experience and its interesting effects on artistic perception and creative expression"[29] and did not explicitly recognise "its therapeutic, heuristic, and entheogenic potential", preferring instead to frame this experience in the languages of "toxic psychosis" (Hofmann 2017: 7-8) or aesthetic experience. It was thus only in the 1940s – perhaps with some rare exceptions (as detailed in Aday, Bloesch and Davoli 2019) – that we begin to see a more nuanced examination of what Grof refers to as LSD's therapeutic potential. This came about with the discovery of the effects of LSD in 1943 and the subsequent promotion of this powerful new substance as a potential medical research tool by Sandoz, the laboratory at which its inventor Albert Hofmann worked.

The period between 1943 and the late 1960s saw a remarkable blossoming of research into psychedelics – primarily LSD but also psilocybin, mescaline and DMT. Grinspoon and Bakalar observe:

> [m]any people remember vaguely that LSD and other psychedelic drugs were once used experimentally in psychiatry, but few realize how much and how long they were used. This was not a quickly rejected and forgotten fad. Between 1950 and the mid-1960s there were more than a thousand clinical papers discussing 40,000 patients, several dozen books, and six international conferences on psychedelic drug therapy. (Grinspoon and Bakalar 1979: 192)

The rigour and thematic content of all this work is hugely disparate, and ranges from proto-New Age metaphysical speculation to more scientifically grounded and philosophically cautious examinations of the complicated relationship between psychedelic alkaloids, neurobiology and subjective experience. This latter work emerged at a messy point of social inflection, where recent advances in neuroscience (neurotransmitters had just been discovered, with serotonin only making an appearance in 1949)[30] intersected with the hubris of early enthusiasm around computing and a nascent cybernetic critique of hegemonic behaviourist models of psychological functioning that had themselves just recently begun to replace phenomenologically, psychoanalytically and existentially inspired views[31]. Breen points out:

> In 1950, the year that witnessed the outbreak of the Korean War, the human mind was reimagined as something programmable – by drugs, by hormones, by electricity, by

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[29] As Jay observes, in the early 20th century such experiences were viewed "neither as a spiritual epiphany nor a model psychosis, but as a zone of aesthetic, creative and existential possibility" (2019: 149).

[30] As Grof points out, there was likely a complex, two-way causality between psychedelics and neuroscience research during this period: "For neuropharmacologists and neurophysiologists, the discovery of LSD meant the beginning of a golden era of research that could solve many puzzles concerning the intricate biochemical interactions underlying the functioning of the brain" (Grof in Stolaroff 2004: 11).

[31] The emergence of functionalist cognition within this milieu is addressed in a subsequent chapter.

> words, and in ways both transcendent and oppressive… Science textbooks and neuroscientists alike imagined the human mind as something like a telephone switchboard: a vast apparatus of electronic relays that could be "reprogrammed" – and that could also short-circuit. Reprogramming the mind to cure the ills of society remained a preoccupation of the era, from L. Ron Hubbard's Scientology to the Macy circle's "Problems of Consciousness" conference series. (Breen, 2024: np)

Similarly, advances in biological and chemical approaches to the mind had "fuelled a trend away from practice in mental hospitals and towards research programmes that were being driven and shaped by pharmaceutical companies such as Sandoz as much as by the universities," meaning that "[p]sychiatry was developing a hard scientific core, with psychopharmacy at its centre" (Jay 2019: 191). This resulted in a complex interplay between third person attempts to describe the results of psychedelic research in the language of cybernetics, logical architecture and neurobiology and the slippery nature of first-person accounts of the underlying psychedelic experiences themselves, which drew more on process philosophy, monism, perennialism and quasi-Jungian views on the unconscious. Whatever provisional reconciliations between these third and first-person views emerged from the milieu of "classical era" psychedelics research were uneasy, and never quite provided the kind of consistency that contemporary research aims for, as I will indicate. Indeed, it is an important aspect of this dissertation to argue precisely that this contemporary research, especially in the fields of neuroscience and enactive cognition, offers a stronger reconciliation than was possible in the classical era and that this reconciliation suggests a philosophical framework as far-removed from the logical symbol manipulation of classic computing as it is from idle metaphysical speculation and its appeals to various inchoate forms of transcendence and ontotheology.

In what follows, I will refer to a broad range of philosophical thinking about psychedelics that emerged from the period between the 1940s to 1960s in order to draw out the aforementioned tension. I will focus less on the concomitant scientific research, which consisted largely of early forays into neurobiological measurement paradigms and various alarmingly ethically lax forms of animal model and human research, but refer to scientific findings that were given a broadly philosophical interpretation – used to speculate about the emergence of consciousness, for instance.

2.3.2 The first wave breaks

The classical era of psychedelics research produced numerous descriptions of psychedelic experience that were very much like the de-structuring and broadening of everyday waking consciousness evident in the indigenous accounts we mentioned earlier. Metzner observes, for instance, that "[t]he first research papers that came out of the Sandoz labs, where Albert

Hofmann had synthesized LSD and accidentally discovered its astounding properties, described it as bringing about "psychic loosening or opening" (*seelische Auflockerung*)[32]" (Metzner vine CIT). This idea of psychic loosening formed the basis for what became known as *psycholytic* or "mind releasing" therapy, an approach that relied on the use of medium doses of LSD and other substances in order to effectuate a lowering of defences and a lessened identification with inculturated, habitual aspects of the self, both so that "the patient would become more vividly aware of his or her previously unconscious emotional dynamics and reaction patterns" (ibid. CIT) and in order for new, healthier dynamics to be developed in the context of an increasingly malleable psychic space.

The psycholytic approach, which came to replace the very earliest work on these substances that saw them as *psychotomimetics*, i.e., as producing temporary psychosis, differs in turn from the so-called *psychedelic* approach. The latter aims, with the use of higher doses, at cultivating an experience of full ego-loss and mystical union. This entails a spiritual experience, as opposed to a more traditionally psychoanalytic one that relies on some rudimentary sense of self to remain intact in order to process unconscious material (for a comprehensive account of the evolution and overlap of the psycholytic and psychedelic paradigms, see Oram 2018: 18-46; for an exhaustive bibliography that retains the taxonomic distinction, see Passie 1997). In many cases, however, and even though some psychedelic therapists explicitly endorsed one of the two over the other, features of both approaches are evident[33]. This is the case for Gerald Heard, for instance, who argues that psychedelics produce "a confronting of one's self, a standing outside one's self, a dissolution of the ego-based apprehensions that cloud the sky of the mind" (1963: 10) which in turn affords "far-reaching insights into one's own self and into one's relationship with others" – insights that can be incorporated into the better functioning of everyday life (9). In their seminal paper, Sherwood, Stolaroff and Harman, aver of such experiences that afterwards, "the person is never the same: in a sense he is born anew, even if it occurs just once, since never can he completely forget the knowledge of the underlying reality which he has glimpsed" (1969: 108), echoing the themes of death, rebirth and an underlying reality evident in the indigenous metaphysics of the psychedelic experience discussed earlier. The authors also refer to Williams James's (1943: 14) notion of the "germinal higher part" of oneself that is contracted during such experiences (Sherwood, Stolaroff and Harman 1969: 108); the notion of germinality – the germinal stage in biological becoming – is closely analogous to that of individuation and the so-called "germinal higher part" of oneself

[32] This German term is also translated as "mental relaxation", something close to the "relaxation of priors" described by the contemporary REBUS model of psychedelic action detailed further on.
[33] For the current purposes the distinction is not particularly important and the appearance of each paradigm in the discussion below should be intuitively clear in each case.

that is contracted while undergoing psychedelic ego death. Thus by extension, this view is resonant with the ideas of the pre-individual that will be addressed later.

Even without making this link, the sense of psychedelics affording access to a domain of increased transformative potential that entails, for its traversal and exercise, an unbecoming seems clear – whether in the form of a death, ego-loss or dis-individuation. Sherwood and co-authors also draw attention to the monist and univocal nature of (ostensibly high dose, i.e., *psychedelic* instead of *psycholytic*) experiences. They assert that a near-universal feature of such experiences is a felt sense that "behind the apparent multiplicity of things in the world of science and common sense there is a single reality, in speaking of which it seems appropriate to use such words as infinite and eternal". They furthermore point out that this experience, which is "apparently independent of subjects' previous philosophical or theological inclinations … plays a dominant role in the healing process" (109)[34]. Krippner gives a similar account of the ego-unravelling nature of the psychedelic experience, noting of one such personal experience that "I had the impression that this swirling tornado was divesting me of verbal conventions, rules, signs, and everyday boundaries, leaving me naked and open to a more basic world of feeling and direct impression. I felt overwhelmingly tuned in to 'the true nature of things'." (1970: 35).

In his introduction to *Myself and I,* Constance Newland's remarkable account of her transformative LSD experiences, the psychiatrist and psychotherapist Ronald Sandison, an early British psychedelics researcher, likewise remarks, based on his facilitation of numerous therapeutic sessions with LSD, that those ingesting the substance sometimes describe "falling apart, or that they are dissolving or disappearing" and that these experiences, which often involve being surrounded by water or other fluids, are perceived as "symbols of ego disintegration" (Newland 1962: 13)[35]. Similarly, Stanley Cohen argues that "[c]omparisons might be made with the undifferentiated, egoless state of the infant" (1965: 44). As he elaborates,

> In sufficient amounts this drug has a disinhibiting or releasing action on learned patterns, particularly those related to reality testing, survival functioning, goal-directed behavior and logical thinking. Instead, a primal thinking-feeling process supervenes,

[34] While such experiences are indeed common, they are, on a broader reading of the myriad accounts of psychedelic experiences available to us nowadays, from "trip report" sites like erowid.org, for instance, far from universal; this kind of surreptitious generalisation based on personal metaphysical convictions it is a notable feature of classical era psychedelics research.

[35] Interestingly, Sandison notes that some aspect of consciousness, perhaps what some contemporary researchers refer to as the 'core self' (Letcher CIT), persists through the experience. As he describes, "[t]his thinning out of ego control may last for some hours and it gives the patient and the therapist an opportunity of exploring the unconscious. Consciousness is not lost and keeps a watching brief on the affair, being able to report events afterwards" (CIT).

> in which dreamlike fantasies become prominent. The thin overlay of reason gives way to reverie, identity is submerged by oceanic feelings of unity, and seeing loses the conventional meanings imposed upon the object seen. (Cohen 1965: 44)

Somewhat provocatively, Cohen, in reference to Kant, claims that under psychedelics we see things truly as they are: "[p]erception ceases to subserve meaning and becomes a Ding an Sich" (1965: 49). Cohen is not the only person to challenge Kant's famous phenomenon-noumenon distinction in this regard. William Braden, for instance, asserts in an even more provocative manner that "[i]n the here and now there are no abstractions" and that objects represent only what they are, thus being perceived as things-in-themselves (1967: 32). He further suggests that "it matters not whether Kant said that sort of perception is impossible. Kant never took LSD. If he had, he would have known that rose is a rose is a rose is a rose" (ibid.). Contentious views on the Kantian edifice notwithstanding[36], Braden provides one of the most lucid classic typologies of the psychedelic experience, so it is worth citing him at length. As he describes, under psychedelics "[t]he sense of self or personal ego is utterly lost … [and] [a]wareness of individual identity evaporates" (30). As an extension of this, "[s]ubject-object relationships dissolve, and the world no longer ends at one's fingertips: the world is simply an extension of the body, or the mind" (ibid.). There is a profound sense of fluidity and creative dynamism within this experience. Braden argues that "[i]t is not that the world lacks substance; it is real, but one is somehow conterminous with it" (ibid.). In other words, there is a radical depersonalisation wherein identity "is expanded to include all that is seen and all that is not seen," due to which "[t]he subject looks back on his pre-drug existence as some sort of game or make-believe in which, for some reason, he had felt called upon to assume the reduced identity or smaller self called 'I' " (31). This scattering of consciousness allows, in Braden's language, for Being to breathe "an ontological sigh of celestial relief … the subject … united with the Ground of his Being" (ibid.). Referencing Bergson's notion of duration, Braden observes that time is similarly transformed within the psychedelic experience, which installs us within "true movement" (Bergson 1992) in which "[s]econds and minutes do not really exist; they are artificially created 'immobilities' dreamed up by science, which is unable to comprehend flux, mobility, or the dynamic character of life itself" (Braden 1967: 32).

In general, the sense developed within the first period of research was that under the influence of psychedelics, "the accustomed worldview undergoes a deep-seated transformation and disintegration" accompanied by "a loosening or even suspension of the I-you barrier" and that this was a great aid in working through problems that were deeply entrenched within the functioning of the ego or self-model (Hofmann 2017: CIT). Frequently, the aforementioned

[36] I will present a challenge to idealism (and naïve realism) in the next chapter by introducing enactivism as a framework that allows us to push beyond this classic antagonism.

loosening enabled a range of suppressed memories or forgotten experiences to re-emerge, meaning that they could be worked with and integrated within the therapeutic context. Hofmann, referring to the work of French psychiatrist Jean Delay, notes of this re-emergence that it "does not involve an ordinary recollection, but rather a true reliving; not a reminiscence, but rather a *reviviscence*, as the French psychiatrist Jean Delay has formulated it" (2017: 31; my emphasis)[37]. Newland describes this reviviscence as follows:

> Under the dual awareness of LSD, one may see extraordinary imagery and fantasy which can be interpreted symbolically; one may hear himself speak isolated and apparently meaningless words which, if pursued, may lead to forgotten and meaningful episodes; one can relive with intense emotion painful experiences which have been totally forgotten; or one can somehow, with some part of himself, become the child he has been. This last is a remarkable phenomenon, as yet not understood. It is as if one enters a region where the past and the present coexist; where time, as we know it, has no existence. (Newland 1962: 42)

A broader articulation of the kind of non-conceptual or pre-reflective affective encounter or "direct-living-of" typified by reviviscence is evident in many other aspects of psychedelic experience too. For instance, reflecting on his participation in Walter Pahnke's famous 1962 Marsh Chapel experiment, in which a group of divinity students ingested psilocybin in a theological context in order to examine its entheogenic properties, Huston Smith observes that, in the mystical experience that ensued, "I experienced – ontologically would be the philosophical word for it – what before that time I had only believed. So, it's like fleshing out an intellectual, cerebral understanding, with the conviction of actually experiencing that reality itself" (Smith *et al.* 2004: 132-3). The experience of revivisence, as well as the broader notion of a non-conceptual thought – thought individuating – and its proximity to Deleuze and Guattari's notions, like *becoming,* which will be discussed in the final chapter, specifically within the context of dynamic systems theory.

2.4 Mapping the expanse

> Drugs weary us with their paradises. Let them enlighten us a little instead. Ours is not a century of paradises. (Michaux 1963: 3)

Thus far, I have presented a number of lesser-known voices from the classical era of psychedelics research. I will shortly turn to more famous – and in some cases infamous – interlocutors like Watts, Huxley and Lilly to explore whether their discussions of the psychedelic experience are broadly compatible with what has been presented so far; as well as the more philosophically trenchant ways in which they attempted to ground this experience.

[37] Reviviscence connotes a sense of renewal or coming back to life. I am using it in this sense, but also in a slightly narrower reading as the re-lived or re-experienced.

Before I undertake this task, it appears to be the case that a taxonomy of sorts is forming. In this regard, it is worth citing Walter Pahnke's frequently referenced classic typologies of the psychedelic experience in order to summarise the preceding section, as well as the more straightforwardly psychotherapeutic framework outlined by Robert Masters and Jean Houston. Starting with Pahnke, it should be noted that he presents two distinct lists of categories of psychedelic experience. The first is a series of nine interrelated categories of experience from "a historical survey of the literature of spontaneous mysticism, including the commentaries of scholars such as William James and W. T. Stace" (Pahnke and Richards 1966: 71). This is in the context of his PhD work, which included the Marsh Chapel experiment. The second is a shorter list of so-called "non-mystical" forms of altered consciousness.

Pahnke's first list[38] is summarised below:

1. Unity. Experience of an undifferentiated unity.
2. Objectivity and reality. Insightful, intuitive, directly experiential knowledge or illumination about being or existence in general, as well as a deep feeling of the objective veracity or authoritativeness of this knowledge (what William James referred to as *noetic*). Reviviscence would feature strongly here.
3. Transcendence of space and time. A sense of eternity or timelessness.
4. A sense of sacredness. Feelings of awe and reverence.
5. A deeply-felt positive mood. A cosmic exuberance or bliss.
6. Paradoxicality. Pahnke here notes that this form of experience can violate Aristotelian logic, ostensibly referring to logical constraints like the laws of identity, non-contradiction and the excluded middle; he notes such experiences as being simultaneously dead and alive, being and non-being, void and plenum and so forth[39].
7. Alleged ineffability. The inability to communicate the experience.
8. Transiency. The fleeting nature of the experience.
9. Positive changes in attitude and behaviour.

[38] This list, it should be noted, overlaps considerably with the philosopher W.T. Stace's classic list of characteristics of mystical experience (1960), which Masters and Houston summarise as "1. The Unitary Consciousness, from which all the multiplicity of sensuous or conceptual or other empirical content has been excluded, so that there remains only a void and empty unity. This is the one basic, essential, nuclear characteristic, from which most of the others inevitably follow. 2. Being nonspatial and nontemporal. This of course follows from the nuclear characteristic listed above. 3. Sense of objectivity or reality. 4. Feelings of blessedness, joy, peace, happiness, etc. 5. Feeling that what is apprehended is holy, sacred, or divine. 6. Paradoxicality. 7. Alleged by mystics to be ineffable" (2000: 302).

[39] The ontogenetic relation between individuation and Aristotelian logic will be discussed in the final chapter.

Pahnke's second list is as follows:

1. Aesthetic phenomena.
2. Psychodynamic phenomena.
3. Psychotic phenomena.
4. Cognitive phenomena (including enhanced reflexivity and lucidity, as well as an increase in capacity for free association – the view that psychedelics can aid in practical problem-solving stems largely from these kinds of experiences).
5. Miscellaneous phenomena (various psychosomatic, sensory and other experiences – it is obvious from the heterogeneous list Pahnke provides of these that they warrant a much fuller account; similar to that given in Shanon (2002) for instance).

To the modern eye, the division of these experiences into two sharply separated lists seems rather arbitrary, and Pahnke's near-exclusive focus on the "mystical" aspects of the psychedelic experience encourages a view of the psychedelic experience itself as primarily of a mystical or spiritual nature – a still dominant trope in the broader psychedelic community. While experiences described as mystical or spiritual are undoubtedly existentially important, and frequently have profoundly life-altering transformative potential, a contemporary naturalist account of these experiences that seeks to consolidate neuroscience and consciousness should deprioritise this kind of metaphysical framing. Letcher convincingly argues that this kind of framing is by no means an inherent part of the healing potential of psychedelics (CIT). As will be further discussed in the final chapter, many of the experiences listed under the mystical category can be described and explained in a more methodologically rigorous manner, albeit one that is non-reductive and which acknowledges the *existential* aspects of these experiences and the neurobiochemical dynamics that are imbricated with them as equally salient. Nevertheless, Pahnke's lists (which appear to exclude the classic death-rebirth experience, although this experience is strongly implied in the unfolding of the experiential trajectory through various items on those lists) provide a useful partial grounding for the broader conversation to follow.

Perhaps the most definitive attempt of the era at documenting the psychedelic experience, however, is Masters and Houston's 1966 guide to the effects of LSD, *The Varieties of Psychedelic Experience* (2000), which the authors describe as the "first detailed presentation of a Western-oriented, non-mystical phenomenology and approach to the direction of the psychedelic session" (2000: 4). Consisting largely of a synthesis of the accounts of 200+ subjects undergoing psychedelic therapy, many of which are provided verbatim in the text, the book develops a different but overlapping typology of experiences. It does so by using a looser heuristic lens in order to divide these experiences into somatic, interpersonal, non-human

(altered perceptions of the natural world), reflexive and symbolic, archetypal and mystico-religious aspects while noting that any given experience can, and most often does, contain several of these elements. Synthesising this typology, Masters and Houston propose a psychological mechanism of deconditioning as underlying the therapeutic efficacy of psychedelics. As they say of LSD, "[b]y presenting a wealth of hitherto unknown perceptual possibilities it can dissolve or temporarily suspend the effectiveness of those psychical mechanisms whose functions would appear to be to inhibit emergence of certain processes and contents of the mind" (2000: 152). Once this inhibitory function of the mind – which is in some ways a more modest, psychotherapeutically realistic version of Huxley's filtration theory, discussed below – is sufficiently attenuated, "the ground has been prepared for the free psyche to function in such a way as to result in the beneficial transformation and self-realization of the individual" (ibid.). The authors describe this transformative process as *entelechical*, referring to the notion of entelechy or vital principle that in some philosophical and biological accounts motivates the perpetuation of the realisation of life. This notion of entelechy, which is sometimes given a transcendent reading, will reappear in immanent form when we discuss autopoiesis in subsequent chapters. This transformative psychedelic unfolding of life, which relies on the cessation of some of the stabilisation features of everyday waking consciousness so that an enlarged domain of potential can be explored and expressed, is largely the same as the classic death-rebirth individuation account that repeats itself with difference across the long arc of conceptualising human encounters with psychedelics.[40] Masters and Houston indeed make it clear that "the process by which one attains to spiritual awareness or to a greater sense of reality finds expression in the thematics of death and rebirth" (2000: 221). Moreover, Masters and Houston see this process of transformation as involving a range of qualitatively distinct forms of experience, which they sometimes term "levels". While the sensory perturbation characteristic of the early stages of the psychedelic experience "prepares the ground" by limning this enlarged domain of potential, this is often a precursor to what they call the "recollective-analytic level" at which altered perceptual experience becomes less important than the rich tapestry of heightened meaning and symbolic depth that opens up.[41] They argue:

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[40] "It has been theorized that many of the problems of modern man stem from the fact that he has few if any effective rituals by means of which he is able to experience catharsis and rebirth. Western civilization since the Renaissance is one of the few social orders that does not provide for emotionally powerful rites of renewal and emergence. An anomalous situation thus has been created in which the accumulated ritual requirements of the millennia have been ignored with consequent repression and deflection" (Masters and Houston 2000: 217).

[41] Importantly, however, this notion of levels is just a heuristic: "our schema of psychical drug-state levels does not describe a phenomenological pattern of progression invariably followed by the subject" (Masters and Houston 2000: 300).

> On the recollective-analytic level there is a readily recognizable and progressive deepening of the emotional tone of the experience. Thinking also is markedly different as it increasingly appears that the usual boundaries between consciousness and the unconscious have been breached and finally in large measure are dissolved. Long "forgotten" memories may become accessible and meaningful in the context of the subject's particular concern. Age regression (similar to that met with in hypnosis) may occur, with the subject "going back in time" to very vividly experience the emotional as well as the other contents of important forgotten or repressed events (while, however, retaining his link with present time). Or there may be a *revivification*, the subject so totally re-experiencing events from his past as to lose all contact with the present and relive, as child or even infant, the significant occurrences most relevant and crucial to his present (nondrug-state) situation. (Masters and Houston 2000: 184; my emphasis)

According to Masters and Houston, this state of memory and meaningfulness, which includes reviviscence and a profound sense of archetypality or mythic psychodrama[42] in terms of both what emerges from the mind as well as what is encountered in the sensory milieu, is precisely that domain in which psychotherapists, particularly psychoanalysts, are trained to operate. They further argue that "[t]he cure of the neurosis and the removal of the neurotic symptom almost always are products of experiences on the recollective-analytic level" (2000: 187). It was a common view among psychedelic therapists at the time – and this largely remains the case, albeit in a slightly tempered fashion – that the kinds of experiences Masters and Houston describe as recollective-analytic can rapidly result, in the course of one or two psychedelic therapy sessions, in the kinds of sweeping positive transformations of behaviour that usually require years of difficult therapy.[43] The authors underscore that "the psychedelic experience has the potential of initiating the unfolding of an entelechical *self-healing* and *self-realizing* process" (201; my emphasis).[44] It sets in motion what I will describe in subsequent chapters

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[42] "The psychedelic drug "world" of myth and ritual, which is also a world of legendary and fairy tale themes and figures, of archetypes, and of other timeless symbols and essences, is of a more profound and meaningful order than that of the historical and evolutionary sequences. Here, where the symbolic dramas unfold, the individual finds facets of his own existence revealed in the person of Prometheus or Parsifal, Lucifer or Oedipus, Faust or Don Juan, and plays out his personal drama on these allegorical and analogic terms. Or he finds the means of attaining to new levels of maturity through his participation in rites of passage and other ceremonies and initiations. In the case of the analogic mythical and ritual dramas, these very often are shaped of the stuff of the raw personal-historic data and insights now seemingly viable and plastic to the un- or pre-conscious myth-making process as a result of the subject's evocation and examination of them on the recollective-analytic level. Now, on the level of the symbolic, these memory and psychodynamic materials may emerge restructured in a purposive pattern of undisguised symbols cast in a flowing dramatic form that illumines the subject's life and may even transform it" (Masters and Houston 2000: 214).

[43] "Many different kinds of patients were successfully treated, often in just a few sessions, including—ironically—alcohol and other drug addicts, along with habitual criminals, sexual deviates, violence-prone individuals, and people suffering from chronic anxiety states, depression, and many other disorders of the kinds with which therapists frequently must deal" (Masters and Houston 2000: viii).

[44] In this regard, "[i]n the psychedelic experience the progressive deepening and ultimate transformation of conscious life are less the result of self-transcendence 'towards the world' than of the gathering enrichment consequent upon increasing knowledge with improved understanding of more of what the self contains within itself" (Masters and Houston 2000: 244). In other words, and as enactivism will

as a psychedelic individuation or ontogenesis. In fact, in terms of the recollective-analytic level of experience, the most commonly occurring theme "is that of the eternal return … [experienced] in terms of the redemption of the vegetation cycle leading to a redemption of human consciousness" (218). Below, one such experience is cited at length to make clear how it unfolds:

> This sequence dissolved and the subject spoke of seeing a kaleidoscopic pattern of many rites of the death and resurrection of a god who appeared to be bound up in some way with the processes of nature. S described several of the rites he was viewing, and from his descriptions the guide was able to recognize remarkable similarities to rites of Osiris, Attis, and Adonis. S was uncertain as to whether these rites occurred in a rapid succession or all at the same time. The rites disappeared and were replaced by the celebration of the Roman Catholic Mass. Seeking to restore the original setting, the guide again suggested the image of the thyrsus. S imaged the thyrsus, but almost immediately it "turned into" a man on a tree (the Christ archetype). The guide then said: "You are the thyrsus," to which S responded: "I am the thyrsus. I am the thyrsus. I have labored in the vineyard of the world, have suffered, have died, and have been reborn for your sake and shall be exalted forevermore." (Masters and Houston 2000: 219)

Masters and Houston observe that through a bricolage of culturally specific mythic and spiritual references – Christianity in particular – the subject "S" experienced a reviviscence not only of personal memory but of "the drama of redemption seen on all levels at once; the redemption of the vegetation cycle and the redemption of the human consciousness" (2000: 220). The participation in this archetypal drama represented to the subject, "in terms both universal and particular the essentials of his own situation in the world" (213)[45]. Masters and Houston argue that the mythic dramas that often unfold in the course of the psychedelic experience "usually relate to occurrences that cannot be specified in space and time but which nevertheless exert a powerful influence on culture and consciousness" (224). This is a strong metaphysical claim, and one that appears untenable on any naturalist reading. I will show in my final chapter, however, how this claim can be naturalistically reconciled via the philosophy of Deleuze and the resources of dynamic systems theory. In other words, I will argue that a scientifically coherent, philosophically rigorous account of what appears to be an egregious case of idealist metaphysical excess is possible.

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underscore, the notion of the self we are dealing with here is not that of the isolated individual starkly defined in opposition to an external world but instead the self seen as a repository of potential in which the world is already implied.

[45] Alan Watts makes a similar observation about the mythic-archetypal quality of this sort of psychedelic experience, describing it as "a sort of cycle in which one's personality is taken apart and then put together again, in what one hopes is a more intelligent fashion. For example, one's true identity is first of all felt as something extremely ancient, familiarly distant – with overtones of the magical, mythological, and archaic" (1962: 83).

There is still a lingering question though as to why the entelechical process so commonly invokes these kinds of mythic journeys through archetypal content. Here, Masters and Houston present a hypothesis that, again, to pre-empt the later discussion on dynamic systems theory, is strikingly resonant with the technical model of individuation that will be developed via Simondon, Deleuze and Guattari. The authors suggest that in the mythic psychodrama "consciousness is confronted with a context one of the essential characteristics of which is a primordial state wherein space and time remain undifferentiated; that this primordial state is characteristic of the deepest levels of the psyche; and that the mythic drama is just that temporally and spatially undifferentiated form into which consciousness most easily and effectively may be drawn with the result that a new consciousness is born" (245)[46]. Masters and Houston (ibid.) further assert that

> consciousness, no sooner entering as participant into the drama, finds itself also in this primordial "eternal" state which by disallowing the preconditions of individuation[47] (i.e., particularity in real space and time), allows for involvement in the universal myth as distinguished from the strictly individual factual or fictional sequence and in the essential as distinguished from the exclusively particular existential reality.

Finally, the authors discuss a further type of psychedelic experience that operates beyond the symbolic-archetypal domain and which they term "the integral level". "On this level," they argue, "ideation, images, body sensation (if any) and emotion are fused in what is felt as an absolutely purposive process culminating in a sense of total self-understanding, self-transformation, religious enlightenment and, possibly, mystical union … a confrontation with the Ground of Being, God, Mysterium, Noumenon, Essence, or Fundamental Reality" (148). This experience of the grounds of being, again best understood as a kind of non-personal or universal reviviscence, takes place "in an atmosphere charged with the most intense affect" which "rises to a kind of emotional crescendo climaxed by the death and purgation of some part of the subject's being and his rebirth into a new and higher order of existence" (266-7), for example:

> He closed his eyes and described great sinuous, jeweled shapes undulating through space. "Everything" was "coming in waves and from all sides." "Great waves of stimuli" were "crashing against the permeable rock" Snow felt himself to be. He reported that 'everything is happening now on a great universal scale. I can dissolve. Now I understand what is meant by being a part of everything, what is meant by sensing the body as dissolving. I have a knowledge of all my particles dissolving and becoming

[46] Similarly, "[a]nother common aspect of the experience is the subject's becoming aware of himself as continuous with the energy of the universe. This is frequently described with words to the effect that the person was part of a dynamic continuum" (Masters and Houston 2000: 308).

[47] To avoid confusion, note that what the authors describe here as *individuation* is equivalent to what Simondon and others term the *individuated'* i.e., a single phase of being or, in Deleuzian parlance, the actual.

> incorporated into a sea of particles where nothing has form or even substance. In this sea there is no individuality (Masters and Houston 2000: 274).

As well as being a vivid account of reviviscence, this recounting also provides a succinct description of ego-loss – in this regard there is a rich vein of strikingly overlapping descriptions in the copious research literature produced during the first wave.

2.5 Aldous Huxley: the writer

Below, I will discuss the figures most commonly viewed as the "philosophers" of the classical era of psychedelics research:[48] Huxley, Watts and Lilly. Of these, Huxley is arguably the most instrumental in developing the philosophical framing that would be used – and frequently still is – in discussing the metaphysical implications of psychedelic experiences. It is hard to overstate Huxley's influence in this regard.

Erica Dyck and Chris Elcock observe that "Huxley's early essays, which were translated into dozens of languages, formed the early basis for an international psychedelic culture that occasionally used a more radical rhetoric of psychedelic revolution" (Dyck and Elcock 2023: 6). This is especially the case for his seminal 1954 account of the mescaline experience, *The Doors of Perception* and its counterpart, 1956's *Heaven and Hell*. Indeed, it was during this time that Huxley and the psychiatrist Humphry Osmond, who coined the term *psychedelics*, were exchanging letters discussing what name best suited these substances.[49] As Jay makes clear, this term was more than a label; it was also "an inflection point, after which a disparate group of plants, chemicals, and practices from across the globe were gathered together under a single rubric" and thus "embodied a new understanding of the possibilities of drug use and communicated it to millions" (2023b: 495). In these early works, Huxley is explicit about the potential import of psychedelics for philosophy. As he notes, referring to an anonymous character, "at least one professional philosopher has taken mescalin for the light it may throw on such ancient, unsolved riddles as the place of mind in nature and the relationship between brain and consciousness" (1959: 12). In this regard, Huxley hews closely to the idea that psychedelics afford a kind of direct access to the world, or what he calls "naked existence" (17), unmediated – or at least far *less* mediated – by the usual mechanisms by which human

[48] None of them were, strictly speaking, philosophers (Huxley was a literary figure, Leary was a psychologist, Watts was a divinity scholar and Lilly was a scientist and psychoanalyst), but they provide, within the classical era, the closest thing to a psychedelic philosophy on offer, at least in the Anglophone world. The lack of interest in psychedelic experiences within philosophy *proper* during this time, something that endures up until the present day, is remarkable.

[49] Huxley's contribution was the rather less appealing *phanerothyme* – spirit revealing.

beings reduce the complexity of lived experience, through sensory filtering, abstraction and so forth, in order to be able to countenance reality.

It is precisely in making this argument that Huxley turns to various philosophical resources to bolster his claim. Most well-known among these is his use of Bergson's much-abused "reducing valve" theory of everyday waking consciousness. In developing his argument, Huxley does not cite Bergson directly but instead the philosopher C.D. Broad, who, notably, refers to Bergson in the context of a paper on the paranormal, specifically on psychical phenomena. Broad claims (as cited by Huxley, without proper attribution), that "the function of the brain and nervous system and sense-organs is in the main eliminative and not productive" (1949: 306). Broad speculates that in fact "[e]ach person is at each moment potentially capable of remembering all that has ever happened to him and of perceiving everything that is happening anywhere in the universe" (ibid.) and that what Huxley terms a cognitive *reducing valve* (Huxley 1959: 21) is thus necessary in order to stop us from becoming overwhelmed[50] by the simultaneity of all time and space, which Huxley refers to as *Mind at Large* (ibid.). In other words, for Huxley psychedelics allow for a temporary cessation of the supposed filtering function of cognition in order for us to draw closer to a transient recognition of our metaphysical nature as "Mind at Large"; what, again, Huxley refers to as *naked existence*. He notes that

> [t]his given reality is an infinite which passes all understanding and yet admits of being directly and in some sort totally apprehended. It is a transcendence belonging to another order than the human, and yet it may be present to us as a felt immanence, an experienced participation (63).

In Huxley's most succinct formulation, which forms part of a letter to Osmond, he argues that

> the most satisfactory working hypothesis about the human mind must follow, to some extent, the Bergsonian model, in which the brain with its associated normal self, acts as a utilitarian device for limiting, and making selections from, the enormous possible world of consciousness, and for canalizing experience into biologically profitable channels (1977: 29).

Huxley even posits a rather hare-brained mechanism by which mescaline effectuates this possibility, involving the inhibition of glucose regulation enzymes.[51] This "felt immanence and experienced participation" are well-described in later work as a kind of unselfing similar to that discussed throughout this chapter. As Huxley argues, "[w]hen the shell of the ego has been

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[50] Huxley develops something close to the infamous Sapir-Whorf hypothesis here in claiming that language in part serves the function of reifying the "measly trickle of the kind of consciousness" that drips out of the other side of the "reducing valve" (1959: 21-2).

[51] Paul Marshall makes the absurdity of this argument clear when noting that "Huxley's physiological explanation has the unfortunate consequence that any substantial reduction in brain sugar level will lead to mystical and paranormal experiences. Hypoglycaemics everywhere should be falling into clairvoyant and mystical states" (2005: 239).

cracked and there begins to be a consciousness of the subliminal and physiological othernesses underlying personality, it sometimes happens that we catch a glimpse, fleeting but apocalyptic, of that other Otherness, which is the Ground of all being" (1977: 24). This Otherness consists "of the various not-selves with which we are associated – the organic not-self, the subconscious not-self, the collective not-self of the psychic medium in which all our thinking and feeling have their existence, and the immanent and transcendent not-self of the Spirit" (24-5)[52].

As regards Huxley's notions, Paul Marshall notes that debates into the underlying mind-body metaphysics implied in the notion of "Mind at Large" (a transcendent consciousness underlying material reality that can ostensibly be accessed, or at least glimpsed, in some altered states of consciousness) were very common in the late 19th century, partly due to "research into the localization of brain function and an increasing awareness of psychosomatic phenomena" (2005: 242);[53] and that "[w]hereas standard forms of materialism, Cartesian dualism, empiricism, and Kantian epistemology put severe restrictions on the reach of consciousness, other philosophies [including those of] Spinoza, Leibniz, and Berkeley amongst the earlier critics of materialist and dualist theories, or in Fechner, Mach, Bergson, James, Whitehead, and assorted idealists amongst the later critics" offered a less prohibitive view (ibid.). It seems that Huxley, in theorising the effects of the psychedelic experience, was drawn to this latter eclectic cluster of philosophers, albeit without developing a particularly rigorous argument of his own. It is also notable that in his possibly indirect (via Broad) paraphrasing of Bergson, some of the important nuance of the latter's actual position is lost. To be clear, Bergson is interested in how perception "is limited, since it should be the image of the whole, and is in fact reduced to the image of that which interests you" (2005: 40). However, it is far from clear whether this limitation, even if it can be slightly ameliorated, can ever be overcome, given that it follows from the simple fact of embodiment (which is always, as Bergson observes, "turned towards action" (179)). He underscores that "[t]he body, by the place which at each moment it occupies in the universe, indicates the parts and the aspects of matter on which we can lay hold: our perception, which exactly measures our virtual action on things, thus limits itself to the objects which actually influence our organs and prepare our movements" (ibid.). Huxley's gloss on Bergson's so-called "reducing valve" or "filtration" theory of consciousness (terms that do not appear in the work Huxley alludes to) is thus an at least partial oversimplification

[52] As will become clear in the next two chapters, these various not-selves that are part of a broader association of self have parallels in both enactivism's organic, sensorimotor and linguistic bodies as well as Simondon's various modes of individuation.
[53] Mike Jay's observation is also apposite here. As he notes, "the twentieth century's taboo on the use of drugs to explore the mind appears as a hiatus in the long pursuit of our modern selves, and the current revival of interest in them as the resumption of a much older story" (2023a: 16).

of the latter's views (as Webb 2023 makes clear). It will be discussed in a later chapter that this downplays the embodied nature of cognition; and later in the current chapter it will be shown how the idea of a "reducing valve" whose functioning is ameliorated by psychedelics, still serves a narrative function in contemporary psychedelic neuroscience – in the idea of the flattening of the brain's "energy landscape", for instance). More crucially, in Bergson and in the aforementioned motley array of thinkers upon which Huxley ostensibly draws, the antagonism between realism and idealism that is exemplified in various ways in their disparate philosophies is itself arguably ill-formed and results in large part from a misconception of, again, the fact of cognition's embodiment.[54]

Huxley also turns to more classical philosophical resources to underscore his point, in the process making a crucial observation:

> Istigkeit – wasn't that the word Meister Eckhart liked to use? "Is-ness." The Being of Platonic philosophy – except that Plato seems to have made the enormous, the grotesque mistake of separating Being from becoming and identifying it with the mathematical abstraction of the Idea. He could never, poor fellow, have seen a bunch of flowers shining with their own inner light and all but quivering under the pressure of the significance with which they were charged; could never have perceived that what rose and iris and carnation so intensely signified was nothing more, and nothing less, than what they were – a transience that was yet eternal life, a perpetual perishing that was at the same time pure Being, a bundle of minute, unique particulars in which, by some unspeakable and yet self-evident paradox, was to be seen the divine source of all existence. (Huxley 1959: 17; my emphasis)

As underscored in the above citation, Huxley is drawing attention to what was earlier discussed as individuation. Here, Huxley argues a quasi-Simondonian-Deleuzian point, claiming that Plato's view of becoming as the reality of the everyday and Being as a separate transcendent domain of Ideality is misplaced and that the two are in fact a single immanent domain of self-unfolding.[55] Huxley reinforces this, in a manner again resonant with our earlier discussion, by saying of the intensification of visual impressions under psychedelics that "the eye recovers some of the perceptual innocence of childhood, when the sensum was not immediately and automatically subordinated to the concept" (1959: 23). He also notes the affective nature of the psychedelics experience, observing that attention in this state is drawn to intensive properties like colour as opposed to extensive ones like "masses, positions and

[54] On the idealism side, the early nitrous oxide researcher Humphry Davis provides perhaps the limit case of this line of thinking when he pronounces, following an experience with the mind-altering gas, that "[n]othing exists but thoughts! The universe is composed of impressions, ideas, pleasure and pains!" (1800: 489).

[55] For Simondon and Deleuze, as will be discussed in the final chapter, the matter is differently inflected, albeit much to the same ends: being is a single phase of becoming as a deeper yet immanent reality. The individuated, on this view, is merely a snapshot of individuation, which nonetheless inheres in the individuated as pre-individual charge.

dimensions" (25). In other words, "the so-called secondary characters of things are primary" (ibid.), these characters being the kinds of properties understood as gradients, continua, diffuse distributions and so forth as opposed to those understood as more metric and taxonomic. Thus, "[i]n the mystical consciousness of being at one with infinite Oneness, there is a reconciliation of opposites, a perception of the Not-Particular in particulars, a transcending of our ingrained subject-object relationships with things and persons; there is an immediate experience of our solidarity with all being" (Huxley 1977: 255). This distinction maps closely to that between the individuating and the individuated.[56] Related to this, what Huxley is arguing for with his notion of *naked existence* also seems similar to the classic Husserlian notion of bracketing, i.e., the stilling of the conceptual-abstractive apparatus of thought so that experience *as such* is foregrounded.[57] Unlike Huxley, Husserl was not arguing that bracketing, or epoché, affords some sort of unmediated access to the world *as it is*, but was instead making the more subtle point that through this practice we can gain a stronger sense of *phenomena* as *they* are, i.e., shorn of the "natural attitude" that usually conforms experience to a habitually inculcated conceptual architecture. With this important proviso in mind, here is Huxley putting forward a distinctly phenomenological position as regards the "antipodes of the mind" – those kinds of conscious experience furthest from the everyday:

> At the antipodes of the mind, we are more or less completely free of language, outside the system of conceptual thought. Consequently our perception of visionary objects possesses all the freshness, all the naked intensity, of experiences which have never been verbalized, never assimilated to lifeless abstractions. Their color (that hallmark of givenness) shines forth with a brilliance which seems to us preternatural, because it is in fact entirely natural – entirely natural in the sense of being entirely unsophisticated by language or the scientific, philosophical and utilitarian notions, by means of which we ordinarily re-create the given world in our own drearily human image. (Huxley 1959: 77)

If Huxley's view is tempered by understanding it as advocating a kind of psychedelic epoché, and if this is combined with his account – shared by many psychedelic interlocutors of the individuative dynamics of the psychedelic experience – he might be seen as proposing, albeit ad-hoc, the use of psychedelics as affording insight into phenomenality in its coming to be. Thus, it may be seen as revealing the individuation of experience[58] and, by extension, some of the mechanisms by which this experience comes to be reinforced, and which are amenable to potential modification. In his own words, psychedelics afford "a glimpse of something

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[56] Similarly, Huxley observes of his experience that "[t]he mind was primarily concerned, not with measures and locations, but with being and meaning" (1959: 19).

[58] This view, as I will explain in the final chapter, is susceptible to what Deleuze describes as the tracing of the transcendental from the empirical, something he accuses Kant of, but which is also the case, to some extent anyway, in Husserl (as pointed out in, for instance, Wambacq 2018).

transcendent to the world of everyday experience – that narrow, utilitarian world that our self-centered consciousness selects from out of the infinite wealth of cosmic potentialities" (Huxley 1977: 121). In order to catch such a glimpse, "[w]e have only to cut a hole in the fence and look around us with what the philosopher, Plotinus, describes as 'that other kind of seeing, which everyone has but few make use of'" (253).

2.6 Alan Watts: the mystic

This "other kind of seeing" which psychedelics promised to facilitate, was pursued with great enthusiasm by the post-war generation in the so-called global North. Many of its advocates resorted to bricolaged appropriations of Eastern mysticism – Daoism, Zen Buddhism, Tibetan Buddhism, Hinduism and so forth – in order to make sense of psychedelic experiences and to proselytise a worldview they viewed as coming to replace the logics of industrial capitalism, Enlightenment rationality, the culture industry and so forth. These logics were seen in many quarters as underlying the horrors of 1939-1945 and the alienation of industrial society more generally (Adorno and Horkheimer 1972).

Leary and Alpert aver in their introduction to Alan Watts's *Joyous Cosmology*, one of the classic texts of first-wave psychedelic literature, that "we have finally been forced back [by the psychedelic experience] on a language and point of view quite alien to us who are trained in the traditions of mechanistic objective psychology … the non-dualistic conceptions of Eastern philosophy, a theory of mind made more explicit and familiar in our Western world by Bergson, Aldous Huxley, and Alan Watts" (Watts 1962: xiii).[59] It should be clear from the mention of these Western figures, however, that this was a syncretic adoption of Eastern philosophy that sought to weave it together with emerging perspectives in physics, the life sciences and the sciences of the mind that appeared to subvert was what viewed as a dated, mechanistic Cartesian worldview. Watts argues that this "science is now delineating a new concept of man, not as a solitary ego within a wall of flesh, but as an organism which is what it is by virtue of its inseparability from the rest of the world" (xvii). Watts is exemplary of the complex interplay between metaphysics and science – often crudely cast in the tropes of the time as timeless Eastern spirituality meets modern Western scientific innovation – that was a prominent feature of theorising around psychedelics during the first wave. On the one hand, he had studied theology and was well-versed in various Eastern spiritual practices, most notably Zen Buddhism, while on the other he was an enthusiastic participant in the nascent dialogues on cutting-edge fields like information science and cybernetics that were taking place in hybrid

[59] It is worth noting here, however, that Huxley was pursuing this line as early as 1945's *The Perennial Philosophy*, a text that predates his experiences with psychedelics.

spaces like the Esalen Institute (the ground zero of the “human potential movement”) at the time.

This resulted in Watts developing a philosophical perspective that, in its materialism and immanence, had some prototypical features of both autopoiesis and Simondon’s critique of hylomorphism (transcendent form imbuing inert matter with capacity). This perspective functioned at the points of intersection of nontheistic and non-dualistic forms of spirituality, the self-regulating systems of cybernetics and the psychedelic experience. The critique of *hylomorphism* – although Watts does not use this term – is especially important in his development of an account of consciousness compatible with naturalism. I will elaborate on this concept in the final chapter, but it can be provisionally thought of as the imbuing of passive matter with transcendent form. In this regard Watts rails against the view that matter is inert and “seems to require an external and intelligent energy to give it form” and argues instead that, “[w]hether it is organic or inorganic, we are learning to see matter as patterns of energy – not of energy as if energy were a stuff, but as energetic pattern, moving order, active intelligence” (Watts 1962: 3). This has serious implications for his theory of mind. He argues that:

> We thought of our conscious intelligence as descending from a higher realm to take possession of a physical vehicle. We therefore failed to see it as an operation of the same formative process as the structure of nerves, muscles, veins, and bones – a structure so subtly ordered (that is, intelligent) that conscious thought is as yet far from being able to describe it. This radical separation of the part controlling from the part controlled changed man from a self-controlling to a self-frustrating organism, to the embodied conflict and self-contradiction that he has been throughout his known history. Once the split occurred conscious intelligence began to serve its own ends instead of those of the organism that produced it. More exactly, it became the intention of the conscious intelligence to work for its own, dissociated, purposes. But, as we shall see, just as the separation of mind from body is an illusion, so also is the subjection of the body to the independent schemes of the mind. (Watts 1962: 5)

Watts’s critique of Cartesian dualism and its consequences, is clear: by denying embodiment or in viewing the physical and organismic as passive recipients of control by a transcendent, disembodied intelligence[60], we dismiss the radical self-forming and emergent potential of matter in a way that ends up alienating us from what gives rise to consciousness in the first place: ongoing formative processes and material dynamisms. Watts is unwavering on this, underscoring that “[t]he world is not *formed* as if it were inert clay responding to the touch of a potter’s hand; the world is form, or better, formation, for upon examination every substance

[60] Interestingly, Watts also anticipates extended cognition in the course of this argument, observing that “the ingrained prejudice that the mind should be independent of all physical aids to its working —despite microscopes, telescopes, cameras, scales, computers, books, works of art, alphabets, and all those physical tools apart from which it is doubtful whether there would be any mental life at all” (1962: 5).

turns out to be closely knit pattern" (Watts 1961: 141). Thus, "[d]ivided matter and form becomes unified pattern-in-process" (Watts 1962: 85). This maps closely to the original cybernetic position, which is that systems can viably function via endogenous, self-regulating processes that do not require any external operator. This hybrid cybernetic-anti-hylomorphic view is the basis of Watts's thinking about psychedelics, of which he famously argued that "[i]f they are an affront to the dignity of the mind, the microscope is an affront to the dignity of the eye and the telephone to the dignity of the ear" (Watts 1962: 20). In this regard, it is worth examining Watts's description of psychedelics at length.[61] While he spends less time than Huxley and others framing the experience in terms of the classic death-rebirth structure, his work can be seen as an attempt to cast the underlying principles of ongoing creative dynamism and transformation in more naturalistic terms, and in this Watts is both an exemplary process philosopher and a forerunner, as will become clear, to enactivism.

In describing experiences with LSD and other substances, Watts begins by offering a more circumspect take on "filtration theory", suggesting simply that the novel forms of consciousness obtained using psychedelics are "probably the way things appear when certain inhibitory processes of the brain and senses are suspended" (23),[62] but his interest is drawn primarily to the spatiotemporal qualities of such experiences, as well as the complex imbrications of mind, body and world they limn. Discussing LSD for instance, Watts observes that it "makes me peculiarly aware of the musical or dancelike character of the world, bringing my attention to rest upon its present flowing and seeing this as its ultimate point" (1962: 142-3). However, he immediately complicates matters by stating that "I have also been able to see that this point has depths, that the present wells up from within itself with an energy which is something much richer than simple exuberance" (143). By "something much richer" Watts is referring to the complex, nested rhythmic patterns that constantly reproduce the world. In his pithiest summation, "the pattern itself is intelligence" (1961: 146). The process-centric and anti-hylomorphic nature of this view is further foregrounded when Watts observes that "the agent behind the action is simply the prior or relatively more constant state of the same action" (142). In proto-enactive language, Watts explains that "[t]he organism and its surrounding world are a single, integrated pattern of action in which there is neither subject nor object, doer

[61] The matter is slightly complicated by the fact that Watts sometimes discusses non-psychedelic states of consciousness, i.e., consciousness in general, in similar language, so it is not always clear when he is discussing psychedelics specifically. For this reason, I have hewn closely to the texts that are presented as explicitly about psychedelics.

[62] Indeed, Watts remains ambivalent about filtration theory: "was the effect of the LSD in my nervous system the addition to my senses of some chemical screen which distorted all that I saw to preternatural loveliness? Or was its effect rather to remove certain habitual and normal inhibitions of the mind and senses, enabling us to see things as they would appear to us if we were not so chronically repressed?" (1961: 144-5)

nor done to" (Watts 1962: 62). In other words, this is a philosophy of events, wherein "it is only a somewhat clumsy convenience to say that present events are moved or caused by past events, for we are actually talking about earlier and later stages of the same event" (ibid.), and it incorporates what was at Watts's time a cutting-edge language of science as "increasingly a language of process – a description of events, relations, operations, and forms rather than of things and substances" (140).

Conscious experience emerges within this world of processes and events as a kind of recursive process of self-world mediation in which these terms are reciprocally defined;[63] in which "[b]rain and world, warp of sense and woof of meaning, seem to interpenetrate inseparably" (Watts 1962: 33 and in which "I am not looking at the world, not confronting it; I am knowing it by a continuous process of transforming it into myself, so that everything around me, the whole globe of space, no longer feels away from me but in the middle" (29). This notion of "in the middle" will be familiar to readers of Deleuze and Guattari. In their famous rhizome chapter, the pair discuss how individuative tensions, differences between differences, are resolved in resulting terms or distinctions and thus how it is *in the middle* that everything occurs (1987: 3-25).

For Watts then, as for the authors of *A Thousand Plateaus*, the subject distinction is the provisional resolution of a self-differing difference and self and world are reciprocally defined as part of this process of individuation. Watts argues that "[o]rdinary thinking conceals polarity and relativity because it employs terms, the terminals or ends, the poles, neglecting what lies between them" (Watts 1962: 48).[64] For Watts, psychedelics afford access to what he terms a *superconscious state,* in which consciousness is *in the middle*, in the sense of a viviscence or unmediated *living* of the creative dynamisms giving rise to ongoing life and the reciprocal selfing-worlding processes that form part of this. In remarkably psychedelic language, Watts says that during an experience like this, "my individual being seems to grow out from the rest of the universe like a hair from a head or a limb from a body" (65).[65] Similarly, in the psychedelic state, it becomes evident that "[t]ables are tabling, pots are potting, walls are walling, fixtures are fixturing – a world of events instead of things" (69).

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[63] "Does the order of the brain create the order of the world, or the order of the world the brain? The two seem like egg and hen, or like back and front" (Watts 1962: 30).

[64] Watts presents an interesting argument in this regard, suggesting that under the influence of psychedelics, the figure-ground gestalt discussed in phenomenology – typified by the famous duck-rabbit visual illusions that can only be perceived in one way at any given time – gives way to multiple simultaneous perceptions that in turn suggest a sensory awareness of preindividual dynamism (Watts discusses seeing a face as being all ages at the same time, for instance (1962: 34)).

[65] "The sure foundation upon which I had sought to stand has turned out to be the center from which I seek. The elusive substance beneath all the forms of the universe is discovered as the immediate gesture of my hand" (Watts 1962: 69).

Generally speaking, Watts's position is that the world is an ongoing process of becoming, one that he describes in vividly cybernetic language as "an electronic interweaving of paths, circuits, and impulses that stretch and hum through the whole of time and space" (55), and that this fact, which is on his view oftentimes obscured due to centuries of Cartesian indoctrination and identitarian metaphysics, becomes vividly self-evident in the psychedelic state. Like various other thinkers in the first wave of psychedelics research, then, Watts proposes that these substances provide access to a space of increased individuative potential. He differs, however, in the extent to which he grounds this view in a contemporary, scientifically informed philosophy of nature and suggests that this individuative domain is an ontological feature of reality itself as opposed to just a particular state of consciousness. Watts, said plainly, derives a process *metaphysics*[66] that is partly inspired by psychedelic experience as well as deeply inflected by the conversations that were happening in various scientific fields at the time. In this metaphysics, the diffuse, self-transforming contours of which were, on his view, psychedelically limned. He sought, finally, "the revelation of a unified cosmology, no longer sundered by the ancient irreconcilables of mind and matter, substance and attribute, thing and event, agent and act, stuff and energy" (94). As will be argued in subsequent chapters, this "unified cosmology" is in large part the metaphysics which Simondon and Deleuze sought to develop.

2.7 John Lilly: the scientist

While the influence of cybernetics is evident in various places in Watts's work, a view bolstered by his biography, it is fundamental to that of the maverick scientist, dolphin communicator and ketamine enthusiast John C. Lilly. This is clearly visible in his best-known book, an instruction manual for the use of LSD titled *Programming and Metaprogramming in the Human Biocomputer* (1972)[67] that Leary once referred to as "the Principia Psychologica of the Cybernetic Age" (Lilly 1997: 5). Lilly, who spent a number of years working the National Institute of Mental Health (NIMH) as a research neurophysiologist, during which time he invented the sensory deprivation tank, was profoundly taken by the work of the cyberneticians. One of his earliest publications (Lilly 1953) is a review of Ross Ashby's seminal *Design for a Brain*, and Lilly's archives[68] contain a wealth of correspondence with second-order cybernetics

[66] This metaphysics is also non-teleological: "[i]t is a dancing present—the unfolding of a pattern which has no specific destination in the future but is simply its own point. It leaves and arrives simultaneously, and the seed is as much the goal as the flower" (Watts 1962: 27).
[67] The book has been republished several times with the shorter title *The Human Biocomputer*. Remarkably, it was originally written as a research report to the NIMH, a government agency.
[68] See https://oac.cdlib.org/findaid/ark:/13030/c8th8s31/entire_text/ for an online catalogue of the John C. Lilly Papers.

figures like Heinz von Foerster and Francisco Varela.[69] In fact, Bruce Clarke argues that "Lilly also homed in on crucial epistemological renovations with a constructivist redescription of cognition that may have influenced and motivated his colleague von Foerster's more renowned formulations" (2014: 3), suggesting that Lilly was perhaps, like Gregory Bateson, an instrumental figure in the shift from first-order to second-order (reflexive) cybernetic systems theory.[70] Such a view is borne out by Lilly's discussion of the recursive nature of consciousness in books like *The Dyadic Cyclone*, where he notes that "I am realizing that the observer is a participant, is part of the system that he is observing and that he is feeding back upon himself in order to generate transitions" (XXX: CIT). Generally speaking though, Lilly "conceptualized the mind and brain as feedback-controlled systems through computational metaphors and systems of quantification from cybernetics and information theory" (Shiga 2013). Lilly's presentation of these views is oftentimes hyperbolic; a representative statement of his views on consciousness is that "[a]ll human beings, all persons who reach adulthood in the world today are programmed biocomputers … each of us may be our programs, nothing more, nothing less" (Lilly 1972: viii). In human beings, these programs form a recursive, multi-levelled network of operations that, at a critical threshold of organisational complexity, gives rise to an emergent property known as a *metaprogram*, i.e., a program that allows for the simultaneous (parallel) control of large numbers of individual programs. As a further complexity threshold is breached, Lilly argues, the classic cybernetic figure of the steersman, Kubernetes, emerges. In his words, "[a]s out of several hundreds of thousands of the substrate programs comes an adaptable changing set of thousands of metaprograms, so out of the metaprograms as substrate comes something else – the controller, the steersman, the programmer in the biocomputer, the self-metaprogrammer", and in fact "[m]ost of us have several controllers, selves, self-metaprograms which divide control among them, either in time parallel or in time series in sequences of control" (x).[71]

Much of Lilly's work, in the *Metaprogramming* book and elsewhere, consists of detailed descriptions of the operating logic of various programs and, crucially, how one can, with the aid of psychedelics, gain an expanded awareness of these programs and their modes of operation – how one can become a better metaprogrammer, in other words. Lilly acknowledges that this metaprogramming takes place within a context. He refers, for instance,

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[69] Both of whom had experiences in Lilly's sensory deprivation talk, as detailed in Lilly 1977.

[70] Cybernetics, a field borne out of mid-20th century information theory and early computer science, regarded all systems, including living ones, as entailing negative feedback loops of self-regulation, essentially conceiving of everything from thermostats to brains to societies along these lines. So-called second-order cybernetics sought to nuance this by recursively situating the observer within the above-mentioned feedback loops.

[71] Interestingly, and in a perhaps fraught manner, Lilly regards the consolidation of these multiple self-metaprograms as a healthy form of self-development (1972: x).

to supraself metaprograms beyond the scope of an individual subject (ibid.), although he takes the metaphysically dubious step of conferring a kind of "entity" status to some of these,[72] and he also observes that the biocomputer that is the mind, is embodied; and this embodiment poses strict physical limits. These limits, however, apply primarily to the body itself – the mind is able to transcend whatever limitations – of belief, for instance – it encounters, with the result that, in Lilly's oft-cited phrase, "[i]n the mind, there are no limits" (xii). It is precisely an exploration of the limitless potentials of the mind, albeit a mind construed via an unwarranted reliance on the symbolic computing of the time,[73] that Lilly aims at in his work. As he says, his interest is "in the processes of finding metaprograms (and methods and substances) which control, change, and create the basic metaprograms of the human computer" (5).

This is where psychedelics become relevant. Lilly develops an essentially cybernetic, information-theoretical account of psychedelic action on the brain, arguing that these substances increase the amount of noise (in the information-theoretic sense of signal to noise ratio). This increase is "not enough to destroy all order, only enough to superimpose a small creative 'jiggling' on program materials and metaprograms and their signals," adding "enough uncertainty to the meanings to make new interpretations more probable" (81).[74] One target of this existential "jiggling" is the self-model or ego itself, which means that new forms of self-identification and patterns of behaviour can be individuated, through the kind of ontological loosening I have been discussing throughout this chapter. As Lilly suggests, in the classic death-rebirth-transformation language we are by now used to:

> In a sense an LSD session can be metaphorically called a "pupation" period. The caterpillar forms the cocoon and then proceeds to total reorganization as a pupa. Only after a period of apparent disorganization and reformation can the butterfly form. After the butterfly is formed, it must rest and realize its being as a butterfly. It has moved from a crawling existence to a flying existence and before it can fly it must become dry, allow its wings to spread and form itself. The LSD session itself is the pupation, the period of organized disorganization, in which things are moving around with a fluidity and a plasticity that one normally does not experience. (Lilly 1973: 28-9)[75]

There is a tension in Lilly's metaprogrammatic account: in describing the brain, he makes use of blunt, straightforward metaphors from computing (for instance, the mind is the software, the

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[72] Indeed, in some cases a kind of *archetypality*.
[73] The influence of the computer revolution of the 1950s on models of consciousness, which persists to this day, will be discussed at length in the chapter on cognitive science and enactivism.
[74] In language that will become clearer in subsequent chapters, when we discuss the free energy principle and the anarchic brain hypothesis, psychedelics thus partially *flatten the energy landscape*.
[75] Lilly is aware of the role of the psychedelic therapist – or at least careful preparation – here; as he notes, "[u]nless some direction is put into this process of pupation, one can be uncertain as to how one will come out: still a caterpillar, or some monstrous combination of caterpillar and butterfly, or as a butterfly" (1973: 29).

brain is the hardware). When discussing altered states of consciousness and their transformative potential, however, he makes frequent recourse to more figurative domains, from the lifecycle of butterflies to encounters with cosmic entities.[76] This dynamic interplay between process and product – between individuating and individuated goes at least as far back as Spinoza's *natura naturans* and *natura naturata*, and finds contemporary articulation in Simondon's discussion of prephased being and Deleuze's prioritisation of becoming over being. It has consequences for how we think about consciousness and the ways in which consciousness and, more specifically, the effects of psychedelics – and other transformative experiences – on consciousness.

It appears that even though the idiosyncratic language Lilly uses in detailing the psychedelic experience is starkly different from that of Huxley or Watts, and even though he borrows far too heavily from computer metaphors,[77] leading to an uneasily quasi-functionalist view of consciousness, his account is fundamentally compatible with the individuative one that I have been mapping across multiple disparate contexts, from Jivaro ayahuasqueros to 20th century psychotherapy. There are, however, serious implications entailed in the use of the kinds of computational approaches to understanding consciousness that were in vogue in the 1950s and 1960s. The consequences of these approaches are evident in the still-dominant functionalist-computationalist-representationalist model of cognition that will be explored in subsequent chapters, including in its most cutting-edge contemporary articulations in the various Bayesian approaches to the brain,[78] which see cognition as in the business of predictively modelling and adapting to the contexts in which it finds itself. This is seen anticipated in Lilly's cybernetic view of the brain, in which, "[l]ike a computer programmed to simulate a real-world process, that brain generates models for the mind to use, and at times, misuse" (Clarke 2014: 7).[79] Not least among the implications is a kind of computationalist

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[76] Lilly's bizarre engagements with a range of cosmic and supernatural non-human entities are described at length in *The Scientist* (1997).

[77] To be fair, Lilly was also trained in psychoanalysis (by Robert Waelder, who had in turn trained with Anna and Sigmund Freud), and did originally try to describe his sensory deprivation tank experiments in psychoanalytic terms, e.g., as ego regression, but "came to reject this psychoanalytic language in favour of his own cybernetic framework of programming, arguing that psychoanalytic theory provided inadequate models for understanding the complexity of consciousness when exploring the isolated mind" (Williams 2019: 99).

[78] Active inference, predictive processing and so forth.

[79] As Clarke notes, this informed Lilly's view of the hallucinations he experienced in his sensory deprivation tank: "[i]n Lilly's cybernetic idiom, and especially as induced by immersion within an isolation tank, hallucinations are particular projective phenomena that compute internal models of outer things and then insert them into a larger model of the mind's external environment" (2014: 8-9). It is notable in this regard that Lilly refers to Berkeley and Kant, i.e., to various forms of idealism, as major influences on his work; as will be discussed further on, we can see variations on this idealist impulse, e.g., strong noumena-phenomena distinctions, albeit in weaker forms, in a fair amount of contemporary cybernetics-inspired cognitive science, in which the brain is viewed as statistically separated from its environment by so-called *Markov blankets* – a contemporary gloss on the Kantian schematism.

hubris; the sense that any residual limitations we have in our understanding of the world are in some way computationally tractable – a view that inarguably underlies a huge amount of Silicon Valley hype and which is visible in some of Lilly's more brazen statements. For instance, modifying Wittgenstein's famous conclusion to the *Tractatus*, Lilly restates the closing line as "[o]f that which we cannot yet speak, we remain silent *until a new experience or way of expression allows us to speak*". He argues that the problem was simply that "Wittgenstein did not have either later neurophysiological knowledge nor the later knowledge of computers, each of which directly opens the domains expressible in new languages" (1977: 75-6).[80] To assuage any doubt about the extent to which the computational metaphor inflected Lilly's thinking, one of his most unequivocal statements on the matter, from a book published several decades after the seminal *Metaprogramming*, is quoted below:

> The human brain, a living computer with unknown properties. A biocomputer. Its properties only dimly understood. Its programs for fear, for anger, for love, for pleasure, for pain built into its structure, its circuitry. Circuits for all these feelings are primitive, inherited in the genetic code. The mind is the software of that biocomputer. The observer located in that brain is the result of the brain's computations. As pain and pleasure are inalterably linked in the biofeedback of the brain with the body, so is the observer computed in the large cerebral cortex. The observer is a programmer resident in the brain. The programmer is the agent within the brain. The self is the operator contained within the brain in self-reflexive circuitry in the cerebral cortex. Is the self immersed in the brain anything more than the computed result of the brain's software? Is the mind anything more than the computational activities of that brain? (Lilly 1997: 126)[81]

I noted earlier that Lilly's view is, despite its reliance on computationalism, broadly compatible with the individuative view. It may remain unclear why this is the case. However, a closer reading of Lilly's discussion of the transformative aspects of metaprogramming reveals significant overlaps with the death rebirth model, albeit articulated within his distinct phraseology. Indeed, Lilly, in offering a more scientific gloss to this model, and one that is more aware of the potential dangers of metaphysical excess,[82] gets close to the kind of dynamic systems theory account discussed in the following chapter. For instance, metaprogramming

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[80] Lilly makes this claim within a broader – and admittedly commendable – observation about the contingent limits of scientific understanding, but the computationalist hubris remains clear in his use of the functionalist language of constructor-descriptors and simulations: "[e]xperimental science somehow seems to topple previously expressed absolutes about reality, about meaning, about language, about perception, about cognition, about creating descriptions of minds with limits, specified by the constructor-descriptor. The limits defined are only in the description used, in the simulations of the mind doing the describing." (1977: 76)

[81] This even influences Lilly's views on interspecies communication, which he pioneered with his dolphin research in the 1970s. Here is Lilly articulating the salient problems with this interspecies communication: "He also has to achieve a common program universe and a common data universe with us" (1975: 259).

[82] As Lilly warns, "[f]eelings of awe, reverence, sacredness and certainty are also adaptable metaprograms, attachable to any model, not just the best fitting one" (1972: xi).

is described as the “exploration of n-dimensional spaces and finding key points for transformations” (1972: 60); a “hunt for those discontinuities in the structure of the thinking which reveal a critical turn-over point at which one can exert emotional energy so as to cause a transformation in all of that region” (ibid.); and a description that elicits the idea of bifurcations – dramatic redistributions of tendencies and potentials – in topological phase spaces that is one of the conceptual underpinnings of dynamic systems theory. Applying this kind of exploratory approach,[83] Lilly describes an experience where:

> the subject found old models in himself (old programs, old metaprograms, implanted by others, implanted by self, injected by parents, by teachers, etc.). He found that these were disparate and separate autonomous beings in himself. He described them as a noisy group. His incorporated parents, his siblings, his own offspring, his teachers, his wife seemed to be a disorganized crowd within him, each running and arguing a program with him and in him. While he watched, battles took place between these models during the experiment. He settled many disparate and nonintegrated points between these beings and gradually incorporated more of them into the self-metaprogram. (Lilly 1972: 47)

While not quite the mythic, archetypal drama described by other psychedelic interlocutors (although Lilly’s encounters with various “supra-self metaprograms” like universe-scale solid state computers suggest their own archetypal properties), and while his work is strongly grounded in a *psycholytic* as opposed to *psychedelic* therapeutic paradigm, it does seem clear that the underlying principle is largely the same: through reviviscence – in Lilly’s case, a reviviscence with a highly technological aesthetic sheen – one is able to traverse and redistribute a turbulent psychodynamic domain of strongly inculturated habits and tendencies as part of a process experienced as an at least partial unselfing and re-selfing.

In closing, one crucial proviso is that Lilly was at least equally interested in an open-ended exploration of the possibilities of psychedelically-altered consciousness. For him, psychedelics were as much experimental tools for the navigation of potential futures as they were mechanisms for the debugging and rewriting of the programs inherited from the past that constrained the present. This pioneering zeal was shared by a figure who has not been mentioned much so far but who is undoubtedly the single person most commonly associated with the first wave of psychedelics research: Timothy Leary, the so-called *guru* of the hippie counterculture and an enthusiastic proselytiser of the psychedelic experience. However, Leary is a figure whose work I will not be discussing. There are several reasons for this. On the one hand, his chosen conceptual framing for the psychedelic experience is near-identical to Lilly’s, relying heavily on computer metaphors and technoscientific enthusiasm. In addition, while

[83] In Lilly’s parlance, this kind of exploration entails the adoption of a provisional “metatheoretical” model or worldview, the consequences of which are then explored.

Leary, along with Richard Alpert and Ralph Metzner, did write a book (1964) describing the psychedelic experience as a classic drama of death and rebirth – in fact the entire book was based on the *Tibetan Book of the Dead* – and often describes experiences of reviviscence on evolutionary and cosmic scales, he is best understood as a psychedelic populist and libertarian political figure, and not as contributing in any substantial way to *philosophical* thinking about the effects of psychedelics on consciousness. Leary produced many great slogans in the 1960s, and his relatively consistent naturalism and enthusiasm for the life sciences during a period of mystical excesses is to be commended, but it is near-impossible to separate the polemic from the careful thinking in his work, which is prone to hyperbole and, in some cases, intellectual dishonesty. For these reasons, Leary is not particularly useful in developing the current account. I therefore pass over him in silence.

2.8 Meanwhile, on the mainland

> Space full to overflowing, space of gestation, space of transformation and multiplication; teeming space, which, even if it were only an illusion, would give better account than ordinary sight of what the Cosmos is. (Michaux, 2001: 679; cited in Davis 2023)

As a penultimate task in this chapter, I will turn briefly to mainland Europe, which, as Erika Dyck has recently argued (Dyck and Elcock 2023), is often forgotten in accounts of the classical era of psychedelics research. In this regard, the history of psychedelics is often told in a manner that centres the US (and to some extent the UK), exoticises various indigenous cultures and elides contributions from other parts of the globe. There are undoubtedly myriad underexplored histories of – and philosophical reflections on – the psychedelic experience still to be properly engaged with by Anglophone scholars. France is especially interesting in this regard. While French clinical research into psychedelics during the classic period was of a relatively modest nature, some of the most interesting thinking around psychedelics, sometimes by serious philosophical figures[84] like Merleau-Ponty, took place in France in the 20th century. Szummer *et al*. note that “Sartre tried mescaline, and Maurice Merleau-Ponty followed his path a decade later. Bergson, Marcuse, and Foucault also proposed psychedelics as a reasonable means to expand the limits of the mind, albeit Bergson never used them” (2017: 55). They also observe that Merleau-Ponty discusses mescaline in several different contexts in *The Phenomenology of Perception* (2012), specifically when discussing “the phenomenon of hallucination, the sense of space, and the phenomenon of synesthesia”

[84] Peter Sjöstedt-Hughes has alluded to some of this work in his invaluable attempt to map a subterranean psychedelic influence across the history Western philosophical history (2015; 2016), although turning to the original work he cites sometimes reveals a less vivid picture than the one he paints.

(Szummer *et al.* 2017: 58). Unfortunately, however, Merleau-Ponty himself never appears to take up the full consequences of psychedelic experience for phenomenology, framing these substances in a mostly pathological way as inducing psychosis and perceptive distortions. Although such altered experiences have import when reflecting on, as Merleau-Ponty does, on, for instance, the difference between the lived and living body, he does not attribute any particularly positive or transformative properties to them – they are interesting examples of different states of phenomenological consciousness, but not states with any inherent depth or profundity. Despite this, Szummer *et al.* argue that psychedelics can in fact reveal what Merleau-Ponty calls "wild being". In their words, "[p]sychedelics suspend the suppressive effect of the routines of the normal state of mind", due to which "a flood of meaning can disengage, revealing the structure of "wild world": the orgiastic connections of notions, feelings, bodily sensations, memories, and stimuli from the outside world become metaphors embracing each other" (61). This wild world is, for Merleau-Ponty, "a space of transcendence, a space of incompossibilities, of explosion, of dehiscence, and not … objective-immanent space" (1968: 259). At the very least, however, he does allow for the possibility that psychedelics, mescaline specifically, can bring about "the solidarity between man and the world, which is not abolished but repressed by everyday perception or by objective thought, and which philosophical consciousness rediscovers" (Merleau-Ponty 2012: 344). While Merleau-Ponty himself does not make much of psychedelics, however, his phenomenological work is a major influence on the enactive school of cognition discussed in subsequent chapters, and which forms a substantial part of the philosophical account of psychedelic experience I develop in the final chapter. Thus, I will return to him, albeit largely indirectly.

While traces of a psychedelic influence are scant in Merleau-Ponty, they are even less evident in Sartre, even when factoring in the latter's infamous mescaline experience, after which he hallucinated crabs following him for a period of several months. While some have argued that said psychedelic experience was a profound influence on Sartre's classic text *Nausea*, and that they may even have woven themselves into *Being and Nothingness* (e.g., Riedlinger 1982), the evidence is exceedingly flimsy and, if anything, the ostensibly largely negative nature of his mescaline trip is probably something Sartre would have rather forgotten. The case of playwright Antonin Artaud, a major influence on Deleuze and Guattari's concept of the *Body without Organs*, which is their mostly explicitly psychedelic concept (as we be seen in the final chapter), is more interesting. In *The Peyote Dance* (1976), Artaud writes about how he travelled to Mexico in 1935, which resulted in him spending a fair amount of time among the Tarahumara or Rarámuri, an indigenous culture in the region who regularly used mescaline in a ritual context. Artaud describes his observation of – and participation in – several such rituals, including the Rite of Ciguri, a creation ritual in which the mescaline experience

“explains how things are in the Void and how the Void is in the Infinite, and how they emerged from it into Reality, and were made” (30). This emergence has a narrative structure that should by now be familiar: that of “reawakening, then of destruction, and finally of resolution in the sieve of supreme surrender” (19). Indeed, in a classic instance of cosmic reviviscence, “after passing through the ALL, that is the many, which is matter, one returns to the simplicity of the one, which is Tutuguri or the Sun, only to dissolve and be reborn by means of this process of mysterious reassimilation” (ibid.). Artaud, notoriously, suffered from serious psychological ill-health after this period, spending the rest of his life in and out of psychiatric institutions, and an understandably commonly held view is that psychedelics contributed to this. It is impossible to know whether this is the case, and his account of his experience in Mexico is in fact remarkably clear, even if tinged with a sense of paranoia and foreboding. It is distinctly possible that mescaline triggered a psychotic break, but it could also be the case that Artaud just lacked a context in which he could successfully integrate a profound and difficult set of existential unravellings. Regardless, he remained lucid enough to write down one of the most pithily affective descriptions of individuation and the pre-individual, in a manner that captures something close to ineffable about the psychedelic experience:

> For there is in consciousness a Magic with which one can go beyond things. And Peyote tells us where this Magic is, and after what strange concretions, whose breath is atavistically compressed and obstructed, the Fantastic can emerge and can once again scatter in our consciousness its phosphorescence and its haze. And this Fantastic is of noble quality, its disorder is only apparent, it really obeys an order that is fashioned mysteriously and on a level which normal consciousness does not reach but which Ciguri allows us to reach, and which is the very mystery of all poetry. (Artaud 1976: 39)

Undoubtedly the most poetically trenchant accounts of mescaline, however, are those of the final figure I will discuss in this section, the Belgian writer and artist Henri Michaux. Michaux wrote extensively about his psychedelic experiences in several books that are little-known outside the Francophone world. Michaux is near-unique in that he refuses to submit to what he regards as the more seductive properties of mescaline and other substances, retaining an air of critical distance even when in the throes of profoundly altered states of consciousness – a cultivated cynicism perhaps inspired by his friendship with the arch-pessimist philosopher Cioran. Michaux’s first sustained discussion of mescaline is in 1956’s *Miserable Miracle* (1972), and the tone of his engagement is encapsulated in his attestation that “I was the fireworks that despises the pyrotechnist, even when it can be proved that it is itself the pyrotechnist” (6). Yet, despite the largely unenthusiastic tone Michaux takes here and elsewhere when relaying experiences that others are more likely to articulate in glowing spiritual tones, his description of what I have begun outlining as psychedelic individuation is unsurpassed. He begins by describing the “[p]henominal [sic] swarmings of possible things

that want to be, are hurrying, are imminent" (9) at the inception of the mescaline experience, conveying a sense of the enhanced space of transformative potentiality to which psychedelics afford access. For Michaux, this is a profoundly unpleasant sensation, but also just a precursor to the unselfing that is to follow – the "thousand shatterings" wrought by the "tongues of infinity" as Michaux is overrun by a "multitude of liquid lines" (11):

> Through me, the sea undulates. Torture of undulation. Breaking against nothing. Torture of what is unstable, of what is impermanent, torture of being tickled by iridescence. I am being hollowed out … There is the fact of its being torrential, there is the fact of its plunging headlong, there is the fact of its bursting (ibid.).

Michaux's description is especially useful for a naturalist account of the psychedelic experience because of his refusal to render this experience in mystical terms. His trip is an eminently secular one,[85] albeit a particularly florid secularity which allows him to grapple more directly with the processual space and infinite speed of creative dynamisms, a "[s]pace that is teeming, a space of gestation, of transformation, of multiplication" (36) and in which phenomenal unfolding is "like a sort of pre-personal state, a 'before existence' state, infinitely archaic" (91). Michaux's poetic descriptions of experiences he terms *xenopathic* (i.e., a foreign affliction) are often remarkably Deleuzian; indeed, Deleuze and Guattari cite him several times in *What is Philosophy*[86] at precisely those points where they discuss the creation of philosophical concepts or "vital ideas" (1994: 207) as entailing an infinite speed (CIT 36) and unfolding on a plane of immanence, "with its infinite, wild movements" (42). As Arun Saldanha puts it in his careful study of the resonances between the mescaline poet and the two philosophers of becoming, "[x]enopathy summons the asubjective as Deleuze and Guattari conceive it in *A Thousand Plateaus*, the faceless, the nameless, the statistically insignificant, a non-site Michaux dissolves into as no longer Michaux, no longer human" (2014: 412). I will return to examine these ideas, which are intentionally still allusive and opaque, in the final chapter.

Returning to Michaux's own work, however, we can find, in the later *Light Through Darkness* (1963) a slightly less cynical account of psychedelics (mescaline, but also psilocybin) and a sustained attempt to meaningfully describe the strangely ungrounding aspects of numerous personal experiments with these substances. Michaux describes this ungrounding in terms of

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[85] As Michaux avers, "for the Westerner today, so long an unbeliever in the gods and now incapable of imagining a form in which they might appear to him, what his mind grasps, the only god he can still conceive, a god it would be vain to worship, is infinite relativity, the unending cascade, the cascade of causes and effects, or rather of what goes before and of what comes after, where everything is driving wheel and follower wheel" (35).

[86] Deleuze and Guattari also refer to Michaux in *A Thousand Plateaus*, and he frequently crops up in Deleuze's lectures on Foucault, often in elaborations of the concept of the fold.

multiplication – a rapid doubling of multiplicity in thought and perception[87] that leads to a melting away of form; as Michaux recounts of a particularly intense experience with psilocybin, "I did not feel myself made smaller but only undifferentiated" (25). This is a world of ceaseless undulations – waves and lines, vibrations and oscillations – in which transient forms emerge only to melt away again in what Michaux, despite himself, admits in this instance to experiencing as an ecstatic dis-individuation; as he expounds, "[e]cstasy and ecstasy alone opens the absolutely without mixture, the absolutely uninterrupted by the slightest opposition or impurity which is the least allusively, other" (17). The thematic of death, rebirth[88] and transformation – of individuation – is, in short, clear in Michaux's work, with all its vivid descriptions of folding and unfolding and refolding; of the complex torsions of thought and being – becoming – that are so integral to the psychedelic experience as "an unwearying surge, far from the dwellings of man and the reasonings and the categories of men and divisions and compartments" (28). While Michaux does not say much about the archetypal nature of his trips, he does occasionally encounter a transpersonal domain of mythic struggle. He describes, for instance, the experience of being surround by serpents, which, he says, began "to wrap themselves around me, to pass through me, to form and to deform me rhythmically, to pass through and through me, to work me greatly, to distract me greatly from everything, to tear me greatly, to exhort me greatly, to twist me greatly, to bend me greatly, to try to make me flexible, to try to make me fluid, to try to make me without resistance" (25). While Michaux's enchanting descriptions, frequently tempered as they are with ironic distance, create a vivid sense of the psychedelic experience, he does not, for all this, formulate any kind of rigorous *philosophical* account of these substances. He does, however, figuratively recapitulate everything I have said thus far about the fundamental nature of this experience as a form of individuation and so his poetic excess serves as a useful drawing together of the long narrative arc I have traced from the grasslands of Africa to the mid-20th century.

In departing from the turbulent infinities of Michaux's mescaline trips, and in order to conclude this chapter, I will turn to the in-between years that followed the first long wave of heady exploration – that rift between the 1960s and the 1990s (when the second wave began to lap up against the shores of consciousness), although these two periods can still be drawn together by virtue of more subterranean continuities. In the next, concluding section, I examine

[87] "Every drug modifies your props. The prop you rested on your senses, the prop your senses rested on the world, the prop you rested on your general impression of being. They give way. A vast redistribution of sense perception occurs, which makes everything strange, a complex, continual redistribution of sense perception" (Michaux 1963: 3).
[88] Michaux frequently uses the term *pullulation* in this regard, a word that refers to germination or sprouting.

two final figures, Stanislav Grof and Terence McKenna, distilling through their work a summary of what this chapter has argued.

2.9 Conclusion: New maps of the invisible landscape

> "Psychedelic drugs exert their influence at the brain/mind/body interface, and are clearly well within that shadowy and forbidden territory where cognition itself originates. Is it any wonder that science hesitates to rip that veil aside and illuminate those shadows with the cold light of reason – knowing that reason itself may become the ultimate sacrifice for such audacity?" (Invis CIT)

The first wave of research into psychedelics, the myriad scientific and philosophical engagements with which I have drawn out across this chapter, came to a close over a period of a few years between the late 1960s and early 1970s. The reasons for this are multifaceted: on the one hand, a moral panic emerged around the radical social transformations being tentatively explored by the *turn on, tune in, drop out* generation, and these intersected with growing establishment concerns about the perceived threat posed by the student movement. On the other hand, scientific methodologies and research ethics were shifting in a more rigorous direction. While research in this area never wholly died out, the combination of these factors meant that justifying clinical trials on psychedelic substances, once they became scheduled in the category of illicit drugs like heroin and cocaine, was increasingly onerous.[89] This also meant the dissolution of various organisations that had formed around psychedelic therapy, including the European Medical Society for Psycholytic Therapy – a group of LSD therapists from various countries that sought to develop a sound methodology for the therapeutic use of psychedelics – and their US counterpart, the Association for Psychedelic Therapy. Stanislav Grof, a member of the former organisation who is still active in the psychedelic therapy research community, notes that a further factor was the complexity presented by the psychedelic experience itself. As he observes, such experiences "cannot be described in terms of the narrow and superficial conceptual model used in academic psychiatry and psychology, which is limited to biology, postnatal biography, and the Freudian individual unconscious" and instead entail the mapping of a "vastly extended cartography of the psyche that includes important domains uncharted by traditional science" (Grof 2008: 12). Much of Grof's work is an attempt at just such a cartography. It is also a reiteration and

[89] Thinking about psychedelics also encourages the use of a highly multidisciplinary approach. As Grof observes, "[d]etailed study of psychedelic phenomena would require a long-term systematic team cooperation of experts from diverse disciplines, such as psychology, psychiatry, neurophysiology, neuropharmacology, ethnobotany, modern physics, zoology, ethology, genetics, internal medicine, obstetrics and gynecology, anthropology, history of art, theology, philosophy, and comparative study of religion and mythology" (1975: 243).

formalisation of the classic death rebirth transformation structure of psychedelic experience and in presenting it I aim to provide a cursory summary of what this chapter has argued.

Grof argues that psychedelics afford access to two levels[90] of the psyche that are seldom seriously considered in conventional psychotherapeutic accounts (which focus on psychodynamic and, to a lesser extent, aesthetic experiences). As he says of these two levels, "[t]he phenomena originating on the perinatal and transpersonal levels of the psyche include sequences of psychological death and rebirth, encounters with archetypal beings, visits to mythological realms of various cultures, past incarnation memories, extrasensory perception, episodes of out-of-body states, experiences of cosmic consciousness" (ibid.). For Grof, these kinds of experiences express modes of operation of the human psyche that are not usually brought to conscious attention, the functioning of which nonetheless underlies our ongoing waking experience of the world and awareness of which we can obtain through the ingestion of substances like LSD, mescaline and psilocybin.

Summarising what a broad range of interlocutors have observed, including most of those I have presented in this chapter, Grof also notes that the pursuit of such awareness is "repeatedly described in the context of various shamanic procedures, rites of passage, aboriginal healing ceremonies, and mysteries of death and rebirth, as well as Eastern spiritual philosophies and mystical traditions of all ages" (ibid.). In *Realms of the Human Unconscious*, Grof presents his own taxonomy based on his observation of a vast number of psychedelic sessions, mostly with LSD. In this taxonomy he breaks psychedelic experiences down into four types: "(1) abstract and aesthetic experiences, (2) psychodynamic experiences, (3) perinatal experiences, and (4) transpersonal experiences" (1975: 33). Importantly, these interact with each other in nonlinear ways – a typical experience will usually contain a complex mixture of at least two these types, and in this regard Grof's model describes the unconscious that is elicited into conscious awareness during a trip as "a multidimensional and multilevel continuum of mutually overlapping and interacting phenomena" (ibid.).

The fundamental architecture of a psychedelic experience, however, often follows a strictly linear trajectory for Grof; one that he describes in terms of what he calls the *Basic Perinatal Matrices* (BPMs), and which closely conforms to the death rebirth dynamism. Indeed, the BPMs are modelled on the birth process itself. This begins with the experience of the "oceanic ecstasy" (Grof 1975: 106) of the womb (BPM I), whose "basic characteristics are transcendence of the subject-object dichotomy, exceptionally strong positive affect (peace,

[90] The term *level* is unfortunate as it suggests a hierarchy of sorts; the word *aspect* or *mode of operation* can serve as a more accurate replacement here.

tranquillity, joy, serenity, and bliss), a special feeling of sacredness, transcendence of time and space, an experience of pure being, and a richness of insights of cosmic relevance" (105). However, this world is threatened by the initial contractions marking the beginning of labour (BPM II), which Grof terms "Antagonism with the Mother" (115). Experiences in BPM II are primarily harrowing, and include everything from "various concepts of hell, to situations of unbearable physical, psychological, and metaphysical suffering that will never end," as well as a heightened awareness of "the ugly, evil, and hopeless aspects of existence" and the perception of the world as "an apocalyptic place full of terror, suffering, wars, epidemics, accidents, and natural catastrophes", which sometimes leads to a sense of existential meaningless and an inability "to find or appreciate anything good in the universe, whether positive aspects of human nature, pleasant episodes in life, natural beauty, or the perfection of artistic creations" (116).[91] BPM II, broadly speaking, thus constitutes a process of transformation-individuation, which is frequently experienced as a profound sense of existential claustrophobia or catastrophic ending, along with various physiological symptoms like shortness of breath and palpitations. BPM II-type phenomena such as these are, as Grof and others have documented, remarkably common features of psychedelic therapy and are often at the inception of so-called "bad trips" – difficult experiences that, if not properly integrated within the context of the therapeutic situation, can lead to lasting trauma and mental ill-health. In turn, however, BPM II's "dark night of the soul" leads to the opening of the cervix and the "volcanic ecstasy" (106) of the propulsion through the birth canal (BPM III, or the "Synergism with the Mother" (123)). For Grof, BPM III takes on:

> the atmosphere of a titanic struggle, frequently attaining catastrophic proportions. The intensity of painful tension reaches a degree that appears to be far beyond what any human can bear. The individual experiences sequences of immense condensation of energy and its explosive release and describes feelings of powerful currents of energy streaming through his whole body. The visions typically accompanying these experiences involve scenes of natural disasters and the unleashing of elemental forces, such as exploding volcanoes, devastating earthquakes, raging hurricanes, cyclones and tornadoes, electric storms, gigantic comets and meteors, expanding novas, and various cosmic cataclysms. (Grof 1975: 124)

Such experiences, as may be clear, are often cast in mythic or archetypal terms as a battle between good and evil or a cosmic awakening. Importantly, and in line with the phenomena of dis-individuation discussed earlier, in BPM III "various polar sensations and emotions melt into one undifferentiated complex that seems to contain the extremes of all possible dimensions of human experience" and in which "[p]ain and intense suffering cannot be distinguished from

[91] Grof notes that this is the world of "Martin Heidegger, Soren Kierkegaard, Albert Camus, and Jean Paul Sartre" (1975: 118) and, somewhat provocatively, suggests that these kinds of experiences can result "in a fresh understanding and appreciation of existentialist philosophy" (ibid.).

utmost pleasure, caustic heat from freezing cold, murderous aggression from passionate love, vital anxiety from religious rapture, and the agony of dying from the ecstasy of being born" (Grof 1975: 125). Finally, the journey through the birth canal ends, leading to the birth itself and the emergence into a new world outside of the womb – BPM IV or the "Separation from the Mother" (138). This final matrix constitutes the resolution of the death-rebirth experience itself; "[s]uffering and agony culminate in an experience of total annihilation on all levels – physical, emotional, intellectual, ethical, and transcendental" (138-9). Thus, BPM IV is the actual process of death and rebirth – the final exit from the reality of the womb and the entrance into a strange new world that is often coupled with a profound sense of expansion and release of pressure, as well as experiences of cosmic union and mystical oneness, in some senses coming full circle to BPM I[92]. In short, BPM I-IV describe the psychedelic experience of death and rebirth in psychodynamic terms using the metaphor of actual biological birth.[93]

Related to his construction of the BPM model, Grof develops the idea of the COEX systems, or *systems of condensed experience*. COEX systems "can be defined as a specific constellation of memories consisting of condensed experiences (and related fantasies) from different life periods of the individual," with "[t]he memories belonging to a particular COEX system have a similar basic theme or contain similar elements and are associated with a strong emotional charge of the same quality" (Grof 1975: 46). In his own work, it appears that Grof associates COEX systems primarily with psychodynamic experiences, i.e., not with the kinds of perinatal experiences discussed using the BPM model, nor those experiences Grof views as transpersonal (these latter forms of experience including such exotic phenomena as reviviscence on an evolutionary scale, perceived access to phylogenetic or ancestral memory, extraplanetary consciousness). He describes COEX systems as largely psychodynamic: a COEX system could consist, for instance, of "all memories of the past exposures of an individual to humiliating and degrading situations that have damaged his self-esteem," or "epitomize and condense the individual's encounters with situations endangering survival, health, and integrity of the body" (47). Yet, they can be more generally construed as clusters of tendencies coupled with strong affective or emotional charges that represent certain tendencies or habituated patterns of thought and behaviour. They could thus include such psychological mainstays as neuroses, fixations, compulsions and fetishes, but also inculturated patterns of thinking, norms, ideological biases and so forth. Furthermore, a COEX

[92] "It should be obvious from this description that there are certain overlapping elements between BPM IV and BPM I. As a matter of fact, the experience of biological birth and spiritual rebirth is often followed by feelings of cosmic unity. In this context transcendental elements merge together with the "good womb" and "good breast" experiences and pleasant childhood memories into one single complex" (R CIT 139).

[93] It should be noted that some such experiences literally take the form of a reviviscence of birth itself.

system's heightened libidinal charge, coupled with the way in which it condenses or abstracts multiple overlapping experiences, suggests that it is distinctly possible that when such a system is triggered within the psychedelic state, it is powerfully experienced in one of two ways: first, as a reviviscence of a particularly highly affectively charged past experience, or second, and potentially more interestingly, *qua system*, i.e., as the condensation of experience itself. This latter experience would be quintessentially *archetypal* – archetypes are, after all, precisely the clustering of a certain range of phenomena under a single representative and thus it is reasonable to assume that a COEX system, if it could be experienced, in an altered state of consciousness perhaps, would be experienced as some or other archetypal dynamic, whether this takes the form of a being, a process or a mythic narrative.

Grof describes the cultivation and strengthening of COEX systems in terms that should be familiar by now, i.e., as a recursive feedback process. He notes that "[t]he term 'positive feedback' is used here in the *cybernetic* sense, not in the way it is frequently used in individual or group psychotherapy". He goes on to argue in information-theoretic terms that "[t]he interpersonal feedback that the individual receives in human situations that are influenced by a strong COEX system tends to increase the original error and deviation from the norm rather than correct it" (1975: 76). In classic psycholytic terms, Grof argues that psychodynamic LSD sessions "can be viewed as a process of gradual unfolding, abreaction, and integration of various levels of negative COEX systems and opening the pathways for the influence of positive ones" (92-3). He furthermore claims that "sooner or later the elements of the individual unconscious tend to disappear from the LSD experience and each individual undergoing psycholytic therapy enters the realms of the perinatal and transpersonal phenomena" (94).

I do not think it is necessary to follow Grof in distinguishing sharply between psychodynamic (or even aesthetic) experiences and perinatal ones. While the latter are indeed of a singular type, it seems to be the case that COEX systems, as clusterings of tendency and potential informing the likely and possible trajectories human experience takes, inhabit all four of the regions of psychedelic experience he describes. Furthermore, the experience of a COEX system qua COEX system would likely assume the equivalent of an archetypal form in each of these instances. The perinatal experience and the BPMs it consists of, therefore, could simply be seen as one *kind* of possible encounter with a COEX system, just as supposedly transpersonal reviviscences of the entire historical unfolding of life on the planet, psychodynamic encounters with clustered traumas or the aesthetic profundity of psychedelically enhanced everyday encounters with the things of the world would be. I will return to this simplified model of COEX systems in the final chapter when I discuss emergent constraint regimes and dynamic systems. For now, it suffices to underscore that Grof, in his

theorisation of BPMs and COEX systems provides a useful partial formalisation of much of the thinking around psychedelics in during the first wave of research: that they bring about an uniquely intense form of insight into patterns of behaviour as well as a transformative dynamic frequently experienced as death and subsequent rebirth, that a frequent part of these phenomena is an experience of dis-individuation. Dis-individuation may be described as a transient loss of ego during which time various forms of mystical consciousness are experienced, and that some of these dynamics are experienced either *archetypally*, as highly emotively charged mythic narratives, or, closely relatedly, as intense reviviscences of past or constructed experiences. This formalisation offers a first glimpse, albeit still inchoate, of what will be more rigorously defined as I proceed to discuss psychedelic individuation.

Finally, there is Terence McKenna, a figure often cast as the Timothy Leary of the 1990s and a prominent relay for the renewed interest in psychedelics that emerged as part of the electronic dance music culture of that period. Terence McKenna is admirable for his attempts to render the ineffability of the psychedelic experience in naturalist and scientifically rigorous terms, even while at the same time enjoying a career as a bardic entertainer waxing lyrical about the bizarre, science-fictional nature of experiences on psilocybin and DMT. McKenna is unfortunately remembered more for the latter – and for his wild-eyed talk of self-transforming machine elves, interdimensional travel and the like – than for his careful, theoretically informed and admittedly sometimes absurdly speculative thinking about psychedelics over several decades between the 1970s and his premature death in 2000. His relationship to science was complex. His brother Dennis McKenna describes their shared views in this regard by saying that science "may remain forever incapable of satisfactorily accounting for the simplest, most basic elements of everyday existence: our experience of life, of mind, of being in the world" (McKenna and McKenna 1993: xvii), adopting a quasi-Husserlian view on the primacy of *leib* (lived life, the subjective view) over *körper* (living body, the objective view). In this regard, Terence's brother Dennis McKenna, in his introduction to their joint work, *The Invisible Landscape* (1993), makes a crucial call, and it is one that will be reiterated when I turn to the work of enactivists like Francisco Varela and Evan Thompson, to adopt a neurophenomenological framework:

> While it seems clear that the modalities of the psychedelic state must be rooted in neuronal pharmacodynamics, explanatory paradigms couched in terms of receptor selectivities, structure/activity relationships, agonist/antagonist interactions, activation of limbic substructures, etc., all somehow fail to do justice to the transcendent, transformative reality that becomes manifest when one actually consumes a psychedelic drug. (McKenna and McKenna 1993: xviii)

Dennis McKenna further argues that a rigorous understanding of the psychedelic experience may be of use in working through questions of ontological significance – the relation between

brain and mind, for instance. In developing such an understanding, “any model of the brain/mind that does *not* reconcile the observations of neurobiology with the *fact* of the psychedelic state, as it is experienced, is doomed to remain scientifically incomplete and philosophically unsatisfying” (McKenna and McKenna 1993: xix; emphasis in original). The psychedelic experience, in other words, given that it straddles the slippery chasm between neuroscience and existential being, between *körper* and *leib* in a singularly unique fashion, affording not just access to regular waking states of consciousness but insight into how consciousness may be transformed, as well as some of the more subterranean mechanisms that usually operate below conscious awareness, is a profoundly important tool for those who wish to understand the mind, be it scientifically or philosophically; and, as will become clear, there is no strict delineation of duties possible in this regard.

In their joint work, the McKennas attempt to develop an ontological framework in which the psychedelic experience becomes conceivable. In doing so, they make substantial use of what they describe as “the process-oriented ‘organismic’ philosophical tradition that finds its most eloquent expression in the thought of Alfred North Whitehead” (7). This in order to “suggest the fundamentals of a metaphysics that is consistent not only with the pursuit of scientific abstraction but also with the apprehension of the world as it impinges on us as living, sensing, minded organisms” (30). The philosophical conclusions they draw in this regard are eminently process philosophical and non-reductive. Non-reductive because the McKennas, being naturalists and scientists, see mind as emerging from nature. So too, however, does the kind of thinking necessary in order to make sense of mind entail a kind of conceptual emergence as well as an disciplinary hybridity: reductionist accounts that reinforce tenuous dualisms are insufficient for explaining “the apparent intelligibility of nature and the fact of living organisms” (33). It is worth citing the processual nature of their view, in part to underscore their deep debt to Whitehead:

> A thing is what it is by virtue of the serial unfolding of pattern through time; if one attempts to isolate an object at a single, nontemporal instant, apart from the instants preceding and following it, the object loses its essential identity. The object requires a self-defined, indivisible epoch for its realization; its reality is defined by the unity of the various processes that enter into its makeup. It is the process of unfoldment of the various components of an entity, gathered into a prehensive unity, that we experience as the sense object; it is not the components themselves that we experience as the sense object, but our unified prehension of these unfolding components. Thus, nature becomes a structure of evolving processes, and space and time the locus of the unification of these processes into sense objects. (McKenna and McKenna 1993: 36)

The McKennas, applying this processual thinking to living organisms, cite the philosopher of biology Hans Jonas, a major influence on enactivism, to argue that “the selfhood of the organism is identified with the dynamical persistence of form” (38) and not with a particular

material structure. It is instead material *flux*, or an "event-structure" (ibid.), that is a necessary condition for the perpetuation of identity qua *form*. As will be discussed later, this is a quintessentially autopoietic view. The young brothers McKenna go further though, and offer a bold proposal, arguing that on the view that material flux is primary, the metaphysics underlying science should be reformulated to "consider the event as the ultimate unit of natural occurrence" (39). On this view, selfhood, and by extension consciousness, for both autopoiesis and the processual framework the McKennas develop, is to anticipate matters, *individuative.*[94] The McKennas also theorise, via Whitehead as well as Leibniz, what I have been alluding to as the pre-individual, arguing that the former's idea of the "extensive continuum can be conceived as the set of all possible relationships, both actual and potential, both of all actual and of all potential entities" (53).[95] Attempts to render ideas like these tractable within a scientifically respectable manner likely explains Terence McKenna's later interest in the mathematician René Thom's catastrophe theory – which in turn was also an influence on Deleuze – and the biologist C.H. Waddington's notion of the chreod and the epigenetic landscape, which are themselves early attempts to formalise the idea that life exhibits certain tendencies and complexly-patterned behavioural dynamisms over time that can be scientifically modelled. Both Thom and Waddington were attempting to theorise a world in motion that consisted of systems views as turbulent creative dynamisms – *processes*. This is also the case with the biologist L.L. Whyte, whose notion of *coordinative conditions* (C.C.) is employed and expanded upon by the McKennas in order to develop what they term, in quasi-cybernetic language, a general systems theory of such a processual reality. Whyte's notion of C.C. is remarkably close to later ideas in dynamic systems theory, including the distribution of attractor-repellor layouts in phase spaces that delineate the tendencies of systems over time.[96] Whyte explains that C.C. are

> not merely morphological, expressing relative spatial positions and orientations within the ordered system (not in an arbitrary external frame), but morphogenetic, representing a one-way tendency towards the development of stationary forms. In other words the C.C. not only define an invariant characteristic configuration which tends to persist through all the normal transformations of the system (i.e., through growth, functioning, reproduction, etc.) but also a 'dynamic' tendency towards ordered equilibrium, i.e., a self-ordered and self-stabilizing process. (1965: 7)

[94] Indeed, as we will see, both Simondon and Deleuze explicitly justify their theorisations of individuation by arguing that science requires a better metaphysics.
[95] This extensive continuum is, for the McKennas, wholly immanent: the potentialities are, as Whitehead too avers, and as Deleuze will reiterate in his conceptualization of the virtual, *real potentialities*.
[96] As Whyte says, the notion of coordinate constraints "must be capable of representing both relatively stable structures and the formative processes which generate them" (1965).

Crucially, in a manner that anticipates much of what I will discuss when I momentarily turn to examining the second, current wave of psychedelics research, Whyte also views C.C. as “the expression of an ordering tendency, related to the movement towards minimum potential energy of complex low temperature systems, which can account both for the genesis of life and for its maintenance” (1965: 76).

I do not need to follow the McKennas all the way in their speculative attempt at solving the hard problem of consciousness – a mission they implicitly set for themselves in *The Invisible Landscape* – and explaining the psychedelic experience. The latter is a task they appear to finally resolve in the context of the 1970s, by appeal to the then-novel but nowadays uncompelling holographic theory of mind put forward by the psychologist Karl Pribram. What matters more, beyond the commendable audacity of their innovative thinking about profoundly difficult topics, is that the McKennas, perhaps more than anyone else of their era, were interested in developing an account of psychedelic experience – and by extension consciousness – which sought to apply the best science available to them in as parsimonious a manner as possible, without falling prey to neuro-reductionism or metaphysical excess. Terence McKenna’s exotic menagerie of metaphysical fabrications, including the famous “self-transforming machine elves of hyperspace”, as well as the surreal logic at play in describing some of the powerfully mind-altering experiences the brothers had in the Amazon, are proof enough that they occasionally failed at tempering their enthusiasm. Yet, they seem to have approached their theorisation of these domains with a sense of humour and humility, experimenting with the creation of concepts in a manner which, as Erik Davis has pointed out, is eminently Deleuzian in its recognition of the messy, partly socially constructed work that goes by the name of objective science (2019). Furthermore, as the brothers McKenna observe, “[o]ur hypothesis is as rigorous and mathematical as we can make it, yet all science springs from some myth” (McKenna and McKenna 1993: 169).

By applying the same ethos, the current chapter has sought to trace the long history of using and thinking about psychedelics in order to demonstrate that a vast number of people and disparate cultures have, across a period of thousands of years and myriad sets of ontologies and metaphysical convictions, painted with the tools of both science and myth a surprisingly consistent picture of psychedelically altered consciousness. The central salient theme depicted in this picture is that psychedelics disrupt normalised, stable patterns of thought and behaviour by giving rise to a processual unfolding that is described in the language of death, rebirth and transformation; which entails the emergence into conscious view of various unconscious and perhaps even transpersonal dynamisms. Some of these take on a mythic, archetypal sheen, and which often results in profound and lasting insights into self and world.

For some, the underlying model of consciousness assumed within these descriptions is that it is some sort of self-regulating machine – a computer consuming representations and operating on information using built-in functions; for others consciousness is a turbulent infinity, a dynamic and processual folding, unfolding and refolding. In every case, there is a liminal point when seeking to produce a final, exhaustive articulation of the complex relation between brain and mind – an Escherian point where the hand tries to catch itself drawing itself. Psychedelics, in this regard, confront us with possibly the most difficult yet salient question of all: who are we, that we can even pose the question "who are we?" In the contemporary era, as the second wave begins to crest, this question is being posed in ever-more nuanced ways and some remarkable new answers, albeit highly provisional but reflecting a dramatic surge in scientific understanding, are being proffered. So too are some of the same old assumptions being perpetuated, not least among them a view of science, of the brain and of consciousness that operates with a reductionist lens inherited from the linear mechanistic scientific worldview of past centuries. I will now turn to see how all of these tensions are playing out. Before I proceed, a reminder of the stakes is apposite:

> What is the nature of the invisible landscape beyond that doorway? The answer to the question is linked to the question of the nature of mind. If the world beyond the doorway can be given consensual validation of the sort extended to the electron and the black hole – in other words, if the world beyond the doorway is found to be a necessary part of scientifically mature thinking about the world – then our own circumscribed historical struggle will be subject to whole new worlds of possibility. (McKenna and McKenna 1993: 114)

Chapter 3

The second wave

> One suspects that had LSD never been discovered, the world might look very different today than it does now, for better or worse, depending on one's perspective. (Nichols 2016: 267)
>
> The advances in research over the last two decades are so profound that the fame of the "psychedelic sixties" pales in comparison to the immense biomedical knowledge we now have about psychedelic effects, safe use, and medicinal applications. (Winkelman and Sessa 2019: 12)

3.1 Introduction

In the previous chapter, I provided a broad overview of the ways in which psychedelics have been used and thought about in a number of disparate contexts stretching from the Late Neolithic to the 1970s. In doing so, my aim was to draw out those aspects of psychedelic experiences that appear to transcend cultural and contextual specificities, even though these experiences are subsequently conceptually and discursively integrated into these contexts. The argument here is not that there is some sort of monolithic essence of psychedelic experience but instead that by drawing attention to the more perennial features of diverse, contextually grounded sets of experience it may be possible to discern some of the ways in which psychedelics intersect with neurobiology and subjective experience in order to produce and modulate consciousness in novel ways. Given that from an evolutionary biological view, our brains and modes of embodiment similarly partly transcend contextual specificities while simultaneously being variously constrained and enabled by them, the fact that we can develop this kind of provisionally transcultural view of psychedelic experience is unsurprising.[97] As I will show in this chapter, it may also aid us in thinking about consciousness and how and when it emerges in new ways. As should be clear by now, psychedelic experiences are typified by processes of dissolution and reformation of the self or ego that are – oftentimes necessarily retrospectively – subjectively described as mythic dramas of death and rebirth. Such transformative experiences frequently entail a collapse or fluidification of stable ontological and epistemic foundations and can in this way be viewed as ontogenetically or individuatively charged, terms that I am currently using in a broadly figurative manner but which will gain a

[97] As an anonymous informant in Langlitz (2016) puts it, "[w]hat students of religion since Leibniz have discussed as *philosophia perennis*, namely, that all religions share the same core of absolute truth, is currently undergoing a modern neurobiological reinterpretation. Maybe the spiritual experiences of human beings do not resemble each other across cultures because they point to the same God or universal truth but simply because human brains all work alike" (381).

more technical set of meanings as we progress. While this aspect of the psychedelic experience was well-described within the first wave, the subjective reporting of phenomenological experience that it relied upon was seldom sufficiently supported by the cursory neuroscientific understanding with which first wave clinical research operated. As I turn to explore the second wave of research that began, after a dramatic hiatus[98], in the 1990s (e.g., Strassman 1994, 1996; Strassman, Qualls, Uhlenhuth, *et al.* 1994; Vollenweider *et al.* 1997; Vollenweider *et al.* 1998) and was fully underway by the early 2000s (Nichols 2002), what will become evident is that contemporary psychedelic research seeks to address this shortcoming by grounding the slippery subjective nature of psychedelic experience in cutting-edge neuroscience within a broadly naturalist frame[99]. The metaphysical excesses that were in play throughout the first wave have, in many cases anyway, been dramatically tempered, albeit in a manner which, as I will discuss, carries its own philosophical risks – risks reflected, for instance, in the frequent slippage between model instrumentalist and realist claims that typifies some of the more popular models of psychedelic action currently being explored.

In examining the second, current wave of psychedelic research, with a focus on the philosophical assumptions and implications that are expressed therein, I undertake several tasks in this chapter. First, I present a provisional list of various aspects of psychedelic experience that would need to be incorporated into a useful philosophical account. This includes both the phenomenological diversity of these experiences as well as the contexts – commonly known as "set and setting" – in which these experiences unfold. I then briefly survey the contemporary psychedelic research field, turning to contemporary psychedelic neuroscience in order to provide a cursory account of how psychedelics work on a neurobiological level. As any meaningful discussion of psychedelic experience necessarily straddles several orders of complexity, from the molecular and neurobiological through to the cognitive, psychological and intersubjective, I also pay attention to contemporary psychedelic therapy and the assumptions it operates with. Like consciousness studies more broadly, a coherent account of psychedelic experience is necessarily transdisciplinary and requires engagement with several diverse and highly active domains of research and expertise, which again means that I can only provide a necessarily cursory and non-technical view of burgeoning fields like psychedelic neuroscience and psychedelically-assisted psychotherapy.

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[98] As David Nichols reminds us in this regard, "[i]t should be kept in mind that the relative dearth of research on psychedelics in the past half century did not result from a lack of scientific interest, but rather occurred as a consequence of political forces that manifested principally in the United States in the 1960s and 1970s." (2016: 267)

[99] To some extent this represents a now exhaustively discussed broader shift in philosophy itself – one that is often articulated in terms of a move away from the linguistic turn in favour of a more materialist and realist focus. This shift in turn entails renewed attention to the complex interplay between science and philosophy.

Next, I turn to the more strictly philosophical question of the speculative models of psychedelic experience that have begun to emerge within this vibrant field of inquiry and show that contemporary neuroscientific and therapeutic findings largely support the view that psychedelics may act as triggers for processes of individuation. Here, I engage specifically with the currently dominant RElaxed Beliefs Under pSychedelics (REBUS) model of psychedelic action (Carhart-Harris and Friston 2019), itself based on active inference and the free energy principle (FEP) (Friston 2010; Carhart-Harris and Friston 2010). While the REBUS model has some utility as a heuristic device for thinking about the effects of psychedelics, I draw out some potential limitations in its reliance on the FEP, which has been the target of a significant amount of critique for the frequent elision of instrumentalism-realism distinctions (Kirchhoff *et al.* 2022) in what has become a substantial secondary literature. Implied in the discussion is also a sense that the REBUS model is, like the FEP, possibly hampered by a residually functionalist (a term I will define shortly) and reductionist account of cognition while being simultaneously suggestive of the benefits of a more enactive account – I unpack the differences between these two accounts in detail in the next chapter. In the current chapter, my critical focus in this regard is on the philosophical implications of the REBUS model, which has become something of an assumed truth in many discussions in the field of psychedelic therapy, psychedelic philosophy and cognitive neuroscience more broadly; this includes Chris Letheby's seminal *Philosophy of Psychedelics* (2021), which is currently the most substantial attempt to think philosophically about psychedelics[100].

While the REBUS model – along with its close cousins such as predictive coding – is by far the most popular contemporary account of psychedelic action and has a significant, and possibly unwarranted, influence on current philosophical work in the area; and while the school of thought clustered around the FEP is massively influential in cognitive science and consciousness studies more broadly, I also briefly note some other emerging philosophical accounts in the conclusion to the chapter, including the closely-related complex systems approach (Hipólito *et al.* 2023), the process-philosophical work of Peter Sjöstedt-Hughes (2023) and the phenomenologically-inflected and anti-functionalist research of Benny Shanon (2002). I do not engage with these approaches in depth but mention them in order to underscore that the work emerging from the second wave of psychedelics research suggests several partly-divergent, partly-overlapping ways forward. On the one hand, we are now in a position to support phenomenological accounts with sophisticated neuroscientific tools and methodologies, bringing first-person experience and third-person scientific observation

[100] This even though the title is something of a misnomer – a fairer title would be something along the lines of *Ethical Philosophy of Psychedelic Therapy.*

together in a psychedelic neurophenomenological practice that holds tremendous promise for consciousness research more broadly.

On the other hand, current philosophical work that attempts to ground and/or conceptually develop this neurophenomenological exploration does not always allow us to consider the full implications of what either contemporary accounts of psychedelic neuroscience or perennially common features of psychedelic experience suggest and is in many instances still beholden to outmoded conceptions of subjectivity, agency, cognition and so forth. Ontologies and metaphysical assumptions have existential consequences and the ways in which we ground our understanding of psychedelic experiences in such assumptions can dramatically impact how, for instance, we develop effective psychedelic therapy modalities. Given the rapid growth of the psychedelic therapy industry and the growing consensus that psychedelics hold tremendous promise for treating everything from PTSD to OCD to depression to end-life anxiety to substance use disorders[101], this is a matter of serious ethical import. Beyond this, whatever philosophical perspectives we choose to adopt vis-à-vis the psychedelic experience (and there is ample room for a lively pluralism here) they should be informed by an adequate grappling with what that experience (across the full gamut of neurophenomenological heterogeneity) actually suggests. A philosophical account that does not coherently describe the processes of individuation that are a central feature of such experiences, therefore, will likely not be of great use.

In closing the chapter I return to its opening, reiterating in more precise terms the partly fleshed-out synopsis I provide in the paragraph just below of what any adequate philosophical engagement with the psychedelic experience needs, at minimum, to account for. As such an engagement relies in turn on a conceptualisation of experience more generally. I turn to this broader task in the subsequent chapter via enactivism before returning to present my own attempt at a philosophy of *psychedelic* experience in the chapter after that.

In terms of the above synopsis, a rearticulation of just what the psychedelic experience *is*, seems apposite. As was shown in the previous chapter, numerous exhaustive taxonomies have been developed over the decades. In the second wave specifically, there has been a concerted drive to exhaustively define key aspects of psychedelic experience via various rating scales that attempt to render the diversity of these experiences into a format compatible

[101] A search on www.clinicaltrials.gov (the authoritative online reference for clinical trials around the globe) listing only completed trials for psilocybin, currently the most commonly studied psychedelic, includes, as of 22 July 2024, 44 completed studies covering everything from Substance use disorder, depression, OCD, end-life anxiety, borderline personality, PTSD, anorexia nervosa, body dysmorphic disorder and migraines to smoking cessation.

with the survey and questionnaire approach that has become common in contemporary psychedelics research. There are now some standard references in the field, among which the 5D-ASC (5-Dimensional Altered States of Consciousness Rating) (Dittrich *et al.* 2006)[102] is most notable. The HRS (Hallucinogen Rating Scale) developed by Strassman, Qualls, Uhlenhuth, *et al.* (1994) is also frequently employed. However, it is still the case that no empirical description of different types of experiences exists (Wolff *et al.* 2024). Additionally, some of the scales in use embed strong metaphysical biases, for instance employing a spiritual or mystical experience framing (e.g., the mystical experience questionnaire (MEQ)[103] (MacLean, Leoutsakos *et al.* 2012). In presenting my own taxonomy, my aim is not to replace any of the existing work in the field. Instead, I simply wish to provisionally outline the features of the psychedelic experience that a philosophical account should reckon with while avoiding any pretention to either excessive metaphysical claims or exhaustiveness. As I see it, any philosophical grappling with the psychedelic experience needs to account for the following:

1. Diverse sensory experiences and phenomenological encounters with the world (increased vividness and novelty of experience; sensory cross-modalities like synaesthesia; eidetics; altered perception of space and time);
2. Perturbations of the self (ego-loss; changes to, or transient loss of, the core and narrative self; delocalization; experiences of death-rebirth-transformation);
3. Changes in processes of individual and collective meaning-making (hypersalience/heightened significance; enhanced mythic narrativity; the traversal of an archetypal domain; spiritual/mystical experiences; modifications of intersubjective meaning-making, e.g., empathy and communitas);
4. Metaprogramming (heightened recursive awareness/meta-awareness; vivid insight into habitual behaviour; conscious manifestations of the “unconscious” – these are all features commonly associated with the *psycholytic* model);
5. Affective and physiological effects (enhanced affect and emotional valence; insight into proprioceptive and interoceptive dynamisms);
6. Set and setting (the context within which the psychedelic experience takes place);
7. The role of neurochemistry and various other biological factors in the above.

[102] See also Studerus, Gamma and Vollenweider (2010) for an English language discussion of the 5D-ASC.
[103] The MEQ’s biases should be clear in its division of “mystical” experiences into “1, an authoritative sense of unity or connectedness accompanied by feelings of reverence; 2, positively valenced feelings such as love or peace; 3, alterations to the sense of both time and space; and 4, difficulty with putting the experience into words” (Yaden and Griffiths 2021: 569).

The account of psychedelic individuation I develop in the course of the current work aims to parsimoniously describe and think about this motley assortment of overlapping features and to provide a conceptual architecture that is up to the task of describing the multiple scales of organisational complexity across which the psychedelic experience takes place, from the neurobiological to the interpersonal, the affective to the archetypal. My philosophical resources are starkly different to Letheby's, who is focused more on normative questions around the epistemic status of psychedelic experiences (e.g., religious phenomena) (Letheby 2021; Chopra and Letheby 2024) and the ethics accompanying such questions ("should we accept comforting delusions?") (Letheby and Mattu 2022). Yet, I agree with his general suggestion that "what is needed is a natural philosophy of psychedelics: a synthetic, big-picture inquiry integrating multidisciplinary evidence to address philosophical issues in a manner continuous with science and consistent with naturalism" (Letheby 2021: 4). In seeking to meet this ambitious task, I will turn first to neuroscience[104], after which I will discuss some of the theoretical registers in which contemporary findings have been discussed, including chaos theory, complex systems theory and connectome harmonics.

3.2 Contemporary psychedelic neuroscience and emergent theories

> It is a remarkable testimony to science, and nature, that the effects of these compounds, which include the triggering of deeply profound, potentially life-changing existential experiences, can be traced to an initial action at the molecular level … and it is a grounding truth for those liable to metaphysical, supernatural perspectives on psychedelics – that if this receptor is blocked, none of their fantastical effects can occur. (Carhart-Harris 2019: 16)

3.2.1 A brief survey of contemporary findings

Contemporary research on psychedelics typically divides these compounds into various classes based on their chemical structure (Banushi and Polito 2023: 1-2). While various psychoactive outliers such as *muscimol*, *salvinorin A*, *nitrous oxide* and *ibogaine* are occasionally studied, most current research focuses on so-called "classic psychedelics"' that belong to either the tryptamine (psilocybin and DMT – a primary active ingredient in ayahuasca that is often smoked by itself) or ergoline (LSD) classes. While MDMA, a phenethylamine, is also the subject of much research, it is more accurately viewed as an "entactogen" or "empathogen" – a substance that facilitates heightened emotion insights and interpersonal bonding. Confusing matters, some phenethylamines have effects similar to classic

[104] A proviso: in what follows I will be using terms like *information*, *function* and so forth unproblematically, in the sense in which they are commonly employed in the contemporary literature. As will be argued in the next chapter, however, these terms frequently effectuate a slippage between model instrumentalism and realism, reifying a computationalist view of cognition that I will interrogate via enactivism.

psychedelics, most notably 2C-B and mescaline[105]. For the purposes of the current discussion, however, I will primarily discuss research into the "big three" classic psychedelics, i.e., the ones with the effect profiles most people have in mind when they discuss the psychedelic experience, and which are by far the most comprehensively studied of the classic psychedelics. These are LSD, psilocybin – which is at the time of writing the most commonly used substance in contemporary research – and DMT (both as an individual substance and as part of the ayahuasca brew). When referring to *psychedelics* in this thesis, the term should, unless specifically qualified, be thought of as referring to these three substances. While a close link between the effects of psychedelics and the brain's serotonin system was already understood in the first era of research – indeed, some argue that first wave psychedelics research encouraged groundbreaking research into serotonergic, dopaminergic and other neurotransmitter systems[106] – the specific mechanisms of action, which have proven to be highly complex, multi-scalar and multifaceted, are still being uncovered today. Most contemporary research focuses on two interrelated streams of inquiry. On the one hand, there is a detailed examination of the neurobiological effects of psychedelics, which has potential significance for our understanding of the brain more broadly. On the other hand, there is an attempt to elucidate the neural correlates of consciousness, or how neurochemistry and brain dynamics give rise to conscious features such as our sense of self and the qualia that comprise subjective experience. Often, these two aspects are looked at together in the hope that by examining the correlations between psychedelic neuroscience and the profound transformations of consciousness effected by psychedelics when they enter the brain, we can unravel some of the mysteries of consciousness (Carhart-Harris *et al.* 2016) and, more modestly, better understand and possibly better treat various forms of psychiatric and psychological suffering.

Currently, most research takes the form of extracting neuroscientific datasets from individuals who have ingested psychedelics using various measurement methodologies, including

[105] Ketamine, similarly, is also the subject of much research within psychedelic neuroscience and therapy, but it is typically regarded as a dissociative and has a different class of effects to classic psychedelics.

[106] "The powerful psychologic effect of LSD was accidently discovered in 1943… followed only a decade later in 1953 by the detection of serotonin in the mammalian brain… The presence of the tryptamine moiety within LSD was also quickly seen to be the scaffold for the chemical structure of serotonin… This recognition led to a proposal only 1 year later by Woolley and Shaw that 'mental disturbances caused by lysergic acid diethylamide were to be attributed to an interference with the action of serotonin in the brain.' Therefore, one could reasonably argue that the whole field of serotonin neuroscience, and especially the role of serotonin in brain function, was catalyzed by the discovery of LSD!" (Nichols 2016: 267)

fMRI[107], PET and EEG, and then analysing this data using a wide range of neurocomputational models and simulations (McCulloch *et al.* 2022). Some of these models are in turn grounded in or informed by speculative theories of consciousness – predictive processing (Hohwy and Seth 2020; Seth 2021) and integrated information theory (Tononi *et al.* 2016), for instance. A fair amount of research also relies on animal models, with all the inherent limits of cross-species extrapolation this entails (Shanks and Greek 2009), something that is especially salient when part of what is being examined is subjective experience.

Myriad other issues beset contemporary research: the ethical complexities of studying psychedelics means that existing datasets are often small and heavily reused, double-blinding is near-impossible given the obvious effects of psychedelics, neuroimaging is itself an inexact science (Moujaes *et al.* 2023) and there is little standardisation of dosage, substance selection or experimental conditions. Consequently, conclusions are frequently overgeneralised only to be found to be artifacts of the idiosyncrasies of particular experiments down the line. While these are the kinds of limitations facing many research fields, they are especially evident in psychedelic neuroscience – a rapidly-emerging field of inquiry on controversial substances with huge amounts of speculative capital driving it forward.

Finally, given the highly cursory nature of our understanding of the complexities of the brain, not to mention consciousness, there is a significant amount of theoretical overdetermination: based on the same datasets, for instance, researchers have developed profoundly different and occasionally outright contradictory causal explanations for the emergence of visual hallucinations. The field is, in short, an ethico-scientific minefield[108]. We have, however, also been able to learn a remarkable amount. In the next few pages I will summarise the current state of knowledge of psychedelic neuroscience, drawing attention to the fact that the bulk of findings and theoretical paradigms support – and add considerable scientific depth to – the intuitive picture of psychedelic experience I have painted thus far.

It is now known that psychedelics are 5-HT_{2A}R agonists, meaning they have a high binding affinity for serotonergic 5-hydrotryptamine 2a receptors in the brain[109]. This binding affinity is

[107] fMRI is increasingly favoured as it allows for real-time, high resolution and relatively whole-brain coverage, unlike older technologies like EEG. In practice, results from several methodologies are often examined together for complementary views on neural activity.
[108] Consciousness studies itself is a sprawling mess of divergent views. In a remarkably thorough recent paper, Robert Lawrence Kuhn lists no less than 214 distinct theories of consciousness, clustered into ten broad categories (2024) and ranging from eliminative materialism to Dennett's multiple drafts model to Damasio, Solms and co-authors' various affect theories of consciousness to enactivism to panpsychism to some remarkably speculative theories based on quantum field theory.
[109] In lay terms, albeit slightly misleading ones, this is sometimes described as psychedelics "mimicking" endogenous neurotransmitters like serotonin.

seen as the primary mechanism of action for these substances (Preller *et al.* 2018; Cameron *et al.* 2023), although each psychedelic has a complex and singular effect across multiple receptor sites and brain dynamics[110] and, as Luppi *et al.* underscore, the "neurotransmitter landscape of pharmacologically induced functional reorganisation". Thus, the correlations between the functional connectivity[111] changes in the brain measured by fMRI and other technologies and the cortical distribution of neurotransmitter receptors and transporters, is itself highly complicated (2023b: 6). 5-HT_{2A}R agonism at layer 5 pyramidal neurons (nerve cells) in the prefrontal cortex (PFC) is seen as an especially important site for the manifestation of psychedelic effects[112]. These neurons, which are rich in dendritic spines (which form part of the connective dynamics of neurons), are major "projection neurons", which means that they are crucial for integrating cortical dynamics and sending signals to other parts of the nervous system, including the motor cortex, brainstem and spinal cord.

The cerebral cortex, which is seen as responsible for integrating various neural dynamics into different aspects of higher order cognitive functioning – social behaviour, aspects of language formation, working memory, decision-making and so forth (Miller, Freedman and Wallis 2002) – features the highest expression of 5-HT_{2A} receptors[113], suggesting crucial links between psychedelic modulations of consciousness and this brain area. This being said, it is important to note the complex dynamic interplay between different brain areas that produces the cognitive features in question. As Bressler and Menon note, "[a]lthough it has long been assumed that cognitive functions are attributable to the isolated operations of single brain areas … the weight of evidence has now shifted in support of the view that cognition results from the dynamic interactions of distributed brain areas operating in large-scale networks" (2010: 277).

When examining psychedelic agonism at 5-HT_{2A}R in PFC, then, this should be viewed in terms of a larger simultaneous unfolding of intersecting, heterogeneous dynamics at various scales, some of which will be discussed below. As Carhart-Harris notes, when examining the effects

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[110] "Virtually all classical psychedelic drugs have a complex in vitro receptor pharmacology. For instance, LSD has agonist activity at 12 of the 14 human 5-HT receptors" (McClure-Begley and Roth 2022: 2). See Banushi and Polito (2023: 6-8) for the currently most thorough overview of the complex effects of psychedelics in the human brain.

[111] Connectivity can refer to actual structural connectivity in the brain, but more often refers to so-called functional or temporal connectivity, i.e., the patterned coactivation of various brain regions over time, which is measured via fMRI by blood-oxygen-level-dependent (BOLD) signals: through examining changes in blood flow and oxygenation in the brain neural activity can be inferred.

[112] This has been verified by successfully blocking the effects of LSD with ketanserin, a 5-HT_{2A}R *antagonist* (Vollenweider *et al.* 1998; Nichols 2016).

[113] 5-HT_{2A} receptors are also located in other parts of the brain; we also have these receptors in our guts, possibly lending some credence to recent discussions of the gut-brain axis.

of psychedelics we're necessarily looking at the "molecular (serotonin 2A receptor agonism) through to the anatomical and functional (heightened plasticity) and up to the dynamic (increased brain entropy), systems level (network disintegration and desegregation) and experiential" (2019: 16). Broadly speaking though, we can observe a cascading disruptive effect on various cortical and subcortical pathways initiated via some PFC 5-HT_{2A} receptors. The neurons these receptors form part of also project to inhibitory GABAergic neurons in the striatum, which is associated with the motor and reward systems in the brain, as well as playing a role in impulse control, learning and executive function. These GABAergic neurons in turn disrupt the functioning of thalamic GABAergic neurons.

The thalamus is understood to regulate the delivery of sensory and motor signals to the cortex, and psychedelics, via this pathway, are popularly thought to disinhibit thalamic activity, dampening the thalamus's regulatory or "gating" function and allowing the PFC to be flooded with increased sensory input. This is demonstrated by research into increased thalamic and cortical functional temporal coupling under psychedelics (e.g., Muller *et al.* 2017) and is commonly described as proof for the quasi-Bergsonian "reducing valve" theory of psychedelic action[114] popularised via Huxley during the first wave and which I discussed in the previous chapter. Psychedelics also modulate glutamergic transmission in the cortex. Glutamate is the most common neurotransmitter in the human body and, as Nichols details, "psychedelics enhance glutamatergic transmission in the cortex at the neuronal level and also in behavioral responses" and induce, in a manner that intersects with altered 5-HT_{2A} mediated dynamisms, a "rapid and dramatic increase in frequency and amplitude of spontaneous (nonelectrically evoked), glutamatergic excitatory postsynaptic potentials" (2016: 290; see also Mason *et al.* 2020).

Beyond these effects, it is increasingly understood that psychedelics enhance structural and functional neuroplasticity, both during the experience itself and for at least several weeks[115] afterwards (Ly *et al.* 2018; de Vos *et al.* 2021; Daws *et al.* 2022; Vargas *et al.* 2023). Technically, substances like psilocybin and LSD appear to induce brain-derived neurotrophic factor (BDNF) expression (via the trkB-BDNF pathway (Banushi and Polito 2023)), as well as

[114] For instance, Delli Pizzi and colleagues suggest that, "under LSD, the binding on 5-HT_{2A} promotes increased excitatory neurotransmission along the prefrontal striatum and dorsal raphe-striatum projections ... This process, besides activating glutamatergic neurons that directly descend to the thalamus, also triggers the activity of GABA-ergic interneurons connecting the ventral/dorsal striatum to the pallidum and the pallidum to the ventral and non-specific thalamic nuclei. The process generates a downregulation of thalamic filtering and an overflow of sensory stimuli to the cortex" (Delli Pizzi *et al.* 2023: 7).

[115] Some of the longer-term changes in plasticity seem to result from endocytosis, a process whereby receptors on the cell surface are internalised to the inside of the cell membrane.

downstream neural signalling, along with changes in gene expression[116] linked to synaptic and axonal plasticity and increases in dendritic complexity and synaptogenesis (Schmidt *et al.* 2024). Importantly, while this heightened plasticity has sometimes been misrepresented as a kind of "hyperplasticity", it is more accurately understood as what Abrahams and Bear call "metaplasticity", i.e., a plasticity of plasticity or "change in the ability to induce subsequent synaptic plasticity … metaplasticity is a higher-order form of synaptic plasticity" (1996: 126). As Ruffini *et al.* explain in developing their neural geometrodynamics model, metaplasticity is based on the view that "the ability of synapses to strengthen or weaken in response to increases or decreases in their activity (which is called synaptic plasticity) can be modulated based on the history of the synaptic activity or other factors (e.g., age, neuromodulatory systems, drugs, or lifestyle)" and that this "has important implications for the learning and memory of an organism, as it can regulate the ability of synaptic plasticity to change and adapt over time as required by its environmental context" (2024)[117].

A focus on the neuroplastic/metaplastic aspects of psychedelics has motivated some researchers to begin to refer to psychedelics with the less historically loaded term "psychoplastogens". This attempt at redefinition to some extent also reflects differing views on the most efficacious use of psychedelics in a treatment context, with psychoplastogen advocates endorsing a model of care that relies solely on the metaplastic effects of these compounds and does not entail subjective experience[118], whereas most psychedelics researchers continue to hold the view, which is the one I will also defend, that subjective experience is a core feature of the transformative potential of these substances. Advocates of the latter view describe plasticity as allowing for a heightened malleability in learning (Grieco *et al.* 2022), for instance as a "reopening of the social reward critical period" (Nardou *et al.* 2023), with the "critical period" referring to the highly plastic state of early childhood learning. As will be discussed below, this feature of psychedelic neurodynamics, along with the plasticity

[116] As Kyzar *et al.* note, because "many of the genes that are upregulated by psychedelics are rapidly induced immediate early genes, and their corresponding proteins perform actions at or near the synapse, psychedelics likely alter neurotransmission and synaptic morphology that could underlie both acute behavioral changes and those that may persist long after the initial drug exposure." (2017: 8).

[117] It is important to note that to date, most research on psychedelic neuroplasticity has employed animal models, typically rodents, with all the inherent limitations (e.g., of extrapolation across species) this approach entails. However, see Siegel *et al.* (2024) for a promising approach to studying psychoplastogenic dynamics in humans via a nascent individually-targeted fMRI technique known as Precision Functional Mapping.

[118] This even though psychotherapy will often be endorsed as part of an overall treatment paradigm. The psychoplastogen approach strongly reflects current psychiatric medication paradigms that view various forms of mental suffering as brain disorders that can be treated on the level of neurochemistry without the messiness of subjectivity getting in the way.

dynamics and the whole brain dynamisms discussed below, is the basis of the entropic brain theory, of which the most well-known version is REBUS.

The complex interplay of inhibitory and excitatory dynamics triggered by psychedelics has emergent effects at a whole-brain level too: neurobiological data from subjects under the influence of psychedelics generally demonstrates both decreased functional connectivity within specific brain areas and increased functional connectivity – heightened desegregation – between areas (Deco *et al.* 2018). In their research on LSD, Preller *et al.* describe evidence that shows that psychedelics induce "widespread alterations of GBC [global brain connectivity] in cortical and subcortical brain areas, characterized by a synchronization of sensory and somatomotor functional networks and dis-integration of associative networks" (Preller *et al.* 2018: 21). In other words, psychedelics produce what can be understood as a kind of de-specialisation of functionally distinct brain areas as well as generating more short-term functional connectivity across discrete areas, e.g., between the thalamus and the somatosensory cortex (Dai *et al.* 2023). These altered intra- and inter-connectivity patterns have also been described as involving a shifted activity gradient away from unimodal (single sense) and towards transmodal cortex (Girn *et al.* 2022; Timmermann *et al.* 2023). This is suggestive of a possible causal principle for the synesthesia that is frequently experienced on psychedelics.

Simply put, what is seen in the neuroscientific data is more whole brain activity and less segmentation during psychedelic experiences (Luppi *et al.* 2021; Roseman *et al.* 2014; McCulloch *et al.* 2022; Tagliazucchi *et al.* 2016). This increased "crosstalk" and concomitant functional de-specialisation of the brain on psychedelics "suggests decreased functional differentiation between sensory and abstract cognitive processing in the psychedelic state – a notion in line with reports that psychedelics can elicit a blurring of the internal-external/subject-object distinction and an increased influence of internal mentation on perceptual processing" (Girn 2022: 9). As Luppi *et al.* put it, "LSD and other psychedelics, such as psilocybin, decrease the integrity of functional connectivity (FC) within resting-state networks (RSNs), but increase FC between normally distinct RSNs" (2020: 2).

It is important, however, not to over-construe this finding by viewing it as a situation where the brain, in regular, non-psychedelic states, operates as a clockwork-like mechanism of functionally discrete, spatially strictly separated components. Indeed, this view of the sharp functional specialisation of individual brain areas is rapidly being replaced by a more nuanced understanding that function and structure are distributed along gradients (Vohryzek *et al.*

2024) and that psychedelics can thus best be seen as a redistribution of these gradients[119], not as a qualitative shift between the discrete and the continuous. Crucially, these altered gradients and the shifts in whole-brain composition that accompany them, and which represent the multiscale imbrication of various neurobiological dynamisms, have been strongly correlated with ego-loss. This is thought to occur via disruption of what is known as the Default Mode Network (DMN) and Salient Network (SN). These resting-state brain networks represent the supposed "default" state of the waking brain when it is not engaged in any particular activity in the world and the DMN in particular, which has been exhaustively studied over the past couple of decades, especially in relation to psychedelics (Carthart-Harris 2018; Carhart-Harris and Friston 2019; see Gattuso *et al.* 2023 for a metareview), is understood as a high-level cortical network that sits atop a "control hierarchy" regulating executive functions like episodic memory, self-modelling and theory of mind. Indeed, a popular view describes the DMN as the neurobiological seat of the Freudian ego (Carhart-Harris and Friston 2010). The SN, on the other hand, regulates what our brain pays attention to and literally determines what its (and our) most salient needs are from moment to moment.

Psychedelics appear to dramatically attenuate or, in the stronger terms usually employed, "disintegrate" the DMN and profoundly alter SN activity, and this, it is argued, comprises the neural correlates of experiences of loss of self or ego dissolution. While the popular association of the DMN with the ego or "sense of self" is a somewhat tenuous oversimplification and needs to be heavily qualified (van Elk and Yaden 2022), DMN overactivation *has* been associated with mental health conditions like major depressive disorder (MDD) (Scalabrini *et al.* 2020) and it has been argued that the positive results in treating MDD with psychedelics can thus be attributed, at least in part, to its effect on the DMN. I address the issue of ego-loss in more detail in the following section.

Several overlapping frameworks have emerged to describe the altered whole brain dynamics witnessed in psychedelics research as well as the oftentimes profoundly novel and transformative subjective effects correlated with these dynamics. For instance, data gleaned

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[119] "The brain's intrinsic functional organisation can be re-represented in terms of a small set of continuous, spatially overlapping whole-brain patterns, termed 'functional gradients' … Gradients map FC to a low-dimensional space where proximity indicates functional similarity. Each gradient represents a dimension in this space and the regions whose FC is most different along that dimension, known as 'anchoring points', establish opposite extremes" (Luppi *et al.* 2024: 6). As Girn *et al.* note in a discussion of the effects of psilocybin and LSD, the principal FC gradient in the brain, between unimodal and transmodal cortex, "was significantly flattened under both drugs relative to their respective placebo conditions. Between-condition contrasts revealed that this was driven by a reduction of functional differentiation at both hierarchical extremes – default and frontoparietal networks at the upper end, and somatomotor at the lower. Gradient-based connectivity mapping indicated that this was underpinned by a disruption of modular unimodal connectivity and increased unimodal-transmodal crosstalk" (2022: 1).

via EEG and fMRI are sometimes interpreted through the lens of receptor-informed network control theory – a DST approach to mapping energy trajectories and state transformations (Luppi *et al.* 2023a). In terms of psychedelically altered neural dynamics, this framework models connectivity shifts in the brain and the so-called "transition energy" required to move from one state to the other. Transition energy "is the minimum amount of energy that would need to be injected into a network (here, the structural connectome[120]) to induce transitions between the possible states of its functional dynamics" (Singleton *et al.* 2022: 3). Current research suggests that "serotonergic psychedelics like LSD and psilocybin induce more entropic brain activity in a manner related to a 'flattening' of the control energy landscape in the human brain" (7)[121], thus enabling easier transitions between states (Luppi *et al.* 2023b). In DST, energy landscapes are sometimes visually depicted as literal three-dimensional spaces consisting of various hills and valleys. Each point within a space represents a particular state of a system and the gradients between a current state and any other state represent the amount of energy required to shift to that state (e.g., "is there a steep hill that needs to be climbed?"). This simple, intuitive image is increasingly being used for conceptualising the higher-order effects of psychedelic perturbation of neural dynamics[122]. Vorhyzek *et al.* point out that

> [c]oncepts and methods from dynamical systems theory are proving useful in the analysis of brain activity at the macroscopic scale, as they serve to formally characterize the complex dynamics emerging from the collective behavior of billions of interacting neurons, exhibiting features such as multi-stability, meta-stability and self-organized criticality, that may serve helpful to identify the underlying principles coordinating cognition at the wholebrain level (2020: 12).

On DST and related views, in short, psychedelics reorganise spatiotemporal brain dynamics (Atasoy *et al.* 2018a; Carhart-Harris and Friston 2019) in a manner that results in less control energy being required to shift between task-free (i.e., the state usually associated with the DMN) brain states, with the result that, as Singleton *et al.* describe, "[a] flatter energy landscape corresponds to lower barriers to transition between different states of brain activity" (2022: 7). One result of this flattened energy landscape is an increase in brain activity entropy, which is sometimes described as a greater complexity of spontaneous neural oscillations (Carhart-Harris 2018). Neural oscillations are the temporal patterns of brain activity popularly

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[120] The connectome is "the network of connections between brain regions, whether physical white-matter tracts (structural connectome), or statistical relationship between functional timeseries (functional connectome)" (Luppi 2024: 3).

[121] I will explain below what entropy, applied to brain activity, means.

[122] Although the actual situation is, as will be seen later, far more complex, entailing far more than three dimensions, the replacement of points with vectors and the swapping out of a simple Euclidean geometry for a topological manifold populated by various attractors that represent the tendencies of modelled systems over time.

known as “brainwaves”; they are commonly measured via approaches like EEG and different brain states can be understood in part as different mixes of oscillatory frequencies (or “brain waves”), each at different amplitudes[123]. The DMN, for instance, represents a particular mix of these patterned temporal dynamics[124]. Decreased control energy is also suggestive of systems being poised near states of *criticality*.

The idea of criticality comes from chaos theory, a field closely related to DST. I will discuss chaos theory in more depth later on, but for now it suffices to invoke the most iconic image associated with this field – the Lorenz attractor. This image, reproduced below, depicts a two-dimensional dynamic system. Each pixel represents a potential state of the system and the pattern represents the actual recorded behaviour of the system over time, which can be seen as a loose circling around two different areas, each of which is an attractor of the system, i.e., a state that it tends towards.

[123] As Swanson helpfully explains, “[i]n mammalian brains, neurons tend to ‘fire together’ in synchronized rhythms known as temporal oscillations (brain waves). MEG and EEG equipment measure the electromagnetic disturbances produced by the temporal oscillations of large neural populations and these measurements can be quantified according to their amplitude (power) and frequency (timing)” (2018: 10).

[124] Interestingly, these dynamics appear to be associated with the spatial distribution of 5-HT_{2A}R when looking at regional control energy (Singleton *et al.* 2023), further underscoring the relation between these receptors, the DMN and various states of consciousness.

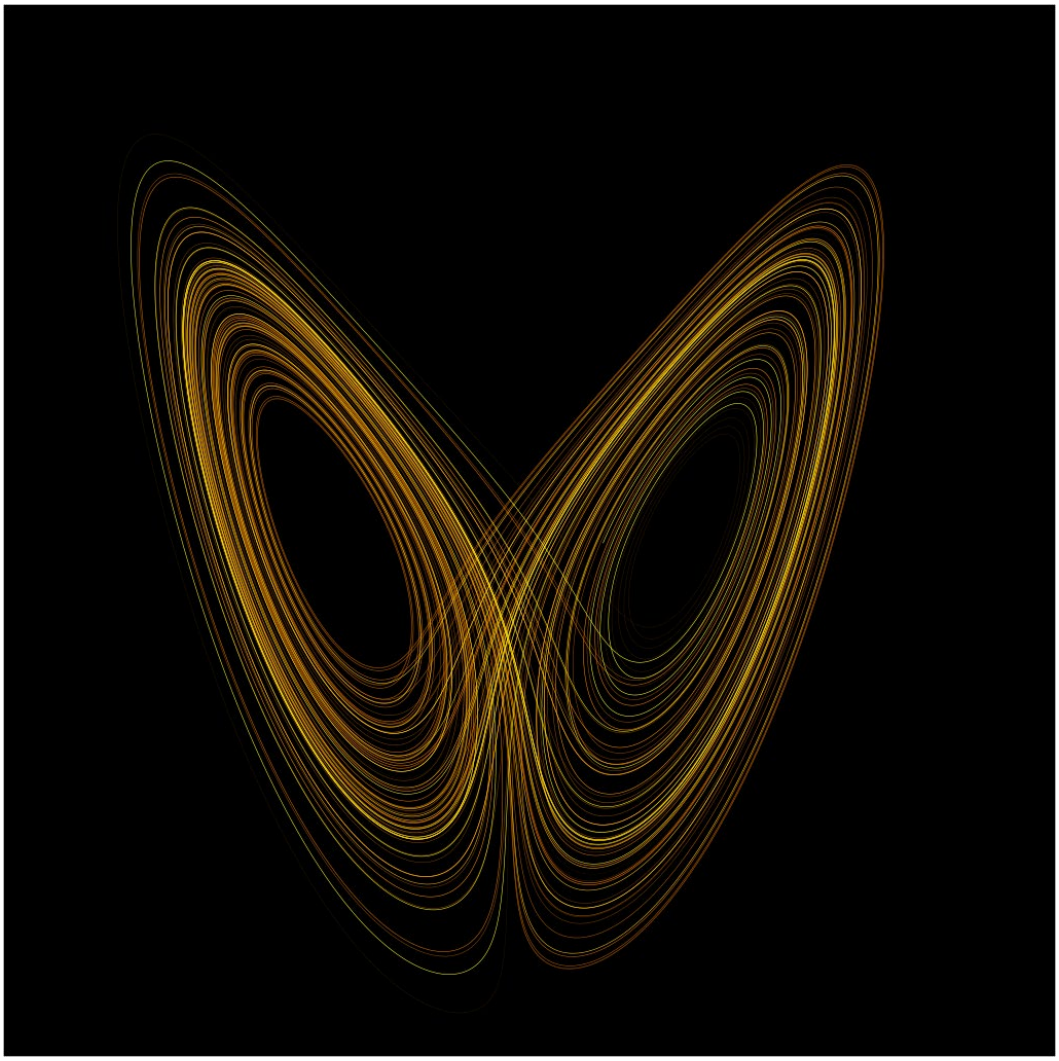

Figure 1: a Lorenz attractor. Image courtesy of Wikimedia. CC-BY-SA 4.0.

Specifically, the Lorenz attractor is what is known as a strange attractor: instead of the system it models ending up in a particular state (a point attractor) or exactly repeating the same behaviour over and over again (a cyclical attractor), it is evident that this system exhibits complex features. There is a roughly cyclical or semi-periodic nature to its temporal dynamics, but also a clear way in which each instance of this cyclical behaviour is singular: the system has definite tendencies, marked out by its attractors, but never expresses these tendencies in quite the same way (technically such systems have a fractal trajectory). This is the result of a system being highly sensitive to initial conditions, something that is usually described as the nonlinearity of the system and which is the basis of the popular idea of the “butterfly effect”. *Chaos*, then, is simply the term used to describe these interesting, complex dynamics that

exist somewhere between strict order and randomness/stochasticity[125], and chaos theory allows us to think about vast numbers of complex systems[126] in the world, often using the resources of DST, that exhibit this kind of behaviour: climate, predator-prey dynamics and, as will become clear, human brains (Kaneko and Tsuda 2001; Tsuda 2015)[127]. Because chaotic systems exhibit such nonlinear dynamisms, they are commonly described as systems that exist near the threshold between order and disorder, i.e., at a point of criticality.

Criticality is also the point at which a system can shift between qualitatively distinct states, something known as a *phase transition*[128]*;* "just as condensed materials can transit between ordered (e.g., solid) or disordered (e.g., gas) phases, neural networks can undergo phase transitions between highly regular and highly unsynchronized activity" (Ruffini *et al.* 2023: 3). As Atasoy *et al.* explain, there is a close link between criticality and complexity[129]; specifically, "an increased diversity of the repertoire and the emergence of complex dynamics are typically observed in complex systems when they approach criticality; the transition between an ordered and a less ordered regime" (2018a: 15). The richness of systemic dynamics near these thresholds has motivated some scientists to argue that criticality, which is in turn generative of novelty, is a core feature of life. Indeed, most living systems modelled using the resources of DST and chaos theory exhibit quintessentially nonlinear, complex behaviour and it stands to reason that it is near states of criticality that "a complex system has enough stability to sustain itself and enough freedom to exhibit a novel pattern of behavior" (ibid.). As M. Mitchell Waldrop describes it, criticality is "the one place where life has enough stability to sustain itself and enough creativity to deserve the name of life" (Waldrop 1992: 12).

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[125] It is important to distinguish between chaos and disorder: "chaos, which is defined as exponential sensitivity to small perturbations, is often used interchangeably with disorder in the literature on neural criticality, but chaos is in fact the ordered phase of dynamical systems because it corresponds to the breaking of the topological supersymmetry present in all dynamical systems" (Toker *et al.* 2022: 2).

[126] Similarly, the distinction between chaos and complexity is crucial: complex systems are any systems that comprise a wide range of parts that exhibit emergent properties or behaviour; chaotic systems are systems that exhibit nonlinearity, i.e., sensitivity to initial conditions and subsequent perturbations. Complex systems can and do often express chaotic features but can also settle into non-chaotic regularities.

[127] As Kaneko and Tsuda note, chaotic systems can be found in multiple natural contexts at various scales of emergent complexity: "[h]eart rhythm and capillary oscillation can be modeled as a coupled system of local nonlinear dynamics. A metabolic reaction network involves an ensemble of nonlinear oscillators which can show chaotic behavior. The population of antibodies and antigens, forming an immune network, changes chaotically in time, and provides an example for high-dimensional chaos. On a more macroscopic level, population dynamics for ecological and evolutionary systems often produces high-dimensional chaos" (2001: 61).

[128] The canonical example of a phase transition is heating water. Water near boiling point is near criticality and, if it breaches this critical threshold, will undergo a phase transition into steam. Notably, water exhibits most of its complex, nonlinear behaviour, like turbulence and convection patterning, near this threshold, as can be witnessed by watching a pot of water boil.

[129] Complexity in the everyday sense of informational or phenomenal richness.

This notion has proven influential within the brain sciences. The critical brain hypothesis, for instance, which develops upon seminal research in chaotic neural dynamics (Freeman 1987; 1988; Kaneko and Tsuda 2001), argues, supported by a fair amount of neuroscientific data, that various brain networks – and perhaps the brain as a whole – operate near criticality, i.e., as chaotic systems (Chialvo 2010; Hesse and Gross 2014). Korn and Faure point out that "chaos has been reported at almost all levels of the CNS [central nervous system] that is in invertebrate neurons and spinal giant axons, in central pattern generators, vertebrate olivary and hippocampal neurons, in the olfactory bulb, and at the level of the human brain" (2003: 828). These near-criticality dynamic states are also described as enhancing the information processing abilities of the brain (Shew and Plenz 2013; Mediano *et al.* 2022)[130] and also, by some accounts, support the emergence and functioning of consciousness (Toker *et al.* 2022).

Brain dynamics operating near criticality have access to a larger repertoire of possible future states or dynamics, including phase transitions or bifurcations to different repertoire distributions (Singleton *et al.* 2023; Atasoy *et al.* 2017; 2018; Girn *et al.* 2023). Strong evidence from various brain measurement experiments shows that psychedelics move neural systems closer to – and possibly beyond (Ruffini *et al.* 2023: 23) – points of criticality, thus theoretically increasing the complexity (also sometimes described as the fractal dimension) of brain behaviour[131]. As Varley *et al.* note, "the changes in consciousness triggered by psychedelics are associated with evolution towards a critical zone" (2020: 1). This complexity is the same thing as what is described in strict information-theoretic terms as entropy: when the brain is brought closer to criticality, via psychedelics for instance, it is also pushed towards a more highly entropic state (Viol *et al.* 2017), which is in turn the basis for the entropic brain hypothesis mentioned earlier (Carhart-Harris *et al.* 2014; Carhart-Harris 2018; Rankaduwa and Owen 2023) and which forms the basis of the REBUS and anarchic brain models.

It is important to underscore here that "default", i.e., non-psychedelic brain behaviour, is also understood to operate close to criticality. Psychedelics are thus seen to effectuate a quantitative shift, nudging brain dynamics even closer to points of bifurcation, *not* qualitatively shifting these dynamics from non-critical to critical states. However, it is also the case that, due to the nonlinearity of chaotic systems, small quantitative shifts can result in dramatic qualitative novelty. In this regard, brains at rest, i.e., when they are not being perturbed by

[130] The hypothetical information processing capacities of the brain in different dynamics states is sometimes measured using the notion of compressibility, for instance by calculating the Lempel-Ziv complexity of neuroscientific measurements taken in a given state (e.g., Timmermann *et al.* 2019).
[131] For instance, researchers have observed "an increase in the dynamical repertoire (i.e., new states) in the brain under psilocybin as well as an increase in the rate at which the repertoire is examined" (Tagliazucchi *et al.* 2014: 5452).

powerful neurobiological agents like LSD or psilocybin, are perhaps best thought of as occupying a state of *homeochaos*. This term, originally developed by Kunihiko Kaneko and Takashi Ikegami to describe nonlinearities in population dynamics (1992) was later generalised by Kaneko, in collaboration with chaotic systems theorist Ichiro Tsuda, as a way of conceptualising a broad range of complex systems that exhibit nonlinear behaviour without becoming merely dissipative, i.e., systems that manage to maintain a viable proximity to criticality in order to endure qua complex systems. In their words, homeochaos is "a mechanism for sustaining dynamic stability with diversity" (Kaneko and Tsuda 2001: 105)[132]. They elaborate:

> The notion of homeochaos can be used for a network like the brain, immune systems, ecosystems and chemical networks in metabolic systems, where the network should be adaptive, flexible and intelligent. The hypothesis states that weakly chaotic states are naturally selected to acquire the flexibility in growing and evolving systems; thereby homeochaotic states become invariant, and among their systems the dynamically controlled system like cardiovascular systems is stabilized to maintain the chaotic states, namely an achievement of homeodynamic control (Kaneko and Tsuda 2001: 236).

On this view, the DMN and SN, as well as other brain resting networks, would exhibit these kinds of weakly chaotic dynamisms and could thus be viewed as homeochaotic systems that serve to maintain complex, nonlinear dynamics within certain viable ranges[133]. Crucially, whether we are discussing homeochaos specifically or the behaviour of dynamic systems more generally, if we are to adequately understand them then we need to pay specific attention to their *temporal* nature, as well as the ways in which spatial and temporal dynamics reciprocally inform each other.

3.2.2 Chaos and emergence in the brain

In this section I will examine how these various emergent properties have been theorised. The Chilean biologist Francisco Varela, most famous for developing the notion of *autopoiesis*, which I explore at length in the next chapter, was an early advocate of the idea that careful examination of the emergent temporal behaviour of the brain was a crucial part of understanding its functioning. He developed the notion of neural assemblies to describe how ensembles of neurons coordinated their behaviour over multiple nested timeframes to give

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[132] Technically, homeochaos is seen as emerging from systems with many degrees of freedom, i.e., systems that, in DST, would be modelled using a large number of dimensions. Homeochaotic systems also exhibit chaotic itinerancy, which is a kind of exploration of possible states – or the exploration of nested phase spaces consisting of "ghost attractors" or "attractor ruins" – with varying numbers of dimensions. These ideas will be deployed more fully in the final chapter.

[133] Here, Kaneko and Tsuda give the helpful example of an complex ecological network, arguing that "the coexistence of many species is dynamically sustained as homeochaos" (2001: 189).

rise to cognitive behaviour (Varela *et al.* 2001). In a seminal 2001 paper, Varela and colleagues examine then-recent evidence to support the notion that these reciprocal dynamics between neuronal populations are achieved via phase synchronisation, i.e., neurons firing either at the same time or in temporally patterned, synchronised fashion. They note:

> These neural assemblies have a transient, dynamical existence that spans the time required to accomplish an elementary cognitive act (a fraction of a second). But, at the same time, their existence is long enough for neural activity to propagate through the assembly, a propagation that necessarily involves cycles of reciprocal spike exchanges with transmission delays that last tens of milliseconds … *the relevant variable required to describe these assemblies is not so much the individual activity of the components of the system but the dynamic nature of the links between them* (Varela *et al.* 2001: 229; my emphasis).

A similar argument is made by Kaneko and Tsuda, specifically in terms of what they describe as the "collective dynamics", "chaotic coupling" and "hidden coherence" of the brain (2001: 157). Inferring interaction between large ensembles of neurons via EEG data, they argue that "[i]f there is no correlation at all among the activities in these neurons or ensembles, the variation of the average activity should be negligibly small, considering the number of elements involved," whereas what is actually observed is that "large temporal variations remain in EEGs, which measure the average electric activity in our brain (over a large domain that includes a huge number of neurons)," thus suggesting that "neurons (or their ensembles) keep some kind of coherence" (ibid.). There is a clear form of recursion at play here: the emergent dynamics Varela describes as "resonant cell assemblies" (1995), whether the result of phase synchronisations, chaotic couplings[134] or some other closely related temporal mechanism is a bottom-up emergent behaviour that in turn effects, in a top-down manner, the neural substrate that gives rise to it. Indeed, the terms bottom-up and top-down are ill-suited for describing the reciprocal interplay between scales of emergent complexity and I use them only provisionally. This view, i.e., that "[h]uman brain activity results from the self-organization of large neural networks, emerging from complex recursive non-linear interactions between interconnected neural populations" (Deco *et al.* 2018: 3065), is supported by contemporary psychedelic neuroscience.

Drawing on early work on the regulation of cortical oscillations (Steriade and Deschenes 1984), for instance, Doss *et al.* note that "[t]he reticular nucleus is thought to function as a "neuronal oscillator", regulating the frequency of cortical rhythms, especially gamma waves," and that "[o]scillations of this kind are thought to support synchronization between brain regions and enable communication and information transfer" (2022: 443), with psychedelics

[134] Chaotic coupling, i.e., the coupling of multiple chaotic systems, can occur through phase synchronisation, but also occurs via other dynamics.

like LSD being observed to alter these reticular nucleus dynamics, specifically by attenuating various oscillatory frequency ranges (Atasoy *et al.* 2017), including neurobiologically "region-specific patterns of spectral power reduction in the alpha and theta bands" that are strongly correlated with the DMN (Barnett *et al.* 2019: 11). It is now understood that "[m]ammalian cortical neurons form behavior-dependent oscillating networks of various sizes, which span five orders of magnitude in frequency" and that these "network oscillations bias input selection, temporally link neurons into assemblies, and facilitate synaptic plasticity, mechanisms that cooperatively support temporal representation and long-term consolidation of information" (Buzsáki and Draguhn 2004: 1926)[135]. More broadly, "various oscillatory patterns have been identified as the neural correlates of different mental states" (Atasoy *et al.* 2018b: 3). For instance, it has been found that "temporal oscillations in spontaneous activity during awake resting-state, in fact exhibit highly structured correlation patterns among spatially distributed cortical regions" (ibid.). For this reason, some researchers "hypothesize that a topographically organized neural variability pattern may orchestrate the rise and fall in global states of consciousness", encouraging a "search for a temporal-spatial nested signature rather than a specific neuroanatomical location as a determinant of consciousness" (Li *et al.* 2023: 2).

In short, the emerging consensus is that the subjective effects of psychedelics are the result of perturbations to brain functioning at various scales of emergent, entangled complexity, from the molecular to the transmodal (and, when considering set and setting, far beyond); that this complexity, which exhibits various forms of nonlinear, chaotic and temporal dynamics, can be usefully understood using the resources of DST; and that the spatial and temporal aspects of these dynamics are, as Cabral *et al.* observe (2022), deeply imbricated. In terms of the latter, it has been argued that "the dynamics of time and space provides a 'common currency' that connects neuronal and mental features" (Northoff *et al.* 2019: 1) and that there is a need to develop a "spatiotemporal neuroscience" that understands neural dynamics as emerging from *while simultaneously iteratively constructing* their own spatiotemporal relations, just as, within contemporary physics, "time and space supposedly consist in the continuous construction of spatiotemporal relations between the different objects or events" (6)[136]. From a

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[135] "Detailed biophysical studies revealed that even single neurons are endowed with complex dynamics, including their intrinsic abilities to resonate and oscillate at multiple frequencies, which suggests that precise timing of their activity within neuronal networks could represent information… perception, memory, and even consciousness could result from synchronized networks. The synchronous activity of oscillating networks is now viewed as the critical 'middle ground' linking single-neuron activity to behavior. This emerging new field, 'neuronal oscillations,' has created an interdisciplinary platform that cuts across psychophysics, cognitive psychology, neuroscience, biophysics, computational modeling, physics, mathematics, and philosophy" (Buzsáki and Draguhn 2004: 1926).

[136] i.e., space and time do not function as separate and quasi-hylomorphic *a prioris* as they do in the folk psychological and pre-Einsteinian "container" view of space and time.

neurophenomenological perspective, this is potentially profoundly consequential; after all, as Northoff *et al.* argue, spatiotemporality is a shared feature of both the phenomenology of consciousness and of the neurobiology of the brain, i.e., our experience takes place in space and time[137], as do neural events (ibid.). In light of all these heterogeneous yet intersecting findings, Luppi *et al.* call for a hybrid multi-perspectival approach consisting of: "(i) a time-resolved perspective, which recognises that brain activity comprises the ebb and flow of distinct dynamical states; (ii) a multi-scale perspective, viewing the brain in terms of distributed patterns of structure-function relationships across spatial scales; and (iii) an information-resolved perspective, disentangling different forms of information storage, transfer, and integration" (Luppi *et al.* 2024: 2)[138].

Perhaps the most promising work in this direction is the recent development of "connectome harmonics" by Selen Atasoy and colleagues (Atasoy *et al.* 2016; 2017; 2018a; 2018b; Vohryzek *et al.* 2024)[139]. Building on work on human connectomics which argues that "the pattern of elements and connections as captured in the connectome places specific constraints on brain dynamics, and thus shapes the operations and processes of human cognition" (Sporns *et al.* 2005: 249)[140], Atasoy and co-authors propose a novel method of mapping neuroanatomy (the structural connectome) to function (oscillatory dynamics) by applying a mathematical operation known as the *eigendecomposition* of the Laplacian to fMRI data in order to map what are described as the "spatial harmonics" of different states of consciousness. This technique can be roughly described as the derivation of different standing wave patterns expressed by different oscillatory frequencies on connectome structure, each pattern being a different "spatial harmonic", and is usually compared to the well-known Chladni

[137] Not necessarily, however, in the sense of Kantian schematism: for Kant space and time are, broadly speaking, a priori constituents of experience whereas on a view informed by contemporary physics, spacetime and experience are reciprocally immanent.
[138] An apposite reminder that I am using and citing the term *information* unproblematically within this chapter but will be drawing critical scrutiny to the functionalist-computationalist-representationalist cluster of views it forms part of in the next chapter.
[139] Closely related work on "brain songs" applies a similar multi-perspectival approach, employing various neuro-oscillatory findings to argue that "the relevant timescale of the human brain emerges from the network properties and specifically the structural connectivity coupling" (Deco *et al.* 2019: 9),
[140] It is crucial not to view these constraints as wholly deterministic: "[d]espite the attractiveness of the idea that function is shaped by anatomy, it is also clear that the single fixed structure of the anatomical connectome should not be able to give rise to the full palette and complexity of brain function. However, evolution has found a solution to this apparent paradox by dynamically modulating the connectome over time through neuromodulatory systems, enabling the richness of behaviors needed for survival" (Kringelbach *et al.* 2020: 9566). Said otherwise, "[d]epending on sensory input, global brain state, or learning, the same structural network can support a wide range of dynamic and cognitive states" (Sporn *et al.* 2005: 249).

plate experiments, where sand or other particulate material is placed on a vibrating surface and, at specific frequencies, surprisingly complex patterns emerge.

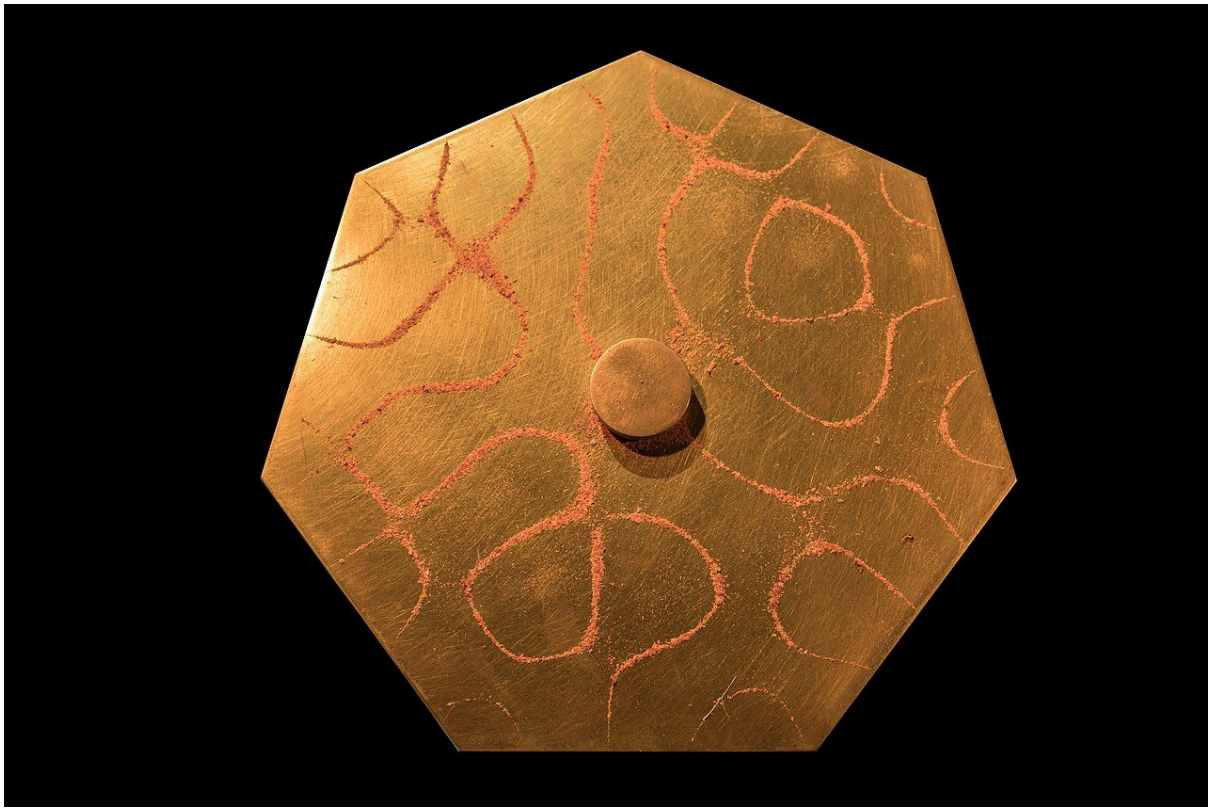

Figure 2: a Chladni plate. Image courtesy of Matemateca (IME/USP)/Rodrigo Tetsuo Argenton (CC-BY-SA 4.0).

Connectome harmonics research is underpinned by the conviction that "it is not only the frequency and amplitude of neural oscillations that is altered during a change in mental state but also the spatiotemporal patterns and the dynamics of cortical activity," and that "[t]he spatiotemporal patterns of cortical activity at the whole-brain level are thought to emerge from the local cortical dynamics and corticocortical interactions constrained by the anatomical connectivity of the human brain" (Atasoy *et al.* 2018b: 7). Put simply, the approach views brain structure as a surface, functional connectivity as the sand and oscillatory dynamics[141] as giving rise to various patterned distributions of this sand, constrained by the structural features of the surface, and by extension to different states of consciousness. Each state, on this view, comprises multiple individual connectome harmonics, just as a musical chord contains

[141] Neural oscillations straddle at least five orders of magnitude, from a few milliseconds to several seconds. The set of all connectome harmonics thus contains thousands of individual harmonics (Atasoy *et al.* 2017).

multiple individual notes[142]. Examining brain activity over time, it can then be viewed as similar to a musical performance involving various temporal shifts in harmonic structure. Although the musical idiom used to describe connectome harmonics can make it seem like idle speculation, it represents possibly the most significant and technically rigorous attempt thus far to provide a coherent description of connectome dynamics, bringing "together the anatomical, neuronal, and neurotransmitter systems at the whole-brain level" (Kringelbach *et al.* 2020: 9566).

Somewhat remarkably, Atasoy and colleagues have been able to successfully predict resting state brain activity patterns by applying the model to human structural connectome (Atasoy *et al.* 2016; 2018). More importantly, the framework has been used to examine different states of consciousness, including psychedelics, where it lends support to the findings that substances like LSD, psilocybin and DMT reconfigure the spatiotemporal repertoire of brain dynamics by altering unimodal to transmodal functional gradients and nudging emergent neural complexity closer towards criticality. Specifically, psychedelics are seen to result in more complex and non-random (i.e., supporting the notion of near-critical dynamics) connectome patterning that is biased towards higher frequency harmonics[143] and lends support to earlier work on the links between neural complexity and psychedelics (Tagliazucchi 2014). While this has been vividly described in the connectome harmonics literature using the musical idiom of improv jazz, with the psychedelically-altered brain expressing itself via a wider range and more complex combination of harmonics (or metastable oscillatory modes), a new iteration of the framework, HADES (the harmonic decomposition of spacetime), promises to more rigorously formalise the temporal focus and has been recently successfully applied to the modelling of the effects of DMT (Vohryzek *et al.* 2024).

Examining the range of various contemporary models that are currently being explored to describe the findings of contemporary neuroscience, particularly the complex neurobiological effects of psychedelics, models that range from chaos theory to the entropic brain hypothesis to connectome harmonics, it seems clear that beyond the distinct technical resources they draw on, there are striking similarities in their overall approaches, including, most importantly, a shift away from cellular reductionism bolstered by a recognition of the nonlinear and emergent dynamics of the brain. Atasoy *et al.* underscore that "it has become increasingly

[142] The method used within connectome harmonics is similar to the ubiquitous Fourier transform that mathematically translates between domains, e.g., between time and frequency domains, and is a staple of signal processing (the Fast Fourier Transform, for instance, is used to extract frequency-specific information from complex sounds for use in audio resynthesis or noise reduction).
[143] The attenuation of lower-frequency dynamics reflects the broadband cortical desynchronisation that is described in various ways in the literature, e.g., as increased entropy or DMN disintegration (Carhart-Harris 2014), a lessening of structural constraints on function (Luppi *et al.* 2023), increased turbulence (Cruzat *et al.* 2022) or the amplification of chaotic itinerancy (Kaneko and Tsuda 2001).

apparent that neural activity shows characteristics of criticality – a delicate balance between two extreme tendencies; a quiescent order and a chaotic disorder – where complexity increases and certain functional advantages may emerge" (2017: 7). It is on the level of human subjectivity, in terms of the much-lauded therapeutic and ontologically transformative benefits of psychedelics, that these advantages are most enthusiastically discussed.

I will now turn to examine the ways in which the neuroscience I have described in this section is being used to endorse various models of psychedelic therapy – and various ideas about consciousness more broadly – in a manner that reflects important, if not always explicitly acknowledged, philosophical assumptions and implications.

3.3 Brains and minds: contemporary models of psychedelic therapy

> The manifestation of the sacred ontologically founds the world (Eliade 1976: 144).

Link R. Swanson, philosopher of cognitive science, observes that "the recently discovered neurophysiological correlates of subjective psychedelic effects present an important puzzle for 21st-century neuroscience" (2018: 11). On the one hand, we are still far from determining the exact manner in which neural dynamics give rise to subjective experience. On the other hand, we have a wealth of evidence demonstrating that subjective experience can be reliably and dramatically transformed by interventions at the neurobiological level. In fact, as French neuroscientist Jean-Pierre Changeux[144] and colleagues have demonstrated, a simple burst of strong transcranial magnetic stimulation (TMS) can result in profound and empirically testable shifts in self-awareness (Lou, Changeux and Rosenstand 2017: 770). Changeux and Stanislas Dehaene elaborate that TMS "over either parietal or prefrontal cortex can prevent conscious perception and even trigger a sudden subjective disappearance of visual stimulus during prolonged fixation, change blindness, binocularly rivalry, inattentional blindness, and attentional blink paradigms" (2011: 216). They further underscore that similar disruptions to consciousness can occur as a result of lesions to similar parts of the brain (ibid.).

[144] Changeux is best-known for developing the Global Neuronal Workspace (GNW) theory of consciousness (Dehane, Sergent and Changeux 2003), of which he provides the following succinct explanation in terms that should by now be familiar: "[GNW theory] privileges a subset of cortical pyramidal cells with long-range excitatory axons, particularly dense in prefrontal, temporoparietal, and cingulate regions, that, together with the relevant thalamocortical loops, forms a horizontal "neuronal workspace" interconnecting multiple specialised, automatic, and nonconscious processors. The conscious content of a given sensory input (seeing, hearing, etc.) is assumed to be encoded by the sustained and amplified activity (termed "ignition") of a subset of neurons from the GNW, the rest being inhibited. The long-distance axons of these elements then broadcast the information to many other processors, brain-wide and with defined spatial distribution, ultimately leading to a report of conscious experience" (Changeux 2017: 9).

Given the emergent complexity of psychedelic brain dynamics I outlined in the previous section, which stretches from molecular agonism at receptor sites to the patterned yet chaotic spatiotemporal connectome harmonics of brains and possibly beyond, it seems almost certain that, regardless of which highly cursory theories of consciousness we subscribe to, a reductionist account – whether bottom-up or top-down – will not suffice if we are to meaningfully begin to untangle the links between neurobiology and subjective experience, i.e., if we are to usefully define the so-called "neural correlates of consciousness" (NCCs) (Crick and Koch 1990). Changeux, in this regard, motivates for what he terms a "dynamic nesting of models" which "assumes that the brain is a nested assembly of functional structures at multiple levels of organisation, from molecules to consciousness, reciprocally inter-regulated and in constant dynamic evolution, which operates intrinsically through variation-selection mechanisms yet on different timescales, from the million years of human ancestry up to the 100ms of psychological operations" (Changeux 2017: 2)[145]. He thus endorses, in lieu of a single unifying account of brain action, "a coherent and open community of brain models" (1).

This notion, of an open community of dynamically nested models, is especially apposite as we turn to examine contemporary approaches to psychedelic therapy and the ways in which these approaches integrate the various provisional neuroscientific findings explored above. Psychedelic therapy is, like the study of consciousness itself, still in its infancy; indeed, the former is inextricably linked to the latter, especially when considering that aspect of the psychedelic experience that is most commonly discussed as key to its therapeutic potential: ego dissolution. Close attention to the neural correlates of what has come to be known as "drug-induced ego dissolution" (DIED) (Millière 2017) and other subjective effects of psychedelics has led to a broad consensus within neuroscience that "[p]sychedelic subjective effects will likely involve widespread changes to hierarchical connectivity subtending associative and sensory processing across the cortex and subcortex" and thus that "[e]xamining and integrating cellular, regional, network, and whole-brain connectivity changes may best account for observed phenomenological changes in consciousness" (Stoliker *et al.* 2022: 898).

The study of psychedelics, on this view, encourages a neurophenomenological approach that brings together third person data from neuroscientific inquiry with first person phenomenal accounts of subjective experience. More prosaically, the technologies and approaches of contemporary neuroscience provide "psychedelic researchers with tools to integrate the

[145] Changeux's own approach, while it dynamically nests models, remains somewhat reductionist in its preferencing of genetic dynamics (from short-term gene expression to intergenerational epigenetics) (2017).

intangible (mystical experiences, ego dissolution) with the observable (brain images)" (Giffort 2020: 98). This is in a manner resonant with what psychedelic research anthropologist Nicholas Langlitz describes as a new image of *Homo cerebralis*. For Langlitz, with the dawning of this new image at the intersection of neuroscience and subjectivity, "[c]onsciousness continued to be inseparably associated with the brain, but it did not appear as a control center anymore. Instead it emerged from the interactions within a decentralized and dynamic neural network constituted by cell assemblies temporarily synchronizing their activities" (2012: 96). This "reconceptualization of the relationship between mind and brain brought about by the cognitive neurosciences" is "no mere biologization of mental life but rather to a 'mentalization' of the brain … a new arrangement [of the subjective] with the objectivity of neurophysiological measurements" (105), something that in turn has significant implications for philosophy of mind. It is hard to overstate the novelty of the forms of psychedelic-assisted therapy (PAT) that have emerged around this image of *Homo cerebralis*. The coupling of acute administration of powerfully mind-altering psychedelic substances in a surrounding context of longer-term therapeutic-integrative work is "arguably unlike anything else in psychiatry and represents a potential paradigm shift for the field" (Aday *et al.* 2024: 1; see also Tullis 2021).

Before we turn to a discussion of how exactly psychedelics produce DIED via the aforementioned complex brain dynamics, it is worth examining precisely what the term *ego dissolution* refers to. In the previous chapter I provided a broad overview of the phenomenon variously described as DIED, ego-loss, ego disintegration, mystical experience, a return to the *fons et origo* and spiritual transcendence and detailed how it formed part of a larger dynamic of death, rebirth and transformation, i.e., psychedelic individuation. While it is clear that psychedelics, especially in high doses, reliably produce such experiences, it is perhaps less clear what their features are and, just as importantly, how these experiences can in turn be meaningfully incorporated into therapeutic practices, not to mention thought about philosophically.

Beyond the myriad informal subjective reports that have emerged from psychedelic experiences over the centuries testifying to DIED, a variety of ego-loss specific rating scales have been developed in recent decades. The most well-known of these is the Ego-Dissolution Inventory (EDI), a well-validated self-reporting psychometric scale that lists eight overlapping items commonly associated with DIED, each of which is rated from 0-100: dissolution of my "self" or ego; feeling at one with the universe; a sense of union with others; a decrease in sense of self-importance; disintegration of "self" or ego; less absorption in personal issues and concerns; loss of all sense of ego; all notion of self and identity dissolved away (Nour *et al.* 2016: 3). The developers of the EDI observe that DIED, as described by the model, entails "a

blurring of the distinction between self-representation and object-representation, and precludes the synthesis of self-representations into a coherent whole" (2), an experience analogous to the 5D-ASC's description of "oceanic boundlessness", and one that has also been described within various spiritual practices – for instance by advanced meditators[146].

Such disruptions of self in relation to other, or subject in relation to object, beg the question of what the self in fact is. While the nature of selfhood has been grappled with throughout the history of philosophy, cognitive science and psychology, it is usually broadly associated with a sense of spatiotemporal experiential and narrative coherence that is grounded in waking consciousness and may be dramatically perturbed or even temporarily extinguished in conditions such as sleep or anaesthesia. As Nour and Carhart-Harris point out, reiterating a view that has become a broad default within cognitive science, there are however at least two distinct notions of self that can be described along these lines (2017: 177). On the one hand, we have a "narrative self", which is associated with our "personal identity … individual life narrative, enduring character traits, life goals and a hierarchy of personal values" (ibid.). This narrative self can be understood as "a cognitive theoretical construct – an object of knowledge, emerging from the stories that we tell, and are told, about ourselves" (ibid.). The concept of the narrative self has been important for explaining how some sort of consistency can be perceived in an individual, even as they age or behave differently in varied contexts.

On the other hand, we also have a so-called "minimal self" typified by an immediate and embodied sense of agency and intuitive "hanging together"; this core self is close, although not identical to, the target of the Husserlian phenomenological reduction or bracketing of experience that seeks to hold at bay "the contingent facts that give substance to the narrative self" (Nour and Carhart-Harris 2017: 2) in order to get to the transcendental pith of phenomena as the arising of experience qua experience. The difference between the narrative and minimal self can also be thought of as a distinction between "the self as an object of attribution and … the self as the knowing subject and agent" (Christoff *et al.* 2011: 104).

This view originates in the thought of William James, who distinguishes between what can be broadly construed as the "Me", or "self-as-object-of-experience" and the "I", or "self-as-subject-of-experience" (2007). Mateusz Woźniak notes that in most cases "this distinction maps onto

[146] The early view that psychedelics produced a kind of "psychotomimesis" is partly grounded in the experience of DIED, given that "self-disturbances and disturbed ego-boundaries are a core phenomenological feature of psychosis and schizophrenia" (Nour *et al.* 2016: 2). However, there are crucial qualitative and quantitative differences between regular psychedelic experiences and psychosis and "it remains unclear precisely how the self-disturbances specific to schizophrenia relate to the experience of ego-dissolution under psychedelics" (ibid.).

the distinction between the phenomenal self (reflecting self-related content of consciousness) and the metaphysical self (representing the problem of subjectivity of all conscious experience)" (2018: 1). It also parallels the distinction Varela and others have drawn in describing the third and first person aspects of the neurophenomenological project and it is, as Varela and his interlocutors have argued, important to draw more attention to the "I" than has been the case within cognitive neuroscience, which is largely "Me" focused. Christoff *et al.* note that "relying exclusively on this paradigm would limit the cognitive neuroscience of self-experience to self-related processing (the 'Me'), to the neglect of the self-experience of being a knower and agent (the 'I')" (2011: 104). The "I" here consists of what Thomas Metzinger calls "minimal phenomenal selfhood": the "pre-reflective bodily foundations of phenomenal selfhood … all those levels which are independent of explicit cognition and linguistic abilities, and which give rise to the subjective experience of being a self … but which can function as enabling conditions for a conceptually mediated, cognitive first-person perspective and high-level social cognition" (Blanke and Metzinger 2009: 7). If this distinction between the narrative self – a system that "represents itself not only as a self but also as 'a self in the act of knowing' " (8) – and the minimal self – the more rudimentary experience of being a self, i.e., "the experience of being a distinct, holistic entity capable of global self-control and attention, possessing a body and a location in space and time" (7) – is unclear, this is, according James, due to the way in which philosophers and others have commonly thought about the relation between self and experience as inextricably reflexive-recursive. He notes:

> Many philosophers … hold that the reflective consciousness of the self is essential to the cognitive function of thought. They hold that a thought, in order to know a thing at all, must expressly distinguish between the thing and its own self. This is a perfectly wanton assumption, and not the faintest shadow of reason exists for supposing it true. As well might I contend that I cannot dream without dreaming that I dream, swear without swearing that I swear, deny without denying that I deny, as maintain that I cannot know without knowing that I know (James 2007: 166)[147].

Metzinger has drawn James's critique to its logical conclusion in his argument that the narrative self (and on some readings, even the minimal self, in the sense of a unified subject of moment-to-moment experience) is largely illusory – an artefact of embodied cognitive engagements with the world. Metzinger argues that conditions like severe prosopagnosia (the inability to recognise faces), which renders some people unable to see themselves in mirrors,

[147] Note that this does not undermine the Husserlian phenomenological view that perceptual consciousness, or mental states more generally, are intentional in the sense that they are *about* something. It is instead a more specific argument that intentionality does not entail reflexivity, i.e., the inclusion of a narrative self, within phenomenal experience. As James straightforwardly says, "I may have either acquaintance-with, or knowledge-about, an object O without thinking about myself at all. It suffices for this that I think O, and that it exist" (2007: 166).

"destroys common phenomenological intuitions about the immediacy of self-awareness" (2003a: 218) and that, therefore, the "phenomenal quality of "mineness" or bodily "selfhood" is by no means a *necessary* precondition of conscious experience" (334; emphasis in original). More provocatively, Metzinger argues that the very idea of a "subject of experience" is not logically primitive (577) but is instead a kind of user illusion or representational "model" wrought by a cognitive system[148]. Specifically, Metzinger draws attention to the transparency of phenomenality – the way in which phenomenal experience elides the *production* of that experience within experience itself, resulting in a naïve realism whereby what is phenomenally presented is conflated with the real. As Metzinger puts it, phenomenal transparency "means that something particular is not accessible for subjective experience, namely the representational character of the contents of conscious experience" (2003b: 358).

While Metzinger's reliance on a representational model of cognition falls prey to the critique developed in the next chapter[149], his core point stands, namely that

> [m]any bad philosophical arguments concerning direct acquaintance, infallible first-person knowledge and direct reference are based on an equivocation between epistemic and phenomenal immediacy: from the fact that the conscious experience, e.g., of the color of an object, carries the characteristics of phenomenal immediacy and direct givenness it does not follow that any kind of non-mediated or direct kind of knowledge is involved (359).

To be clear, Metzinger does not support a straightforward view that phenomenal experience is always transparent – indeed, he points to examples like lucid dreaming (and ostensibly would include metaprogrammatic insights cultivated by psychedelics too) to draw attention to the fact that transparency is "a *gradual* property of phenomenal states" (362) and that various forms of opaque phenomenality exist. He does, however, in terms that overlap considerably with the earlier distinction I noted between narrative and minimal selves, subscribe to the idea that "the phenomenal first-person perspective is a condition of possibility for the emergence of a cognitive first-person perspective" (385); as he elaborates:

> Cognitive self-reference always is reference to the phenomenal content of a transparent self-model. More precisely, it is a second-order variant of phenomenal self-modeling, which, however, is mediated by one and the same integrated vehicle of

[148] In many instances, Metzinger occupies a hybrid position between the kind of functionalist-computationalist-representationalist perspective that is the target of the next chapter (albeit an "extended" functionalism that looks beyond the periphery of the skin) and a proto-enactivism. His critique of folk-psychological selfhood, however, is not inextricably bound to either position.

[149] Metzinger, for instance, sees representation as a crucial to the emergence of consciousness; on his view, "a conscious cognitive subject is generated as soon as a globally available representation of the system as currently generating and operating with the help of quasi-linguistic, opaque mental representations is integrated into the already existing transparent self-model" (2003b: 367-8).

> representation. The capacity to mentally conceive of oneself as oneself*[150] consists in being able to activate a dynamic, "hybrid" self-model: Phenomenally opaque, quasi-symbolic and second-order representations of a pre-existing phenomenally transparent self-model are being activated and continuously re-embedded into it (Metzinger 2003b: 385).

In Preller and Vollenweider's summary of Metzinger's view, "the ego is the content of a self-model; this conscious self-model constructed by the brain allows us to interact with our internal world as well as with the external environment in a holistic manner … [u]ltimately, the subjective experience of the ego arises from dynamic self-related information processing, which is the result of a self-organizing brain system interacting with its environment, because no such things as selves exist in the world" (2016: 229). If we perhaps necessarily fall prey to this illusion, this is simply because "the distinction between intentional and phenomenal content collapses for self-consciousness" (Metzinger 2003b: 387).[151]

3.3.1 Selves, non-selves and the deaths of selves

To return to our discussion of DIED, we can adopt the provisional view that the "ego" that is being dissolved is, generally speaking, the "Me" or narrative self, which is in turn not an ontological primitive but an emergent – and oftentimes remarkably enduring – holding pattern that binds experience together spatiotemporally via subject-object distinctions and explicit forms of self-reference. This holding pattern, which we commonly refer to, in a folk psychological register, as "the self", "should be understood as a complex matrix of representations involving different structures and functions rather than a single entity that could be readily abandoned in psychedelic states" (Vollenweider and Smallridge 2022: 130). When this holding pattern (the connectome harmonic refrain of *Homo cerebralis's* DMN, perhaps) breaks down, the dynamics giving rise to it can be encountered in a less reflexive manner, i.e., qua their heterogenetic and non-unified nature[152]. On a therapeutic view, this affords an opportunity to interact more directly with these dynamics – drives, complexes,

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[150] The * here is an allusion to Hector-Neri Castañeda's argument that pronouns that "refer to the object of a person's knowledge, beliefs, thoughts, assertions, about himself" (1966: 132) constitute a unique logical category of self-reference and should be specified as such.

[151] Metzinger's more recent related discussion of MPE – minimal phenomenal *experience* – wherein he examines the idea of "pure awareness" or consciousness that is not, strictly speaking, phenomenologically *intentional*, is also useful to apply to an examination of DIED; as he notes, "MPE is non-egoic self-modelling: as such it is atemporal, selfless, and not tied to an individual first-person perspective. It instantiates a unique but highly abstract kind of phenomenal character which can be described on different levels of analysis – for example, as a maximally abstract form of embodiment or bodily self-awareness, as a dynamic representation of tonic alertness, or as an internal model of an epistemic space" (2020: 36).

[152] This, as we will see, is close to what Varela terms a *meshwork of selfless selves* (1991) and what Deleuze calls *larval subjects* (1994).

COEX clusters, tdySt[153], attractors – prior to their unification into a narrative self, and thus the possibility of reworking or redirecting them in order that a healthier self may emerge.

At this point, however, a seeming paradox emerges: if the self is dissolved then who or what is the subject of this experience of the heterogenetic dynamics giving rise to selfhood? Here, it is crucial to underscore that DIED is typically understood as a *process*. While ego-loss is often viewed as a binary switch, it is perhaps more useful to view it as a transition: before the point is reached, the emergent system known as the self moves closer towards criticality and thus begins to express more complex non-linearities of the kind that, in this case, give rise to a progressive unravelling of the usual features of the narrative self until the critical threshold is crossed. This is what Hayes *et al.* describe as an "alteration of sense of self away from a judgmental self-narrative and toward a perspective-taking self" (2020: 33). As they note, this kind of trajectory can take the form of a positively experienced depersonalisation or decentring of "the perspective-taking self and the deictic and other frames from which it is derived," resulting in "an *increased* sense of union with others, a *reduced* sense of self-identity, a *reduced* sense of self-importance or other forms of self-judgment, and an openness and sense of connection across time and place" (ibid.; my emphasis). More formally:

> The psychedelic experience can be conceptualized as having two interrelated components: the experiential content and the experiential *process*. At the core of this process is the *loosening* of self-boundaries and the *diminishing* of ordinary ego-functions, which *unfolds* along a perception-hallucination continuum with *increasing* arousal, *culminating* in ego-dissolution and a state of oneness with the external world (Preller and Vollenweider 2016: 229; my emphasis).

To reiterate the list of features of a quintessential psychedelic experience I provided at the beginning of this chapter, what becomes clear is how the unfolding of DIED across the course of such an experience can result in an unfolding cascade of profoundly altered phenomenological experience (including affect), perturbations of the self and its narrativisation (including meaning-making) and the emergence of various target features of the psycholytic model (e.g., metaprogrammatic awareness and increased expression of "unconscious" material), all of which is potentially therapeutically relevant. What is of specific importance here is that "the phenomenon of ego-dissolution is neither an all or nothing affair nor does it

[153] First-wave psycholytic therapist Hanscarl Leuner independently developed a framework that overlaps considerably with Grof's notion of COEX clusters. Specifically, he "hypothesized that many LSD phenomena observable in the context of psycholytic therapy can be understood through a concept of specific memory constellations…[that] selectively determine the field of experience. Such systems controlling the sequence of experiential contents were described by Leuner, who named them "Transphenomenal Dynamic Control Systems" (tdySt). They are 'transphenomenal' in the sense that they are not restricted to specific mental functions or any particular life event. Rather, they propagate through the personality in various functions of thought and behavior" (Passie *et al.* 2022: 9).

occur on its own … [it] arises dose-dependently along a perception-hallucination continuum associated with increased sensory and emotional arousal, distinct changes in cognitive functions, the release of emotions, often with the recall of emotionally loaded autobiographic memories, and increased capacity for introspection" (Vollenweider and Smallridge 2022: 122).

Below, I will discuss how psychedelic-assisted therapy (PAT) works. I have already covered the neuroscientific basics, but it needs to be explained how exactly we navigate the complex links between neurotransmitters, the DMN and brain oscillations, on the one hand, and the messy details of subjectivity on the other in order to effectively therapeutically intervene in experiences like depression (Dawood Hristova, and Pérez-Jover 2023), PTSD (Elsouri *et al.* 2022), end-life anxiety (Yu *et al.* 2021; Whinkin *et al.* 2023) or substance use disorder (Zafar *et al.* 2023). On the broadest level, there is the popular view that "psychedelics function more or less as nonspecific catalysts and amplifiers of the psyche" (Grof 2008: 11), which entails a recognition of the contextual specificity of any given psychedelic experience. How such an experience is facilitated and how set and setting[154] interact to produce the experiential context will inform the trajectory of DIED and other common dynamics.

What has become clear in recent research (see Andersen *et al.* 2021 for a comprehensive overview) is that the subjective intensity of experiences, along with positively-experienced ego dissolution (characterised by "letting go" and a lack of anxious scrambling to retain the holding patterns of regular consciousness – so-called "fear of ego dissolution") are predictive of PAT efficacy (Roseman *et al.* 2018; Preller *et al.* 2017). Evidence here includes strong correlations between oceanic boundlessness and other relevant measures of the 5D-ASC scale and positive clinical outcomes for conditions like depression and PTSD (Acero *et al.* 2023: 5), as well as a negative association between mystical experience and psychological insights, on the one hand, and depression and anxiety on the other (Davis *et al.* 2019 cited in Acero *et al.* 2023: 5).

This does not entail that acute experience takes the form of an effortless unfolding of oceanic boundlessness and the dissolution of the self: many positively transformative experiences can be profoundly challenging (Barrett *et al.* 2017) and may include in their unfolding one or more analogues of Grof's BPMs, i.e., experiences of claustrophobia or existential collapse, mythic struggle and so forth. For instance, "[a]yahuasca experiences are often described as going through an initial state of confronting innermost fears: fear of insanity, fear of death, paranoid thoughts, or the despair of loneliness and rejection" and, if "the subject is able to surrender,

[154] Set and setting will be briefly addressed below but will be more fully elaborated via enactivism in the following chapter.

this challenging initial phase is usually followed by a sudden transformation of the experience into emotional relief, insightful reflections, states of self-transcendence, and changed worldview and outlook on life" (Scheidegger 2021: 49-50).

The role of the facilitator here is to ensure that such experiences, so-called "bad trips", do not get stuck or locked into a specific point, something that may have serious long-term consequences given the heightened plasticity of the psychedelic brain. Such facilitation work often entails acutely enhanced processes of narrativisation and meaning-making. Gassi *et al.* observe, for example, that "when entering psychotherapy, patients often present a narrowed view of themselves, designed as a maladaptive framework of meaning, based on fixations and rigid rules, preventing fruitful meaning-making" (2021: 6). There is evidence in this regard to support the idea that difficult psychedelic experiences are especially effective at driving renewed processes of meaning-making, often in the face of acute existential crisis, in a manner that may oftentimes result, paradoxically, in improved existential well-being (Carhart-Harris *et al.* 2016; Garcia-Romeu *et al.* 2016)[155]. The effectiveness of psychedelics in this regard is frequently described as reliant upon "reducing patterns of experiential avoidance and promoting more adaptive acceptance" (Watts *et al.* 2017; Wolff *et al.* 2020).

The efficacy of psychedelics for treating depression is not entirely surprising. The DMN, which is attenuated or "disintegrated" during DIED tends to be overactive, with higher functional connectivity, in people with depression (Sheline *et al.*, 2009; Northoff 2016; Scalabrini *et al.* 2020). This has been associated in turn with the excessive rumination (Mastinu *et al.* 2023) and self-preoccupation that often typify depressive symptomatology (de Araújo 2019: 114). Psychedelic attenuation of the impact of the DMN can thus be understood to contribute towards a decentring of the ruminative and obsessive aspects of the narrative self in favour of a "detached view of one's own thoughts and emotions that the substance elicits" (Soler *et al.* 2015: 2).

On this view, the "recollection of highly emotional events simultaneous with a detached view of these events, as induced by ayahuasca [or other psychedelics], may help the reprocessing of emotional experiences" in a manner that results in "increased awareness, changes in self-perspective, decreased hopelessness, and positive impact on general well-being" (ibid.), which may in turn have therapeutic benefits for treating substance use disorders (Thomas *et*

[155] While one recent meta-analysis has argued that psychological insight and emotional breakthroughs (as well as mystical or DIED-type experiences) are more strongly associated with enduring positive changes than challenging or discomforting experiences are (Kangaslampi 2023), it is unclear how the latter types of experience were strictly separated from the former within the review process and it is likely that there is considerable overlap.

al. 2013). There is also evidence to support the role of higher-order brain networks other than the DMN, including the SN and the executive network (EN) in depression; as Daws *et al.* observe, the 5-HT_{2A} receptor, "which is the key proteomic binding site of "classic" serotonergic psychedelic drugs, such as psilocybin, is most densely expressed in a broad pattern of cortex that closely resembles a conjunction map of the DMN, EN and SN, corresponding to the transmodal portion of the brain's principal hierarchical gradient" (2022: 844).

Furthermore, unlike conventional psychiatric medication for depression and related situations, which has an average onset time of two weeks, the acute effects of psychedelics result in a near-immediate antidepressive effect that endures for weeks to months[156], ostensibly due to a combination of the transformative dynamisms set in motion by DIED as well as longer-term psychoplastogenic potentiation (Osório *et al.* 2015)[157]. At different temporal scales, both of these enable forms of increased psychological flexibility that render depressive etiology more tractable. This psychedelically-induced metaplasticity, discussed in the previous section, is especially interesting given that, as Acero *et al.* point out, neuronal plasticity plays a key role in learning and memory and that "dysfunction of mechanisms regulating plasticity in key brain regions, e.g., the PFC [prefrontal cortex]], may underly the pathophysiology of PTSD and depression" (2023: 7). Heifets and Olson furthermore point out that "[a] psychedelic or entactogenic experience may have long-lasting effects on the brain's ability to adapt to future experiences" and therapists "may take advantage of this unique metaplastic state" through careful and supportive post-experience medium term integration (2024: 9).

In short, the currently dominant view is that psychedelics, taken in a supportive therapeutic context – which includes attention to broader context, i.e., set and setting, as well as preparation[158] – act via neurobiological agonism to disrupt a complex web of spatiotemporal brain dynamics. This results in an acute process of decentring of the narrative self and frequently entails various forms of amplified meaning-making[159], reviviscence, including

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[156] In their 2021 overview of clinical trials with psilocybin, for instance, Lowe *et al.* cite several studies listing positive effects lasting up to 14 months (7-8). See also Jaster and González-Maeso (2023: 10) for an overview of documented post-acute effects in various follow-up studies.

[157] However, no one causal pathway is necessarily the case: "psychedelics could have beneficial effects on depression by increasing neuroplasticity for one patient, while for another patient the improvement might be due to the psychedelic-induced mystical experience" (Van Elk and Yaden 2022: 11).

[158] "Preparation sessions typically take place the day before the drug administration, the participant is prepared for the experience by at least 1 trained therapist, who are often referred to as guides, based on the analogy of the psychedelic experience being a psychological journey. An overview of the dynamics and nature of psychedelic experiences is explained, including how it can be challenging for many people, how any such challenges can be best confronted, and how the participant can get the most out of the experience" (Nutt and Carhart-Harris 2021: 121).

[159] Which can include the attribution of archetypal significance to meaning-laden phenomena which can in turn oftentimes be understood in Grofian terms as COEX clusters.

autobiographical memories that may have been suppressed, and the experience of DIED. Careful post-acute work that integrates the often profoundly significant insights and other content that emerges during psychedelic experiences, including the common theme of death, rebirth and transformation, into a renewed framework of meaning, holds vast possibilities for PAT. It means that PAT is able to effect long-term positive changes in the everyday lives of people undergoing such experiences in a manner that is facilitated by the window of heightened neural plasticity. This window is also known as the reopening of the "critical reward period" or "psychedelic afterglow" and lasts between weeks and months after the immediate subjective effects have subsided. The long-term positive changes effected by PAT include unlearning deeply entrenched negative habits (Casanova *et al.* 2024) and decreasing ruminative loops, as well as amplifying personality traits like openness and increasing cognitive flexibility. As one researcher explains:

> When ego boundaries are dissolved to a degree where the conceptual distinction between external and internal world is suspended, there is no interface for the generation of symptoms anymore. With progressive reorientation in body, space, and time, the constructivist and process-related dynamics of symptom formation and possible avenues for their resolution become more evident to the patient. From this clinical epistemological perspective, it can be argued that drug-induced states of self-transcendence provide unique chances to gain metacognitive awareness into the intrinsic dynamic of root causes and processes underlying the formation of symptoms and open a psychotherapeutic window for adaptation, transformation, and personal growth. (Scheidegger 2021: 53)

PAT, to reiterate an earlier point, is thus qualitatively distinct from strictly reductionist pharmacological approaches of the kind that have been described as "psychedelic chemotherapy" (Pahnke *et al.* 1970: 1857) on the one hand, as well as traditional "talking therapies" on the other. Unlike the psychotherapeutic context, the acute phase of the psychedelic experience is primarily introspective and typically entails lying on a bed wearing a blindfold and listening to carefully selected music (Stoliker 2022: 878), with most conversation only taking place during the integration phase over the following days (Aixala 2022). This novelty, which brings science and subjectivity together in an especially vivid manner via the pharmacologically aided perturbation of the self, encourages renewed reflection not just on the healing potential of psychedelics but on the nature of the self qua consciousness and its ostensible neurobiological and spatiotemporal substrates more broadly (Luppi *et al.* 2024).

In the next section, I examine in detail some of the speculative models of the psychedelic experience that have been proposed, with an eye towards their philosophical implications and assumptions.

3.4 REBUS, anarchic brains and other hallucinated selves: Are we all Bayesians now?

> LSD – short for "Let the State Disintegrate!" (Timothy Leary quoted in Greenfield 2006: 303)
>
> A diving gannet may well be describable by a differential equation, but only one of them catches a fish. (Nave 2025: 98)

3.4.1 RElaxed Beliefs Under pSychedelics

By far the most popular contemporary theoretical framework for discussing the psychedelic experience and its potentially transformative effects is Carhart-Harris and Friston's RElaxed Beliefs Under pSychedelics (REBUS) model (Carhart-Harris and Friston 2019) and its corollary, the anarchic or entropic brain hypothesis (Carhart-Harris *et al.* 2014; Carhart-Harris 2018)[160]. On the REBUS view, regular states of conscious activity can be understood as based upon various sets of predictive models about the self and the world that are iteratively updated to arrive at long term arrangements of beliefs or, in the language of Bayesian statistics, priors. Indeed, at its most rudimentary level, REBUS is an application of Bayes's theorem to the brain.

The above theorem, which was originally developed in the late 1700s, is a way of dealing with probability distributions that is distinct from frequentist statistics. The latter approach is based on the quantification of the probability of something being the case based on its prevalence in data gleaned from the repeated sampling of a particular domain. For instance, if we want to know the probability of it raining today, we can look at the weather data for the last year to determine the overall likelihood of rain occurring on any particular day. The Bayesian approach instead begins with an initial assumption of the probability of something being the case that is known as the *prior probability* and then conditions this prior on something else, for example an observation, being the case.

A Bayesian would, for instance, begin with the assumption that there is, say, a five percent probability that it will rain today but could then, upon looking out of the window and seeing rainclouds or hearing thunder, update their prior based on the *posterior probability* of rain being

[160] Apart from REBUS, which is grounded in the neuroscientific view that high-level cortical networks are attenuated so that more bottom-up flow from hippocampus and parahippocampal gyrus occurs, other notable contemporary theories include CSTC (cortico-striatal-thalamo-cortical) loops model, which argues that altered thalamocortical coupling allows for an increase in sensory information flow to the cortex (a variation on classic filtration theory) and the related CCC (cortico-claustral-cortical) loops model, which examines the effects of disruption of the claustrum, which is viewed as a kind of attentional hub (Doss *et al.* 2022). While each of these theories has some good evidence to support it, I focus on REBUS a) because it is by far the most popular; and b) because it makes more explicitly philosophical assertions.

the case, given the evidence of dark clouds or distant rumbling. So, if P(A) [probability(rain)] is the prior probability of rain, P(A|B) [probability(rain GIVEN thunder)] is the posterior. Similarly, P(B|A) (the probability of thunder or clouds given rain) can be assigned a value, which in this case is known as the *likelihood function* or *conditional probability*. This is important as it specifies the compatibility of the evidence (clouds and thunder) with the hypothesis (it is raining). If clouds and thunder were widely observed in conditions where it was not raining, for instance, the underlying model (thunder and clouds increase the chances of rain) would not have as much explanatory purchase. Formally, Bayes's theorem can be written as p(A|B) = p(B|A)p(A) / p(B); in other words, the posterior probability of rain given clouds and thunder is equal to the conditional probability or likelihood of thunder and clouds given rain, multiplied by the prior probability of rain, divided by the probability of thunder and clouds overall. In short, in Bayesian statistics:

> [A]ll observed and unobserved parameters in a statistical model are given a joint probability distribution, termed the prior and data distributions. The typical Bayesian workflow consists of three main steps: capturing available knowledge about a given parameter in a statistical model via the prior distribution, which is typically determined before data collection; determining the likelihood function using the information about the parameters available in the observed data; and combining both the prior distribution and the likelihood function using Bayes' theorem in the form of the posterior distribution. The posterior distribution reflects one's updated knowledge, balancing prior knowledge with observed data, and is used to conduct inferences (Van de Schoot *et al.* 2021: 1).

The Bayesian approach, as employed within frameworks like REBUS, can thus be broadly understood as a mode of statistical inference in which the determination of the probability of something being the case relies on the updating of evidence for that thing being the case, thus the incremental updating of a hypothesis (it is raining) by knowledge (there are clouds).

The link between calculations of statistical probability and the psychedelic experience probably seems rather tenuous at this point. Updating our priors by incorporating one more fact about the Bayesian approach may help to make our posteriors a little better. This fact, evident in the equation above, is that prior, posterior and likelihood are all represented in terms of probabilities and these probabilities can range from completely certain to completely uncertain. In other words, there is a *precision-weighting* attached to each of these probabilities that applies not to the object of the probability (it is raining) but to the probability itself, namely how "confident" this belief is[161]. With this in mind, "[t]he main tenet of REBUS is that psychedelics decrease the precision-weighting (inverse variance or "confidence") of internal

[161] "It is precision-weighting that guards the predictive agent against being swept to and fro by each random fluctuation in the sensory stream, or against becoming entrenched in the determined commitment to some particular pattern" (Nave 2025: 58-9).

predictive models ("beliefs" or "priors") encoded in brain activity … REBUS proposes that precision-weighting on priors is decreased under psychedelics; effectively flattening the free-energy landscape" (Carhart-Harris *et al.* 2023: 7).

More informally, what REBUS says, is that prior to undertaking a psychedelic experience we have a certain distribution of beliefs, each of which we have a certain amount of confidence in. This can be pictured as an "energy landscape" where the beliefs we are very confident about, form steep slopes or valleys; whereas beliefs that we are uncertain about or only hold loosely, may look more like gentle hills. Upon ingestion of psychedelics, this landscape becomes flatter, representing a loss of confidence in any of our beliefs and also, if we imagine ourselves as literally navigating this landscape, the ability to move more easily between various points upon it now that the terrain has become less daunting. With less sheer cliffs to scale, or which block our view, we can catch better sight of and more effectively traverse the terrain of our subjectivity. The appealing intuitive gloss, in line with the description of psychedelic therapy in the previous section, is thus that psychedelics can, by facilitating a flattening of the energy landscape that defines each of us, allow us to climb out of ruts whose walls may previously have been too steep, or to see looming mountains of negative belief as mere molehills that can be scaled. In terms used earlier, psychedelics have rendered the energy landscape more plastic and fluid, something borne out in the increases in cognitive flexibility and overcoming of habituated negative beliefs that are frequently seen in PAT research. It is somewhat poignant in this regard that the etymology of the word *entrench*, as in entrenched belief, is *trench*, which refers to a topographical feature of a landscape.

REBUS relies on a view of the brain – and by extension of the self – as operating on Bayesian principles; specifically, on this view the brain is "an active probabilistic prediction machine: instead of building up the incoming sensory input stepwise to a complete percept of what is out there, the brain generates a percept by using its best predictions of what is likely to be out there" (Villiger and Trachsel 2023: 2). In Bayesian terms, our brains operate using a set of prior probability distributions, or top-down predictions (hypotheses), described as a *generative model of the world*[162] (Parr, Pezzulo; Friston 2022: 67-70) that we are continually revising into posteriors by integrating bottom-up prediction errors (evidence), a process known as *hierarchical predictive coding* (Rao and Ballard 1999; Friston 2018). The hierarchical nature of this dynamic is due to the fact that "predictions are hierarchically organised, with high spatial

[162] We can understand a generative model simply as the combination of a prior and a likelihood. As Clark helpfully explains, "[a] generative model … aims to capture the statistical structure of some set of observed inputs by tracking (one might say, by schematically recapitulating) the causal matrix responsible for that very structure" (2023: 182).

and temporal preciseness at lower levels and increasing abstractness at higher levels". The goal of predictive coding is "to minimise accumulated prediction error that results from mismatches between top-down predictions and bottom-up sensory input" (Villiger and Trachsel 2023: 2). These mismatches, which are quantified in various ways, for instance as "free energy"[163] or "surprisal"[164], are minimised either through the adjusting of beliefs, namely the generative model (perceptual inference) or through action (active inference), namely the updating of evidence. The choice is made based on the relative precision-weighting of predictions and sensory input: "the less precise the prediction is estimated to be, relative to the current sensory input, the more dominant perceptual inference becomes (and vice versa)" (ibid.).

On the REBUS view, these dynamics are coupled with the entropic brain hypothesis, which "proposes that within upper and lower bounds, i.e., a critical zone, the entropy of spontaneous brain activity indexes the richness (i.e., the diversity and vividness) of subjective experience, within any given state of consciousness, and that psychedelics acutely increase both" (Carhart-Harris and Friston 2019: 317), rendering the brain more "anarchic". In an earlier section, I mentioned entropy when examining how the information richness of the brain increased as it moved closer to criticality. At this point, we can think of entropy as indexing this information-theoretic property. The argument in support of REBUS is thus seductively simple: if the DMN and other higher brain networks represent the encoding and regulation of beliefs or priors, including so-called *hyperpriors* such as our predictions "that we are a consistent and independent entity" (Villiger and Trachsel 2023: 2), their disruption, which leads to a more turbulent or chaotic neural dynamics, including an increase in bottom-up (anarchic) flow and transmodal connectivity, can be seen as reducing "the precision of high-level priors (expectations or beliefs about the world), and thereby liberating bottom-up information flow … [rendering] recurrent cortical information processing more sensitive to the ascending information flow resulting in increased entropy or complexity of the underlying neuronal activity" (Vollenweider and Smallridge 2022: 126). This includes reducing the precision of the

[163] Free energy is a term that originates in statistical physics as Helmholtz free energy – a formalization of the amount of work a system can perform via a thermodynamic process relative to the relation between internal energy, entropy and temperature. As Clark explains, "[t]ransposed to the cognitive/informational domain, it emerges as the difference between the way the world is represented as being, and the way it actually is. The better the fit, the lower the information-theoretic free energy" (2013: 187). Importantly, whereas Helmholtz free energy describes a real physical quantity, free energy as employed in the FEP is meant purely as a statistical device.

[164] The specifics of these various quantifications do not need to worry us here. Technically, free energy is an upper bound on surprisal, which is in turn the negative logarithmic probability of a particular event occurring.

hyperpriors associated with our ego or sense of self[165], which explains why psychedelics can cause ego-loss via DMN perturbation.

In other words, “if the DMN and SN perform their integrative functions by modelling the existence of a simple, indivisible entity, sharply bounded and distinct from the external world, then this would explain why disruption to these systems should lead to the feeling that the individual is disintegrating, dying, or merging with the cosmos” (Letheby 2021: 136). More modestly, the drop in precision-weighting of priors also ostensibly explains the visual hallucinations that often accompany psychedelic experiences, including common experiences like a sense that usually static parts of the world have become more fluid. For instance, “ordinarily, the assumption ‘walls don’t breathe’ is so heavily weighted that it is rendered implicit (and therefore effectively silent) by a confident (highly-weighted) summarizing prior or compressive model. However, under a psychedelic, V5 [layer 5 deep pyramidal cells] may be forced to interpret increased signaling arising from lower-level units because of a functional negligence, not just within V5 itself, but also higher up in the hierarchy” (Carhart-Harris and Friston 2019: 323-4).

It is important to reiterate here that the idea that our brains are prediction engines stretches across various scales; the argument, in other words, is not just that we rely on Bayesian inference in some quasi-subjective sense, but that the neural architecture underlying subjectivity is similarly engaged in minimising prediction error and so forth. The corollary to all this is that, to reiterate, pathology can be cast as precisely the inverse: affording too much precision-weighting to priors and hyperpriors (“I am a bad person”, “they’re out to get me”, “I am overweight”, “if I don’t step on the right paving stones, bad things will happen”) in a manner that reinforces DMN activity at the expense of bottom-up information flow (i.e., evidence).

Lending some credence to the Bayesian view, there is evidence to support the idea that the aforementioned pyramidal cells, including the 5-HT_{2A} receptors that are a crucial agonism site for psychedelic alkaloids, “play a key role regarding such precision weighting, with superficial pyramidal cells being associated with the precision of sensory input and deep pyramidal cells with the precision of predictions” (Villiger and Trachsel 2023: 2)[166]. In short, if our beliefs about ourselves and the world, including our beliefs that we *are* a self, rely on the neural mechanisms exemplified by the DMN, SN and other high-level networks, and if these are in turn stabilised by complex cascades of neurobiological activity involving various receptor sites and emergent

[165] Hyperpriors have also been described as similar “to Kantian categories, to Wittgensteinian ‘hinge’ or ‘framework’ propositions, to the constituents of a Kuhnian paradigm, or to the central nodes of a Quinean web of belief” (Letheby 2021: 119).
[166] Although, as will shortly be seen, facts about brain activity do not entail a Bayesian interpretation.

spatiotemporal dynamics; then the destabilisation of the latter will likely have a significant effect on the network of beliefs or predictions via which we make sense of reality. Psychedelics, on this view, are onto-epistemologically corrosive in a manner that encourages the contracting of new beliefs through either perceptual or active inference, and part of the appeal of models like REBUS is that they offer a unified account of perception and action. From a therapeutic perspective, psychological situations like depression, OCD, eating disorders, PTSD or addiction can be recast within the REBUS model as based upon overly-precise priors – dysfunctional beliefs that have been too deeply entrenched within the energy landscape to be surmounted. Due to the high level of precision attached to these beliefs, evidence that disconfirms them or proposes other hypotheses is regarded as inconsequential, whereas lower precision priors would be more amenable to being updated via active inference. In short, entropic, anarchic brains are flexible brains, less constrained by the authority of the DMN and more able to navigate and sometimes even rearrange the topographies of their free energy landscapes, hopefully accompanied by seasoned travellers and map-makers, i.e., trained psychedelic therapists.

The idea that brains – and living systems more broadly – maintain their viability by seeking to reduce the error using the principles of Bayesian model updating – the so-called Bayesian Brain hypothesis, which receives an ostensibly neurally plausible formulation in predictive processing – is far from unique to REBUS. It can be traced at least as far back as the 19th century German physicist and physician, Hermann von Helmholtz (1924), who proposed "that sensory systems are in the tricky business of inferring sensory causes from their bodily effects" and that "[t]his in turn involves computing multiple probability distributions, since a single such effect will be consistent with many different sets of causes distinguished only by their relative (and context dependent) probability of occurrence" (Clark 2013: 182). As Swanson (2017) convincingly argues, the underlying epistemological/metaphysical commitments of predictive processing can in some sense be traced even further back, given their striking similarities to Kantian transcendental idealism. Here it is significant that "Helmholtz saw his work as providing validation for Kant's constructivist account of experience, via discussion of optical principles that reveal the underdetermination of a perceptual experience by sensory stimulation alone" (Nave 2025: 54).

In this regard, "Kant and PP [predictive processing] each aim to offer detailed accounts of how minds track 'hidden causes' using only the data from the senses, and they both develop these accounts using methods of top-down analysis in an attempt to reverse-engineer perception and cognition" (4). Swanson even claims that the idea of hyperpriors or generative models finds its roots in Kant's conception of the schemata, i.e., the necessary forms of cognition that

"constrain and restrict possible perceptions of outer objects" (6); he also notes that given the famous epistemic divide Kant constructs between phenomenon and noumenon, the form of transcendental argumentation he develops can be seen as a precursor to the view that brains are continually constructing – via the imagination in Kant – models of the world in order to track the causal structure of that world. As Swanson summarises this argument:

> Kant's schematism anticipates the generative model strategy in two major ways. Kant claims that: (1) object recognition requires a top-down generative process akin to imagination, in addition to a bottom-up sensory input flow and (2) that mind must classify perceptual objects, not by associating and comparing them to a set of previously encountered images, but rather by identifying the endogenous abstract rules it would use to generate the sensory patterns in imagination (Swanson 2017: 7).

The parallels have not been lost on contemporary philosophers of mind, and have led more than one commentator to observe that predictive processing, the Bayesian Brain hypothesis and related endeavours amount to a "neo-neo-Kantian view of the relationship between mind and world" (Anderson and Chemero 2013: 204)[167]. Strikingly, the Kantian-Helmholtzian approach also lies at the heart of contemporary machine learning, which on a crude gloss can be seen as the training of a system of priors and hyperpriors that are then iteratively tested and updated based on the evidence that is presented to trained models as part of their everyday use. Dayan *et al.* explicitly acknowledge their philosophical debts in their seminal paper on the use of statistical inference via generative models in machine learning, arguing that "[f]ollowing Helmholtz, we view the human perceptual system as a statistical inference engine whose function is to infer the probable causes of sensory input". They argue, in language strongly resonant with the Bayesian Brain views I have been discussing, how in unsupervised machine learning approaches, "[a] recognition model is used to infer a probability distribution over the underlying causes from the sensory input" (Dayan *et al.*1995: 889)[168]. The computer scientist and cognitive psychologist Geoffrey Hinton, a co-author of the

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[167] Without getting into the Kantian weeds, one proviso here is that predictive processing, etc., also include a quasi-Humean view of learning, i.e., how priors emerge; similarly, Helmholtz is sometimes viewed as having adhered to an empiricist view of perception that is at odds with the Kantian transcendental approach. As Swanson argues, however, "Kant was primarily concerned with explaining a priori features of perception and cognition. He did not focus on the empirical acquisition of priors, he lacked evolutionary understanding, and he did not set out theories of learning. This creates a prima facie tension for comparisons between Kant and PP, since PP places emphasis on learned priors, 'empirical Bayes', and the idea that organisms perceive using probabilistic computations based on prior experience. However, this apparent tension might be dissolved if we keep in mind that PP is not a traditional 'empiricist' theory, for it recognizes that many priors could be innate and biologically hard-wired, even if such wirings are ultimately the result of long-term phylogenetic experience" (2017: 6).

[168] The idea of predictive coding has its roots in the same early information-theoretic milieu that gave rise to machine learning and cybernetics, and was originally, in the guise of differential coding, a way of compressing information using the idea that data – video frames for instance – can be encoded as, in lay terms, what differs from what is predicted in each instance (see especially chapter 3 of Shi and Sun 1999).

aforementioned paper and a hugely influential figure in machine learning due to his groundbreaking work on artificial neural networks, was in turn a significant influence on Karl Friston, the figure commonly associated with the most significant contemporary variation on the predictive processing/Bayesian Brain view.

Friston – lead theorist of the FEP and active inference (Friston *et al.* 2007; Friston 2010; see Friston 2012 for an acknowledgement of Hinton's substantial influence on the FEP) – in turn frequently collaborates with Carhart-Harris and is co-author of the paper in which REBUS and the anarchic brain are most thoroughly presented (Carhart-Harris and Friston 2019). Therefore, one admittedly highly caricatured narrative arc traces a trajectory from Kantian transcendental idealism via Helmholtz and early work on thermodynamics and entropy to second-wave connectionist AI and figures like Hinton and Friston, and then onwards to the philosophical underpinnings of psychedelic neuroscience and a significant swathe of contemporary philosophy of mind, with a burgeoning sense of "the contingent, dynamic, and historical nature of these transcendental structures, in contrast to the supposedly atemporal and absolute foundations of Kant's categories" (Nave 2025: 21) arising along the way. I shall now examine these ideas, which have become hugely influential in mainstream philosophy of mind and cognitive science, in more detail.

3.4.2 Are we really safe beneath our Markov blankets?

One missing element in my loosely sketched conceptual phylogeny is cybernetics. As Friston has noted on several occasions, the FEP and active inference are similar to the "good regulator theorem" that was proposed by first-wave cyberneticians[169] W. Ross Ashby and Roger Conant, encapsulated in their titular statement that "every good regulator of a system must be a model of that system" (1970: 89; see also Ashby 1957: 219-4 for an extended discussion of self-regulation as adaptation to error[170]). If any system that seeks to maintain viability, engages in self-regulatory behaviour vis-à-vis an environment on which it has no direct epistemological traction, then "any regulator that is maximally both successful and simple must be isomorphic with the system being regulated … [and] the living brain, so far as it is to be successful and efficient as a regulator for survival, must proceed, in learning, by the

[169] While cybernetics is a significant influence on the free energy principle and thus by extension REBUS, for reasons of scope I engage with it only indirectly via the discussion of enactivism, individuation and systems biology in the following chapters. It is worth noting, however, that Ashby, in describing the goals of cybernetics as entropy minimisation in the face of error signals from the environment as entailing a unification of "regulation, information, and survival" (1957: 196) is an ideal proto-advocate of the predictive processing view.

[170] Notably, some of Friston's favourite examples of self-regulating systems minimising surprisal, e.g., a fish that finds itself out of water, have their origin in this work.

formation of a model (or models) of its environment" (ibid.). The proximity to Friston's approach is plainly visible:

> The free-energy considered here represents a bound on the surprise inherent in any exchange with the environment, under expectations encoded by its state or configuration. A system can minimise free energy by changing its configuration to change the way it samples the environment, or to change its expectations. These changes correspond to action and perception, respectively, and lead to an adaptive exchange with the environment that is characteristic of biological systems. This treatment implies that the system's state and structure encode an implicit and probabilistic model of the environment (Friston and Stephan 2007: 417).

I have elsewhere dealt with the technical details of the FEP and active inference (Eloff 2022), as well as the implications of the REBUS model's reliance on this framework for thinking about psychedelics (Eloff 2023). While I will not rehearse those arguments here, it is worth drawing attention to one further aspect of the framework: the idea that systems are necessarily separated from their environments – at the very least statistically, but in a way that has ontological stakes – by a kind of partitioning called a Markov blanket. Technically, in what can be construed as a contemporary articulation of transcendental idealism, a Markov blanket separates internal states from external states via a third set of "blanket states". This blanket "consists of sensory states, which affect but are not affected by internal states; and active states, which affect but are not affected by external states … [which] implements conditional independence between internal and external states, under mild assumptions" (Hipólito *et al.* 2021: 89)[171]. Markov blankets are thus a way of pointing out a system qua systemic operation and they tend to be nested within complex systems[172], which "are hierarchically composed of Markov blankets of Markov blankets – all the way down to individual cells, all the way up to you and me, and all the way out to include elements of the local environment … [such sub-systems] can self-assemble into a global system that itself has a Markov blanket" (Kirchhoff *et al.* 2018: 1).

In short, then, the Friston view adopted by REBUS sees systems, including living systems that occupy nonequilibrium steady states (i.e., systems that, as discussed earlier, exhibit chaotic

[171] Conditional independence simply means that internal and external states do not depend on each other, "i.e., internal states cannot influence sensory states, and… external states cannot influence active states" (Hipólito *et al.* 2021: 90).

[172] "In cells, for instance, internal states are the states within a cell, blanket states are states of the cellular membrane, and external states are those environmental states beyond the cellular membrane. Similarly, in brains, the states of the brain are internal states, blanket states are divided between the states of sensory receptors (sensory states) and the states of motor receptors (active states), and the states of the surrounding environment are external states" (Raja *et al.* 2021: 53).

dynamics by maintaining near criticality dynamics)[173], as separated or blanketed from their environments, at various scales of organisational complexity, in a quasi-Kantian manner that necessitates an ongoing modelling of that environment in a manner whereby these generative models, comprising various priors and hyperpriors, are iteratively updated to minimise free energy (via the equivalent of a gradient descent algorithm, perhaps) by selecting, at each juncture, between updating beliefs (perceptual inference) or updating evidence (active inference), based on the relative precision weighting assigned to each of these. A useful recent summation that redescribes the framework in terms of "Bayesian mechanics" explains that the approach consists of:

> physical, mechanical theories about the beliefs encoded or embodied by internal states and how those beliefs evolve over time: it provides a formal language to model the constraints, forces, fields, manifolds, and potentials that determine how the internal states of such systems move in a space of beliefs (i.e. on a statistical manifold). Because these probabilistic beliefs depend on parameters that are physically encoded by … internal states … the resulting statistical manifolds (or belief spaces) and the flows along them have a non-trivial, systematic relationship to the physics of the system that sustain them … [W]e model the behaviour of a particular system by a path of stationary action over free energy, given a function … that defines the manner in which internal and external states are synchronized across the boundary (or Markov blanket) that partitions any such dynamical system (should that partition exist). In summary, Bayesian mechanics is about the image of a physical system in the space of beliefs, and the connections between these representations: that is, it takes the internal states of a particular system (and their dynamics) and maps them into a space of probability distributions (and trajectories or paths in that space), and vice versa (Ramstead *et al.* 2023: 3).

A remarkably abstruse and busy cottage industry of increasingly technical formulations of this dynamic via the application of a wide range of scientific fields – statistical physics, machine learning and computational neuroscience for instance – has emerged in the past decade or so (although Friston *et al.* 2022 and Parr *et al.* 2022 have offered "accessible" accounts), ostensibly to add some scientific heft to what is, at its core, an eminently philosophical set of epistemological and ontological convictions[174]. Life, on this view, just is the accumulation and

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[173] "The notion of nonequilibrium steady state is native to statistical mechanics, wherein it describes a particular energetic dynamic between a system and its surrounding heatbath. NESS is best understood as the breaking of detailed balance. Detailed balance is a condition in which the temporal evolution of any variable is the same forwards as it is backwards (the system's dynamics are fully time-reversible). Detailed balance holds only at thermodynamic equilibrium. In nonequilibrium steady state, balance holds in that none of the variables that define the system will undergo change on average over time, but there is entropy production, and there are flows in and out of the system" (Andrews 2021: 7).

[174] As Kathryn Nave warns, "[s]ince its initial statements … the free energy framework has developed and mutated across thousands of publications under the hand of a diverse menagerie of coauthors. In 2022, just under two thousand papers were published on the topic and this figure has been doubling every few years. As a result, there is now a range of subtly different, and sometimes directly contradictory, re-formulations of the theory's core claims" (2025: 69).

refinement of Bayesian model evidence. To reiterate, in REBUS's application of this framework:

> psychedelics alter consciousness by perturbing neural processes that encode the precision (or "confidence") that the brain assigns to its own high-level beliefs [hyperpriors]. Since these high-level beliefs play a central role in the cognitive economy, one flow-on effect is to induce an unconstrained mode of cognition, sending the system on a whirlwind tour (or "trip") through an expanded state space. When phenomenal feelings of uncertainty or puzzlement occur, they result from specific representational activity: from the brain representing its own beliefs as highly imprecise or uncertain (Letheby 2021: 107).

Psychedelics, therefore, temporarily turn us into bad Bayesians in order to allow us to become better Bayesians in the long term. It is precisely at this point, whereby the rules supposedly governing the viability life are acutely undermined in order to better meet them, that REBUS runs up against its limits. On the one hand, it could be argued that the unravelling and rebuilding that a psychedelic experience frequently entails, could be modelled and thus incorporated into the predictive architecture of our Bayesian brains. On a more realistic view, however, when the very target of the psychedelic experience is the entangled web of priors and hyperpriors via which such a predictive posture could be enacted, something close to a paradox of self-reference emerges wherein the target of a Bayesian prediction is that which gives rise to that Bayesian prediction. Like a snake trying to eat its own tail or Bertrand Russell desperately trying to ward off the Gödelian dawn, it is hard to see precisely what kind of endless regress of hyper-hyper-hyperpriors would suffice to account for the undertaking of an experience that maximises surprisal and may lead to the unravelling of all priors.

While we can take a provisionally sanguine view on the operation of prediction, Bayesian or otherwise, in service of our everyday undertakings in and reflections on the world, something else seems to be required to account for what gives rise to a Bayesian architecture in the first place: what weaves and reweaves the statistical blanket that separates phenomenon from noumenon? It is undoubtedly correct that the acute model-corrosive phase of psychedelics via high-level cortical network attenuation in favour of increased bottom-up hippocampal, amygdala and cortical flow is not the whole story, and that "[n]ew, healthier forms of self-modelling must be discovered during the acute experience, and consolidated during the subsequent period of integration" (Letheby 2021: 151), but even given that this is the case, the notion of psychedelic death, rebirth and transformation is ill-fitted to an exhaustively free energy minimising account. If, said plainly, frameworks like the FEP provide a plausible account of the functioning of systems qua systems (although I will shortly interrogate this plausibility), they do not appear to afford us a coherent articulation of how those systems come to be and how, via psychedelics for instance, they can come to be otherwise.

The individuative core of systemhood, in short, is ill-served by accounts that focus on systemic maintenance to the near-exclusion of systemic emergence[175] and on this view, REBUS is pulled in two directions: a straightforward application of predictive processing style reasoning to the psychedelic experience or, on the other hand, an interrogation of the individuative dynamisms whose full ontogenetic scope is obscured by accounts that would reduce them to minimisations of negative log probability in a Bayesian landscape. What I mean by this is that Baysian models, while ostensibly providing a framework for accounting for the *homeostatic* aspects of living systems, fall short in being able to meaningfully address their largely non-homeostatic nature (living beings, as made clear in the next two chapters, are better viewed as *teleodynamic* systems, i.e., as systems in *becoming* that seldom conform to cybernetic or quasi-thermodynamic principles).

This leads me to ask: is the FEP – and by extension REBUS – even a plausible account of living systems, let alone psychedelically unravelled ones? And why is it that these accounts seem eerily similar to the ways in which contemporary machine learning works, albeit bolstered by mid-20th century cybernetics and information theory – views that have come under serious critical scrutiny in the intervening period? As various critics have argued, there is an ironic circularity to cybernetics specifically, wherein

> the cyberneticist has an understanding of organisms based on selective attention to analogies with machines and then uses this conception of organism to inspire the building of new devices, which are then projected back onto living organisms as models of their workings, and through the cumulative and recurrent effect of this process it becomes impossible to think of the organism – including the human being – in any other terms than as a tool, a thing to be manipulated and an instrument at the service of interminable projects of intervention and control (Chirimuuta 2020: 450).

Similarly, there is something disingenuous in the application of cybernetics and its surrounding milieu to questions of consciousness, specifically in the appeal to computational objects like Turing machines and McCulloch-Pitts neurons, which "were crucial to the birth of artificial intelligence and the goal of 'designing a mind' that lay at the heart of the cognitive revolution" (Lyons 2006: 14). As Pamela Lyons argues, the founding hubris of the early cyberneticians and their ilk was that "[s]imulating cognition, it was presumed, would reveal the principles of natural cognition" (ibid.). If the FEP is little more than warmed over Ashbyan cybernetics, where "[t]alk of minimizing surprisal translates to countering the deviation of an essential variable from assigned limits, and to say an organism must avoid surprises just means that it must maintain homeostasis of its essential variables" (Nave 2025: 117), then we should

[175] In the next chapter I will note how an analogous insight has drawn some enactivist theorists towards Simondon's work on individuation.

exercise extreme caution in deferring to it as a viable account of life, cognition or any other complex, dynamic system simply because it comes clothed in the brightly-coloured Markov blanket of arcane mathematical formulae from a sprawling range of technical fields. This should in turn inform a more fundamental question: "should we understand FEP as a modeler's tool to characterize and predict adaptive behavior, or should it be understood as an objective feature of target systems?" (Colombo and Wright 2018: 15-16).

There is, in other words, a tension in this regard in the FEP literature between realist and instrumentalist claims[176]. On the one hand, ambitious claims have been made that the FEP or some closely-related branch of Bayesian inference constitutes a necessary feature of actual living and conscious systems (Friston 2013; Solms 2021), while on the other hand, the approach has been framed as nothing more than a useful model (Van Es 2020). This is why Clark can claim that "there is mounting neural and behavioral evidence that such a mechanism [predictive processing] is somehow implemented in the brain" (2013: 9)[177] while in the core FEP literature, we read definitions of the principle such as "[a]ny ergodic random dynamical system with an attractor and a Markov blanket behaves *as if* it were minimizing the variational free energy of its particular states" (Raja *et al.* 2021: 54; my emphasis). This is sometimes justified by arguing that the FEP is just a speculative counterpart to active inference or predictive processing, which supposedly present plausible implementations (e.g., biological ones) of the principle, but the issue is muddied by equivocation and the principle often blurs into the realist claims, especially when interpreting evidence from fields like cognitive neuroscience. Mel Andrews observes that this results in a conceptual reification whereby "people begin with the assumption of an analogical relationship to physics, or a mere formal equivalence, but conclude that the formalism of the FEP nonetheless picks out real and measurable properties of natural systems, albeit perhaps more loosely and abstractly than its physical equivalents would" (2021: 4).

However, "the energy and entropy of the FEP are formal analogues of concepts defined in thermodynamics and statistical mechanics with a long history of use in information theory, statistics, and machine learning, in which they have lost their correspondence to any measurable properties of physical systems" (9). If the view is accepted that the FEP is a

[176] The FEP, as one astute observer has pointed out, is called upon to fulfil an impossible range of requirements. It is frequently cast, for instance, as "[a] pure formalism, empty of all content. A precise theory of neuronal signalling and transient ensembles. A tautology. A transcendental argument. It is both unfalsifiable and yet makes precise predictions about the physical or physiological systems and dynamics capable of instantiating it. Both materialist and dualist. Both representational, cognitivist, and neurocentrist and, at the same time, ecological, enactive, and extended" (Andrews 2021: 15).
[177] See also Clark (2016) for a full philosophical application of the predictive processing account within the context of extended functionalist cognition.

modelling framework that does not have any necessary traction on physical reality – if we concur that "[t]he fact that a system has a particular sort of dynamics, merely means that it admits of description by a generative model and mere mathematical describability does not confer any functional role upon this property" (Nave 2025: 99) – then what residual utility does it have? Here, a brief digression into philosophy of scientific modelling is apposite. Andrews points out that "models need not represent, and representation is not the chief epistemic virtue of scientific modelling" (12), and in fact the FEP is not even necessarily a model – instead, it is an empty formalism or way of thinking about things upon which a pluralism of models could in turn be built; models that would in principle be amenable to empirical testing. Indeed, as several key advocates of the FEP have themselves recently noted, "the FEP itself is … a mathematical theory: a formal structure without specific empirical content (i.e., that has no specific empirical application)" (Ramstead *et al.* 2023: 21).

3.4.3 Throwing off the blanket

What are we to make of this way of thinking about things; for instance, thinking about the psychedelic experience? For one thing, Friston himself acknowledges that the FEP approach "does not easily accommodate the fact that the particles that constitute a Markov blanket can, over time, wander away or, indeed, be exchanged or renewed" (2019: 50). While the example he provides is of a candle flame, the stochastic dynamics of which preclude usefully applying a set of statistical blanket states to it, whereas Friston argues that dynamic structures "characterised by the spontaneous emergence of topological [super] symmetry breaking and itinerancy; e.g., turbulence, cyclones and living systems" (ibid.) *are* amenable to being thought about via FEP and related frameworks because Markov blankets are steady-state phenomena of the emergent dynamics of such structures"[178]. However, given that psychedelics can be viewed as perturbations of such structures that brings them closer to criticality in a manner that causes a cascade of increased complexity and novel dynamics to be expressed, i.e., more *chaotic* behaviour that is in a substantial sense *destructuring*, it appears that at the very least we need a more rigorous discussion of emergence – or individuation, in the terms I have been using – to account for the spontaneous emergence Friston takes for granted in his discussion of systems whose steady state behaviour warrants interpreting them via the FEP formalism.

Thus, the FEP relies on a particular kind of parcelled out ontology of discrete things that can be separated into systems and environments, and "[t]he Markov blanket formalism does not provide a principled way to distinguish *things* from their environments" (Raja *et al.* 2021: 60).

[178] These are described in somewhat misleading terms as dissipative structures, but should in fact be seen as a new kind of emergent order operating in far from equilibrium conditions (Prigogine 1978), a matter I will more fully broach in subsequent chapters.

Instead, “Markov blankets seem to work as a tool to formalize a statistical distinction between sets of states that are *already* taken to be the states of a *thing* and the states of its environment” (ibid.; emphasis in original). If, however, “concepts such as adaptivity and agency are defined in terms of the modulation of parameters and constraints of the agent-environment coupling, which entail the possibility of changes in variable and parameter sets, constraints, and in the dynamical laws affecting the system” (Di Paolo *et al.* 2022: 1), it is hard to see how an approach that assumes most of these things at the outset can describe such transformative dynamics.

In fact, it is not too hyperbolic to claim that “[t]he introduction of (causal) Markov blankets to individuate living systems, a task for which they are woefully under-qualified is … the point at which the FEP starts to lose touch with biological reality” (Nave 2025: 146). Similarly, the FEP struggles to make sense of relational properties or imbricated system environment relations like *affordances*[179]; for instance, “that a step is climbable for a given organism does not seem to be well captured in terms of the statistical partition between organism and environment required under the Markov blanket formalism” (Raja *et al.* 2021: 61). In fact, there is a sense in which the formalism of the Markov blanket is superfluous to thinking about system-environment entanglements and dynamics, but is employed in or to ensure the kind of structure that Bayesian-style accounts require (64). If the ontological relationship between what we respectively call systems and environments is not as neat as this conceptual division warrants, and does not conform to a transcendental idealist view (a point that will be extensively explored when I discuss enactivism), then the artifice of the FEP and various related predictive processing models, formalisms or principles becomes largely unnecessary and their tacit foundational assumptions increasingly visible.

In terms of these assumptions, it does seem convincing, especially given the entangled histories of the FEP and machine learning and their mutual origins in early computation and cybernetics, that “[c]onverting any system into a form of computational system – e.g., a kind of variational autoencoder – is both the main outcome and the main driving force of the principle and, more concretely, of the Markov blanket formalism” (Raja *et al.* 2021: 65). This includes the representationalist assumptions that usually underly models such as Markov blankets that construct a kind of epistemological closure that is mediated by parsimonious representational dynamics. Such assumptions, however, are problematically tenuous,

[179] In the Gibsonian ecological sense that will be briefly covered in the discussion of enactivism. For Gibson, “The affordance hypothesis says that meaning is detected directly. If meaning is detected directly, then it is possible to understand meaning as existing in only one place, namely in the relation between perceiver and world” (Raja *et al.* 2023: np).

specifically the core FEP axiom that systems necessarily track their environments across the statistical closure of nested Markov blankets in a manner that renders them models of these environments. Kathryn Nave astutely observes of this dynamic that "the fact that this correlation [between system and environment] is expressed in terms of probability distributions … and the fact that these distributions become more similar as the divergence between them is reduced via free energy minimization does not turn this into a representational relationship" (2025: 103-4).

To underscore, "a mattress might start to take on the shape of the person who sleeps there, but the purpose of sleep is not to create a likeness of oneself in springs and foam. Sagging springs are no more a representation of an absent partner than a dry riverbank is of the water that once flowed through it" (104). Furthermore, the very parcelling out of the parts of any complex system into a set of nodes and edges on each side of a Markov blanket is often an egregiously arbitrary simplification. For the neuroscientist, for instance, "should a node correspond to the state of one brain region, one neural cluster, one neuron, one synapse, or one individual neurotransmitter molecule?" (141). To summarise, for all the above reasons and more, "even if some parts or aspects of reality do have the structure of a statistical-causal graph, an organism is about the last place we would expect to find the stability of interactions needed to pick out a stable Markov blanket as persisting and defining the existence of this system over time" (149).

The aspirations motivating FEP thus carry with them all the limitations that haunted first-order cybernetics, including a lack of capacity to theorise "precisely what happens in transitions between different relatively metastable situations (which might in some cases be approximately stationary in themselves) or in enduring situations where metastable conditions are not reached for significant periods" (Di Paolo *et al.* 2022: 18). Such situations are strikingly common in the living world, and include

> embryogenesis, life-cycle patterns, epigenetic variability, symbiosis, and metamorphosis … fluid, critical agent-environment integration across scales in the development of perceptual learning, skill acquisition, expert tool use, and habit formation … developmental plasticity, possibly many-many mappings between neural networks and cognitive functions, and … the continued acquisition of new uses for neural circuits in evolution and development without those circuits losing their original uses (20).

Many of the aforementioned dynamics are salient features of psychedelic experiences. In this regard, it does appear as though REBUS sometimes wants to have its cake and eat it: it proposes a model of subjective transformation wrought by exhaustively scientifically described emergent neural dynamics, but this model is fundamentally and conceptually at odds with the ontogenetic quality of transformation itself. Bayesian metaphysical sophistry aside, REBUS

and the anarchic brain hypothesis are, at base, appealing post-hoc ways of making sense of necessarily ineffable experiences by appeal to the legitimacy of scientific language. This is not to argue that they are useless, but as ways of thinking about psychedelic individuation they fall far short, not least in their frequent conflations of math and territory (Andrews 2021).

In an earlier section, I noted that we should not view psychedelic and non-psychedelic states as qualitatively distinct in the sense that the former are chaotic – in the sense of complex nonlinearity – while the latter are not, and I underscored that, vis-à-vis criticality, it is a matter of degree (albeit nonlinear degree), not kind. To underscore this in the present context, it is thus not the case that the application of the FEP to the psychedelic state is simply an overreach of this approach and that it is less problematically applicable to non-psychedelic states. While the psychedelic experience is undoubtedly an exceedingly complex, turbulent unfolding of dynamics in which various transformative events can take place, both subjectively and from the view of dynamic systems theory, "the fact that our environment is so volatile and changeable, not only in its temporary state but also in its ongoing dynamical tendencies, is precisely what makes biotic systems' ability to maintain their homeostatic stability so interesting" and "[t]o *begin* by modelling the system's local surroundings as being at steady state would seem to extract much of the interest from this problem at the get-go" (Nave 2025: 166).

Hence, FEP and its various counterparts are theories of *being* that elide *becoming*. They are models of *ergodic* systems, but most of the systems they purport to apply to are eminently *non-ergodic*, the psychedelic experience quintessentially so, leaving them with little to get a foothold on in order to reify a probabilistic model. Crucially, Nave observes, in terms that will become important for my own account later on, none of the aforementioned limitations are "just a flaw of the FEP and its conceptualization of the organism as a homeostatic mechanism with stable behaviours and stable parts. Instead, this misconception stems from a broader ontological framework that views organisms as substances, and specifically, as machines" (2025: 201). However, organisms are fundamentally self-transforming and non-ergodic historical dynamisms that "may change both their components and the rules that govern the behaviour of these parts in unprestatable ways" (ibid.) – they are hurricanes, not statues, and "there is likely no level of abstraction at which we can identify an invariant equation that is both specific enough to individuate this particular organism and flexible enough to allow us to derive every change it might possibly undergo in the course of its lifespan" (207).

The use of the FEP, active inference, REBUS, the anarchic brain hypothesis, predictive processing or any number of related Bayesian brain approaches, whether to think about the psychedelic experience (e.g., Letheby 2021) or life more generally, is hamstrung in myriad

fundamental ways. These approaches may result in viable toy models in some carefully circumscribed domains, but the pre-packaged ontological and epistemological assumptions render these in turn seriously, and perhaps fatally compromised. Life, it turns out, is not a large language model iterating a gradient descent algorithm on a dataset in order to adjust the precision weightings in a high-dimensional statistical vector space, no matter how much we may wish for austere, scientifically naturalised ontologies or epistemologies.

3.5 Conclusion: From cybernetic brains to embodied processes

> There is no such thing as philosophy-free science; there is only science whose philosophical baggage is taken on board without examination (Dennett 1995: 21).

As I covered a lot of ground in this chapter, I reiterate the most salient points here, making some inroads to the next chapter. I began with a brief overview of the current state of psychedelic neuroscience, detailing what we have been able to glean since the dawning of the second wave of psychedelics research in the 1990s. While I have presented a solid understanding that psychedelics are powerful neurobiological agents at the receptor and gene level, what has become increasingly evident is that many of their effects are attributable to a variety of emergent dynamisms and complex cascades that straddle multiple scales of organisational complexity. These dynamisms have an irreducibly spatiotemporal character, something which is increasingly evident in work examining the spatial distributions of temporally synchronised patterns of neural activity in different states of consciousness. This is a project that is currently being explored via connectome harmonics (Atasoy *et al.* 2018b) and neural geometrodynamics (Ruffini *et al.* 2024).

I also briefly examined the growing consensus that brains are chaotic, nonlinear systems that operate near-criticality, and that psychedelics nudge brains even closer to, and possibly sometimes beyond, critical thresholds, something which, in dynamic systems theory language, can give rise to phase transitions, bifurcations and so forth. I then turned to a discussion of how these understandings and speculative assumptions are borne out in psychedelic-assisted therapy (PAT) and noted that – in line with the view of psychedelic action described in the previous chapter – contemporary approaches operate with a view that psychedelics effect an acute form of drug-induced ego dissolution (DIED) and a related post-acute increase in plasticity that, if well-managed, can be employed for therapeutic ends.

The DIED view, which is supported by neuroscientific understandings of higher-order networks like the DMN and SN that regulate everyday states of waking consciousness and the ways in which attenuation of these results in dramatic transformations of subjectivity, also has philosophical implications for how we think about our selves. This includes differentiating

between so-called narrative and core or “minimal” selves and extends, if Metzinger and others are correct, to the view that selfhood is an emergent phenomenon that steers close to being a convenient illusion of integration provisionally wrought by a multiplicity of sub-personal dynamisms and amenable to chemically or otherwise-induced dis-integration.

I then moved to explore the REBUS model more closely, detailing how it relies on a dominant approach to cognition – and living systems more generally – as in the business of Bayesian model optimisation, a view that inherits a great deal from the computationalist hubris of mid-20th century first-order cybernetics and information theory, which are critically discussed more extensively in the following chapter. By appeal to some contemporary work in philosophy of science, I argued that REBUS, and more specifically the FEP it is based upon, relies upon a dangerously tautological mode of self-justification and is ill-equipped to deal with the historically unfolding, unprestatable nature of precarious living systems that are continually redistributing their space of probabilities as they confront an ever-changing world that they are inextricably entangled with. This is especially true of psychedelically modulated brains. The Markov blanket formalism was my chief target in this critique as it forms the methodological core of the system-environment distinction that justifies the use of the transcendental idealist approach of which, on final reckoning, the FEP and its broader family of principles and frameworks is a contemporary, post-Helmholtzian iteration.

In order to set out the way forward, a note of clarification is necessary at this point. Throughout this conversation, I have discussed REBUS and the anarchic brain hypothesis as corollaries, and have focused almost exclusively on the former. It is not the case, however, that these two approaches are necessarily coupled: REBUS is a variant of the FEP and inherits all of its limitations. The anarchic brain hypothesis is instead simply a way of describing the increase in neural entropy as an increase in bottom-up flow due to the disruption of higher-order regulatory networks that usually filter and attenuate this flow. While I think we should abandon REBUS as anything beyond a toy model – and one that is particularly badly-suited to thinking about systems in their undoing and re-becoming – my view is that we can retain the anarchic brain hypothesis, or something close to it. This becomes possible by implementing it more fully into a model of brains and subjectivity – psychedelic and otherwise – that incorporates contemporary chaos theory, dynamic systems theory (which is already employed, albeit partially, in some models of REBUS and FEP) and the enactive approach, to which I will shortly turn.

In my final chapter I argue that situating the chaotic, anarchic brain within a broadly Deleuzian-Simondonian philosophy of individuation via dynamic systems theory is a far more fruitful way forward than endlessly revising and delimiting the scope of a Bayesian framework that is

fundamentally compromised by its founding ontological assumptions. In this regard, the recent canalisation model of psychopathology (CANAL) (Carhart-Harris *et al.* 2023) developed by the proponents of REBUS is, while similarly compromised by its residual appeal to REBUS, suggestive of a way forward. CANAL, which its authors argue has its roots in Bergson and Whitehead, is an attempt to apply the ideas of mid-20th century developmental biologist C.H. Waddington (1959) to psychopathology, and to learned states more broadly. Specifically,

> [i]n what became known as the "Waddington Landscape" Waddington invites us to imagine a ball rolling down a gradient featuring various valleys of differing depth. Within this metaphorical image, the steepness and depth of the valley or "canal" walls, is meant to reflect the strength or depth of canalization, encoding phenotypic precision. Translating this image into a more modern, energy landscape representation, the valleys or canals represent dynamical attractors, whose gravitational pull is also encoded by the steepness of their walls and overall depth. Within a free-energy scheme, the landscape represents a gradient descent, and the steepness and depth of the valleys relates to their precision-weighting, i.e., steep and deep valleys encode precise models. Translating to psychology, we can imagine a valley as representing a cognitive or behavioral phenotype, feature, or "style", and its depth and steepness is intended to encode its strength of expression, robustness, influence, and resilience to influence and change (Carhart-Harris *et al.* 2023: 3).[180]

As should be clear, the CANAL approach is a rearticulation of the core insight that psychedelics acutely "flatten the energy landscape" or "make the canals of belief more shallow", allowing us to perceive and work through habituated beliefs that no longer serve us well. In the language of CANAL, this includes temporarily raising the "Temperature of Entropy Mediated Plasticity" (TEMP) (4), a term roughly equivalent to increased entropy and plasticity, although the authors use the metaphor of annealing (heating a metal to make it more malleable and then cooling it into its revised form) to describe the therapeutic implications of their model.

While the CANAL framework usefully clarifies that we should not simply view canalisation as bad and plasticity as good, but instead focus on pathological distributions of the two, it is hard to see what value this new framework adds to the anarchic brain hypothesis beyond a fresh descriptive language. Nevertheless, within the CANAL model the reliance upon REBUS and the FEP seems slightly vestigial; all the important conceptual work is done via an examination of plasticity dynamics and their role in pathology and healing and it is unclear why any of this necessarily needs to be cast in the language of Bayesian brains. While the language of canals, phase spaces and so forth is equally as figurative as talk of priors, probability distributions and

[180] Interestingly, Terence McKenna referred to Waddington's idea of canalization in several of his popular talks and explicitly described how psychedelics could be useful de-canalizing agents. It is sometimes hard to see how much the overwrought architecture of the REBUS framework adds to this beyond the sheen of scientific legitimacy.

so forth, it should be clear that the former can be employed as useful heuristic devices without adding too much metaphysical weight to the ways we think about brains and minds. However, to view ourselves and our neural substrates as ongoing processes of model optimisation via gradient descent on precision weighting perpetuates a highly metaphysically loaded view that has its roots in computationalism and cybernetics, as discussed earlier.

In short, de-emphasising the predictive processing artifice and focusing instead on plasticity dynamics, whether cast in dynamic systems terms or otherwise, likely brings us closer to parsimony and metaphysical modesty. This is more fruitful than the view that brains are somehow just like machine learning in the 21st century – just as they were clockwork mechanisms in the 18th century, steam engines in the 19th century and Boolean logic machines in the 20th century (and we are all transcendental idealists to boot – a matter that will be substantially complicated when I begin to explore enactivism's phenomenologically-inspired critique of the idealism-realism[181] dichotomy itself).

Some encouraging albeit cursory work in this direction is already evident. Recently, for instance, Hipólito *et al.* (including lead REBUS theorist Carhart-Harris) have endorsed a (complex) dynamic systems theory account that, while residually beholden to Bayesianism, is more attentive to the kinds of chaotic, historically unfolding processual dynamics that typically living systems and which, as I have detailed, FEP-style reasoning struggles to incorporate. They argue:

> [i]n contrast to eliminativist or excessively brain-centric approaches to consciousness and the psychedelic experience, we believe that CST offers an approach that respects the phenomenology of lived experience and acknowledges the relevance of emergent and dynamical phenomena in psychology, mental health, and psychedelic therapy. By incorporating insights from CST [complex systems theory], we can gain a deeper appreciation of the complexity and nonlinear dynamics underlying the psychedelic experience and the therapeutic mechanisms that underlie its efficacy. This may ultimately inform the development of more effective and personalized psychedelic-assisted therapies for a range of mental health conditions (Hipólito *et al.* 2023: 10).

[181] Naïve realist accounts of the psychedelic experience such as the classic Huxleyan "reducing valve" view should also, of course, be similarly critiqued. As Langlitz argues, for instance, "[p]resenting the brain as a reducing valve rather than a system actively generating a mental picture of the world has both epistemological and ontological implications with respect to the psychedelic experience. If the brain does not autopoietically make up or add anything, then the inner experience needs to have an external referent. Accordingly, so-called hallucinogenic drugs do not actually produce hallucinations, illusions, and delusions; they provide access to a dimension of reality that remains inaccessible to human beings in normal waking states, a divine or supernatural sphere not conducive to biological survival but edifying to spiritual animals striving for more ethereal goals than self-preservation and procreation" (Langlitz 2012: 128).

It is unlikely that we will ever entirely eradicate metaphysical assumptions from our thinking around psychedelics, whether in how we think about the psychedelic experience or how we think about the acute metaphysical convictions arising in psychedelic states (Sjöstedt-Hughes 2023). Also, attractors, phase spaces, nonlinearities, criticality, bifurcations and the various other components of dynamic systems theory and chaos mathematics are at least as abstract as Bayesian priors. Yet, we should at the very least aim for a metaphysics worthy of both contemporary science and life as we know it. I hope to provide a compelling case that, at the very least, a psychedelic metaphysics of individuation benefits more from processual accounts of the dynamics of complexly entangled living systems than from the austere functionalism of predictive processing; even when the latter, like extended functionalism, pays lip service to embodiment and action via active inference. This processual view has begun to gain traction, as evidenced, for instance, in the recent edited collection *Philosophy and Psychedelics* (Hauskeller and Sjöstedt-Hughes 2022) which, apart from some lapses into mystical excess, is strongly suggestive of a neo-Whiteheadean (and Spinozist) and enactive turn in psychedelic philosophy.

Similarly, there is renewed interest in Merleau-Ponty inspired phenomenological accounts of the psychedelic experience, with Benny Shanon's monumental *Antipodes of the Mind: Charting the Phenomenology of the Ayahuasca Experience* (2002) being a foundational text in this regard. Notably, Shanon has also done significant work in cognitive science critiquing the functionalist-representationalist paradigm (e.g., Shanon 2003). Together with the aforementioned move towards process philosophy, he thus helps delineate the meandering path I will travel towards an account of psychedelic individuation that combines phenomenology, enactivism, dynamic systems theory, systems biology and Simondon, Deleuze and Guattari's work on individuation and becoming.

This approach will also, importantly, be *biogenic* as opposed to *anthropogenic.* Lyons explains that whereas

> [a]nthropogenic approaches assume, to a greater or lesser extent, that human psychological attributes are the hallmarks of cognition and ask what sort of biological or evolutionary story might account for them … [biogenic approaches] ask psychological questions as if they were biological ones … [e.g.,] what is it that biological systems do such that they might require cognition? (2006: 11).

Lyons argues that such phenomena should not *a priori* be assumed as "beliefs, desires and other so-called 'propositional attitudes,' rational problem solving, the ability to form concepts and to generalize from particular instances to categories, abstract and/or symbolic ideation, language, episodic memory, theory of mind, the ability to represent the absent, phenomenal consciousness, reflexive awareness, and so on" (12). Instead of making such an assumption

a priori, in other words, and then attempting to naturalise or reason from these, Lyons argues, it is more fruitful to examine the nature of actual biological systems in order to discern why they may have given rise to so many features of mind and life we take for granted.

What was described in the previous chapter as psychedelic death, rebirth and transformation has been here formalised as DIED, and considerable neuroscientific weight was lent to this formulation. I have also examined the neurobiological dynamics that give rise to acute perturbations of selfhood, increased phenomenological novelty and vividness of experience, altered perceptions of space and time, disruptions of meaning-making, salience assignation and so forth. It was demonstrated via connectome harmonics and chaos theory how there was a close interplay between spatiotemporal dynamics at nested neurobiological levels and subjectivity. In this chapter I also began to diverge from the Bayesian consensus, and will continue to do so in later sections,

While I did not explicitly discuss metaprogrammatic and affective dynamics, the latter will be indirectly grappled with in the following chapter when I turn to discuss the autopoietic dynamics of organic, sensorimotor and linguistic bodies. Set and setting, while briefly touched upon here, will likewise be dramatically transformed on the autopoietic-enactive view. Armed with the humility entailed by an acknowledgment of the inherently abstractive nature of all our conceptual engagements with the world (Chirimuuta 2024) – a sense that it is entirely folk psychology – the remaining two chapters will argue that some abstractions are better than others and that abstraction may not be effectuated via the kind of representationalist computational architecture that constrains the utility of FEP-style views.

By “better”, all I mean is that we should aim for an account that smuggles in as little excess metaphysical baggage as possible; that is broadly naturalist in this regard; that incorporates our best current understanding of the relevant scientific and philosophical accounts of life and mind and the profound continuity between these two oftentimes unnecessarily sharply ontologically divided expressions; that is biogenic, not anthropogenic; that affords us, to the extent it is possible or desirable, a single conceptual language for speaking across a wide range of scales, from molecular agonism at serotonin receptor sites to spatiotemporal patterns of oscillatory brain activity to existential and intersubjective realities; that is intellectually honest in the face of the existentially explosive nature of the psychedelic experience itself; and that, most importantly, does not make the perennial philosophical mistake of burying becoming beneath being – of confusing one *phase* of being, the individuated, for the continuous and multiphased individuative dynamisms that comprise life in all its rich difference.

More pressingly, by “better” I also mean that we should aim for a philosophical account of the psychedelic experience that affords the best possibility of making good use of psychedelics – for therapy, insight, play and so on – while minimising the damage that highly plastic brains are especially susceptible to when confronted with a stale or toxic metaphysics. Metaphysics, finally, have real consequences, especially those that posit various forms of transcendence or transcendental *a prioris* that come to alienate us from life in its living, and for this reason, perhaps driven by a strong intuitive sense that is itself the subjective result of my own psychedelic experiences, I err too on the side of immanence.

In the next chapter, I will turn to a full reckoning with the computationalism that haunts so many 20th and 21st century accounts of cognition in order to see if we cannot do better.

Chapter 4

From functionalism to enactivism

4.1 Introduction

In the previous two chapters, I laid the groundwork for this thesis by examining the ways in which the psychedelic experience has been thought about across a wide swathe of human history, most notably in the early 20th century, when psychedelic substances became the objects of extensive medico-scientific research, as well as of theological and philosophical reflection. Specifically, I described the ways in which the psychedelic experience was conceptualised within the first wave of psychedelics research in the 1940s to 1960s. I detailed some of the more popular speculative accounts of psychedelic action on consciousness, including the cybernetics-inflected views espoused by Lilly and the neo-cybernetic REBUS model that currently has major traction within psychedelic neuroscience and philosophy. I showed that with some exceptions (including the phenomenological work of Shanon and Sjöstedt-Hughes's recent moves towards a process philosophical account) contemporary theorising about the effects of psychedelics on consciousness still appears to rely on a broadly functionalist/computationalist approach to cognitive science. This in turn intersects with various philosophical assumptions around subjectivity, agency, perception, meaning and so forth. This is strongly reflected in the ideas of subjectivity, set and setting that form a core part of the theoretical architecture of psychedelic experience in general and psychedelic therapy more specifically.

In this chapter, I set the groundwork for an alternative account of subjectivity, set and setting that incorporates recent developments in enactivist cognitive science, neurophenomenology, dynamic systems theory, biological autonomy and related intersecting fields of inquiry in order to clear the path for the account of psychedelic individuation that will occupy the next two chapters. As will become clear, the enactive view – which increasingly spans all these fields – provides a remarkably different understanding of cognition, subjectivity, meaning-making and so forth as emerging from ongoing processes of affectively charged sense-making by precarious, self-producing, far-from-equilibrium systems complexly enmeshed with environments that they recursively define qua their own metastable organisational systematicity.

I begin by backgrounding the discussion of psychedelics in order to outline the core assumptions of functionalism/computationalism, before presenting some critiques of this still

dominant school of thought in cognitive science and philosophy of mind. I then move to introduce enactivism, which forms part of what has been described as the 4E school of cognition, a cluster of associated alternatives to the functionalist/computationalist paradigm that argue for a view of cognition as a necessarily embedded, embodied, extended and/or enactive process. Enactivism is in many ways the most far-reaching of the four E's, and its proponents have gone to lengths to distinguish it from the other views it is clustered alongside, and which it arguably incorporates within its founding assumptions; while I offer a passing definitional gloss of the other E's, therefore, it is enactivism that occupies the bulk of my account.

I locate the roots of this approach in the hugely influential albeit commonly misrepresented theory of autopoiesis, tracing a trajectory from Maturana and Varela's seminal work on self-defining biological systems to current cutting-edge research into enactive adaptivity as the underpinning for complex forms of sensorimotor and linguistic cognition. I argue that enactivism is a compelling alternative to functionalism, and that it allows us to conceive of cognitive processes (including those that are supposedly "representation hungry") as immanent, materialist and processual. This is possible without having to posit various tenuous forms of substance dualism or Gods of the gaps (as has transpired recently in the various panpsychist (Chalmers 2015)) or mind-body dualist concessions to the so-called "hard problem" of consciousness – a problem that is, as I will recount, ill-conceived on the enactivist view. I will offer a necessarily synoptic overview of this broad and internally diverse school of views, paying less attention to the debates that happen within its philosophical purview than to the foundations this philosophy rests on. Not all of what follows will thus apply equally to every specific strain of functionalist theory. It is, however, a schematic outline of the necessary conditions on which any such theory relies.

4.2 The computationalists

> [T]here is no neutral perspective on how we decide to study the human mind; nothing is just the way it is, untouched by an ideology. (Di Paolo, Cuffari and De Jaegher 2018: 309)

Up until this point, I have proceeded as though consciousness and cognition are wholly synonymous. While this view may make intuitive sense, especially considering the etymology of "cognition", i.e., *cognoscere* or "get to know", the term has a broader sense in cognitive science. Within this field, while consciousness is arguably always inherently linked to at least one cognitive act, cognition does not need consciousness in order to proceed. For instance, the interoceptive functions that maintain homeostasis in the body entail various neurobiological processes, but these happen below the level of conscious awareness, as does

the low-level sensory processing of retinal information from the environment. As Francisco Varela, Evan Thompson and Eleanor Rosch put it in *The Embodied Mind*, “we are not simply unaware of the rules that govern the generation of mental images or of the rules that govern visual processing; we could not be aware of these rules … if such cognitive processes could be made conscious, then they could not be fast and automatic and so could not function properly” (2016: 49). While the way I have just described matters may seem unproblematic, even commonsensical, there are numerous insidious assumptions that should be drawn out. What philosophical convictions, for instance, are packaged into terms like “processing” and “information”, or the idea that our sensory relation to the world is mediated by “mental images” operated on by “rules”, or, indeed, that cognition consists of discrete “acts”? In fact, this way of proceeding when thinking about cognition as “getting to know”, or as how we become – and endure as – subjects of experience within a world, forms part of the metaphysical architecture of what I will broadly describe as the *functionalist-computationalist-representationalist* (hereafter FCR[182]) view that has dominated cognitive science, as well as several related fields, for over half a century.

On this view, which is often simply referred to as “cognitivism”, in reference to its oftentimes elided origins in the work of post-behaviourists like Noam Chomsky, brains are information-processing machines that transform incoming data streams – sensory experience for instance – into abstract representations that can be manipulated by well-defined functions, oftentimes modularised within a network of functions, in order to produce a discrete outcome, whether this is determining the direction of a sound, the meaning of a word or the correct action to execute in response to a charging rhinoceros, and whether it involves perception, memory, language or any other faculty[183]. Thus, the driving assumption is that “intelligence – human intelligence included – so resembles computation in its essential characteristics that cognition can actually be defined as computations of symbolic representations” (Varela, Thompson and Rosch 2016: 40). More specifically, cognition can be understood as “abstract, a-modal processes that mediate between modality-specific sensory inputs (perception) and motor outputs (action)”, as well as “computations over mental representations that are either

[182] These three terms, defined further down, do not *entirely* overlap within a single cognitivist worldview but are almost always all present as different aspects of a philosophical edifice I will be critically elaborating throughout this chapter. Dupuy (2000: 38) glosses the same cluster as “computational-representational functionalism”.

[183] This is sometimes described as the ‘sandwich model of cognition, which “regards perception as input from world to mind, action as output from mind to world, and cognition as sandwiched between” (Hurley 2008: 2).

symbolic [in a strongly linguistic sense]… or sub-symbolic (e.g., activations in neural networks)" (Newen, A., de Bruin, L. and Gallagher 2018: 5).

These representations are "intentional", i.e., they are "about" something in the sense that all cognitive activity involves some or other mode of engagement with the relevant features of situations agents find themselves in (Varela, Thompson and Rosch 2016: 40). As for amodality, within FCR this is usually described in terms of perception, where an amodal perception is simply one where partial sensory input from a range of modalities (e.g., sight and sound) is apprehended as a completed whole or "plenum" by the perceiver[184], in a manner that bears strong similarities to Husserlian phenomenology and the view that the spatiotemporal objects given to consciousness are necessarily limited to a particular finite perspective or "adumbrational" givenness that is reconciled in intuition[185]. Barsalou explains,

> [W]hile the sound of a cardinal and the sight of a cardinal must initially take the form of distinct codes – one the product of the auditory system and the other via the visual system – later cognitive stages unify these modal representations into a single representation that no longer bears any trace of its sensory origins. From various sights and sounds comes the deliverance of the amodal and arbitrary CARDINAL symbol that is now available for whatever further consideration one cares to give it (1999: 578–9)

Cognition, according to this view, entails nothing more than functions and variables; "[i]ts ontological commitments, that is, its commitments to the existence of various theoretical entities, are overt: cognition involves algorithmic processes upon symbolic representations" (Shapiro 2011: 2). According to Jean-Pierre Dupuy, for those who adhere to the FCR model, "thinking is a form of computation" and by virtue of this "comes within the domain of the mechanical" (2000: 4-5). Computation is here meant in the broad sense of "an operation performed or carried out on symbols, that is, on elements that represent what they stand for" (Varela, Thompson and Rosch 2016: 7), but is usually figuratively constrained to the narrower sense of digital computing as involving operations consisting of discrete, unambiguous states and transformations. This computation is also strictly brain-bound; there is, as Adams and Aizawa note, a "contingent intracranialism" (2008) assumed by FCR, something which, as I will elaborate shortly, recapitulates the metaphysics of Cartesian dualism. In sum, FCR argues that mental states can "be properly identified by their functional role (i.e., by their relation to other mental states and their role in the production of behavior)" and that these states, whether they take the forms of beliefs, perceptions, desires or synthetic reason, can "be implemented

[184] The bringing together of disparate sensory modalities is often discussed in terms of the "binding problem", which can be traced back at least as far as Kant's discussion of the synthetic unity of the manifold of intuitive experience in consciousness.
[185] I will return to Husserl later in this chapter when discussing the close links between enactivism and phenomenology.

as states of the brain", which encourages researchers to study "this biological organ in terms of the computations that could be instantiated by it" (Di Paolo, Buhrmann and Barandiaran 2017: 14).

At this point I should underscore that computationalism did not only express itself in terms of loose analogies between computers and minds[186]; Putnam, for example, although his view shifted in later years. In *Renewing Philosophy*, for instance, he surveys the idealisations that were necessary to support the functionalist view and concludes that there "does not seem that there is any principled reason why we must be perspicuously representable as Turing machines" (1992: 7[187]). Putnam (1988: 73-105) originally argued that mental states could *literally* "be defined in terms of Turing machine states and loadings of the memory (the paper tape of the Turing machine)" (Putnam 1988: 73)[188]. For the early Putnam and his fellow functionalists, the brain was so much like a computer that "if we could discern its physical structure in sufficient detail, we would discover a binary mechanism, probably electrochemical in nature, that constitutes mental representations, exactly as a computer can be said to create representations" (Golumbia 2009: 59). In fact, for Putnam, it simply is the case that "the various issues and puzzles that make up the traditional mind-body problem are wholly linguistic and logical in character" (Putnam 1975: 362).

FCR remains profoundly influential within the cognitive neurosciences and in much work in philosophy of mind, not least of all because it allows researchers to conform the object of study – neurobiological processes qua cognition, for instance – to the structure of the tools and discourses used within their field (which also have a broadly linguistic-computationalist form). This means that "[w]ith this premise, scientists can attempt to match the algorithmic structure of any given problem (say, how we weigh the pros and cons of a particular decision or how we anticipate someone's reaction to a piece of news or how we tie our shoelaces) to candidate mechanisms (typically in the brain) that could implement these computations", which, entirely unsurprisingly, results in "a successful formula for the practice of research, a powerful recipe for generating empirical hypotheses and testing them, accumulating results, and assembling theoretical frameworks" (Di Paolo, Buhrmann and Barandiaran 2017: 2). There is clear utility

[186] This said, the popular framing of "minds" as "software" and "brains" as "hardware" is suggestive in this regard.
[187] A Turing machine, named after its inventor Alan Turing, is an abstract model of general computation; general in the sense that a Turing machine can implement any algorithm/function defined as a string of symbols that can be transformed via a rule table, the transformation of this string being – if the algorithmic operation resolves, which is undecidable in advance – the output of the algorithm. Modern computers are often thought of as "universal" Turing machines.
[188] Note that Putnam is here reflecting on his earlier views; he is at this stage already critical of this position.

in this modelling activity, borne out in the many gains made within cognitive neuroscience in the past few decades. These gains, however, do not entail that the models that are instrumentally employed are even remotely realistic depictions of how cognition functions. Furthermore, benefits notwithstanding, it is also the case that the prevailing "computer metaphor imposes an implicit grammar; it promotes certain questions but not others. Attention is directed to how things function, more precisely, to how cognitive problems are or should be solved" (ibid.). More than this, FCR conceals a particular set of metaphysical assumptions common to the post-Cartesian[189] Western philosophical tradition, which "has been haunted by a pervasive mediational epistemology: the widespread assumption that one cannot have knowledge of what is *outside* oneself except through the ideas one has *inside* oneself" (23). This pervasive view "has the status of a framework, of a common sense. The pull of representations is like the gravitational pull that backdrops our everyday activities" (ibid.)[190].

Thus, while FCR gains much of its appeal from the sense that it is a "best-fit" model for understanding cognition within a broadly naturalist framework, or because it is presented as the currently optimal endpoint of an always-improving practice of neutral scientific inquiry, it is useful to spend more time tracing the origins of this view in order to make its historically contingent philosophical and *ideological* foundations more visible. This task is particularly consequential given that, as I have noted, FCR – oftentimes simply tacitly assumed as a view from nowhere – continues to inform a great deal of theoretical and experimental practice, including psychedelic neuroscience and therapy (e.g., Letheby 2021, an otherwise groundbreaking intervention)[191]. While cultural critics examining the history of FCR differ on the details and the exact order of events (e.g., Dupuy 2000; Golumbia 2009), there is general agreement that the roots of the idea that brains are like computers and operate on abstract representations – or symbols – using a ruleset of functions in a manner analogous to grammar (i.e., contentful semantic artifacts embedded within a syntactic structure that defines salient

[189] "Descartes is mainly responsible for conceptualizing consciousness as inner experience accessible only to first-person reflection, and life as external and mechanical structure and function. Before Descartes, in the Aristotelian tradition, life and mind belonged together under the heading of soul (psyche). For Aristotle, soul is not an immaterial substance, but in the broadest sense it is the capacity of the organism to be active in various ways. It thus encompasses whatever capacities or abilities belong to life, including cognitive or mental ones" (Thompson 2007: 226).

[190] This metaphysics, as Evan Thompson points out, is also located in genetic reductionism; indeed, "[g]enocentrism and computationalism thus run on the same conceptual fuel" (2007: 174).

[191] To drive home the near-ubiquity of this phenomenon, a paper just released in preprint *on the very day I am writing this section* (31 October 2023), on the admittedly interesting topic of the modelling of the meso-level neurobiological effects of DPT, a tryptamine-based psychedelic, defaults entirely unreflectively to a discussion of "information processing in the brain' and 'the computational effects of psychedelics", as though cognition and consciousness *just are* what FCR claims they are (Varley *et al.* 2023).

relations) can be traced back to first-order cybernetics[192] and particularly to the seminal work of linguist Noam Chomsky; cognitive and computer scientists Marvin Minksy and John McCarthy; and political scientist and decision theorist Herbert Simon, along with various others, in the late 1950s and early 1960s[193].

Golumbia (2009: 31-80) notes that Chomsky and fellow researchers at Harvard sought, in what was termed cognitivism, an alternative to the behaviourist paradigm that was then hegemonic (and which, along with positivism, in turn sought to replace the idealisms of phenomenology and introspectionism with a rigorous materialism), and which proscribed reflection on the nature of cognition by "black-boxing" consciousness – viewing it as a simple input-output mechanism whose inner workings were opaque and unnecessary to interrogate given that one could instead reliably anticipate or control behaviour (or so the argument went) by modelling and statistically aggregating input-output relations until a threshold of predictability was reached. Countless experiments on primates, for instance, relied on the logic of stimulus-response conditioning in a manner that reinformed the behaviourist view of living agents as automatons whose conscious experience (not to mention abject suffering) was inconsequential. Behaviourists, generally speaking, simply "accepted external manifestations as the only part of the mind accessible to scientific inquiry and were happy to forgo any hope of studying meaning or subjectivity" (Di Paolo, Cuffari and De Jaegher 2018: 15).

Addressing the limitations of the behaviourist approach and seeking a renewed focus on the inner workings of the mind, cognitivists brought together ideas from cybernetics, linguistics, computer science and psychology to develop a view of cognition whose core theoretical assumption is perhaps best encapsulated in what Chomsky's student Fodor termed a "language of thought" (1975). The gist of the cognitivist argument, popularised by Chomsky's ambitious, albeit neuroscientifically tenuous (Ibbotson and Tomasello 2016) idea of a "Language Acquisition Device", which was eventually reformulated into the more austere notion of "Universal Grammar", "thoughts are sentences in an internal language, and reasoning involves combining and manipulating the components of these sentences, just as one might do when performing syllogisms in a natural language" (Shapiro 2011: 15). This is a

[192] Dupuy argues for the centrality of first-order cybernetics in the emergence of both the FCR and modern computing (and we can add symbolic AI to this list), arguing that it "is responsible for introducing the logico-mathematical style of formalism and conceptualization to the sciences of the brain and the nervous system; for conceiving the design of information-processing machines and laying the foundations of artificial intelligence; for producing the 'metascience' of systems theory, which has left its mark on all the human and social sciences, from family therapy to cultural anthropology" (2000: 43). I pay more attention to cybernetics later in this chapter when I discuss autopoiesis.
[193] Miller 2003 offers a useful short historical synopsis of this formative years.

remarkably bold idea, as striking in its arbitrariness as it is for its intuitive appeal: because the public expression of thought usually entails the use of language, i.e., the application of complex combinatorial operations to symbols that carry abstracted representational content and exist within a semiotic space of meaning and interrelation it is deceptively straightforward to assume that thought itself – or all of cognition, on the broader view – entails similar dynamics. There is further appeal in the resolution cognitivism seems to provide to the problem of mental causation known as the "explanatory gap", or how thoughts can motivate acts. Varela, Thompson and Rosch argue that

> the problem that must be solved is how to correlate the ascription of intentional or representational states (beliefs, desires, intentions, etc.) with the physical changes that an agent undergoes in acting. In other words, if we wish to claim that intentional states have causal properties, we have to show not only how those states are physically possible but how they can cause behavior. Here is where the notion of symbolic computation comes in. Symbols are both physical and have semantic values. (41)

In other words, symbols are simultaneously physically instantiated[194] – whether in a brain, a spoken word or a piece of paper – and *meaningful*, i.e., cognitively salient qua form (syntax) and content (semantics). They can thus mediate the fundamental anxiety of Cartesian dualism as a kind of triple-Janus-faced bridge between incommensurate modes. Arguably "this separation between form [both material and syntactic] and meaning was the masterstroke that created the cognitivist approach – indeed, it was the same one that had created modern logic" (Varela, Thompson and Rosch 2016: 99). As Dupuy explains, "symbols are objects that have three aspects: physical, syntactic, semantic", and it is by appeal to this tripartite structure "that cognitivism claims to be able to span the gap that separates the physical world from the world of meaning" (2000: 5), squaring the circle by providing a view of symbols as an intermediate level straddling the mental and the physical (13). Furthermore, "[t]he parallelism between physical processes subject to causal laws and mechanical processes carrying out computations, or inferential or syntactical operations, ceases to seem mysterious once one comes round to the view that the material world contains physical versions of Turing machines: computers, of course, but also every natural process that can be regarded as recursive" (38).

Once this assumption was made, it became natural to view cognitive science's project as the description of "the programs that determine the behavior of the mind's computational

[194] "The cognitivist is not claiming that if we were to open up someone's head and look at the brain, we would find little symbols being manipulated there. Although the symbolic level is physically realized, it is not reducible to the physical level. This point is intuitively obvious when we remember that the same symbol can be realized in numerous physical forms. Because of this nonreducibility it is quite possible that what corresponds to some symbolic expression at the physical level is a global, highly distributed pattern of brain activity." (Varela, Thompson and Rosch 2016: 41)

mechanisms" (14), these programs, along with their execution, being housed exclusively within brains. I explored some of the consequences of this in the previous chapter when I introduced the idea of the Bayesian brain and its use within psychedelic neuroscience via the REBUS model. It is telling that cognitivists sought to elide the complexities of the social, anthropological and biological in the computational account, reducing cognition to the functioning of a neatly disembodied and dis-enculturated von Neumann architecture. For cognitivists, "[t]hought corresponds to nonconscious, skull-bound, symbol manipulation. It takes place in a central cognitive module of the brain separate from the systems for perception, emotion, and motor action. The cognitive unconscious is neither somatic nor affective, and it is lodged firmly within the head" (Thompson 2007: 6). Thus, by extension, "classical cognitive science … offered abstract and reified models of the mind as a disembodied and cultureless physical symbol system or connectionist neural network in the head of a solitary individual" (36).

The cognitivist view also carries echoes of the Kantian legacy; the founding assumption of cognitivism is strongly redolent of the Transcendental Deduction of the categories, only now the conditions of possibility of experience are determined by a supposedly innate semiotic schema with a linguistic-categorical architecture and the transcendental unity of apperception is an epiphenomenon supervening on cognitive processes that do not necessarily entail a self qua experiencing subject[195]. Dupuy points out that in the development of FCR "[t]he transcendental subject was replaced by the 'physical symbol system' and the universality of the synthetic a priori by the universality of the Turing machine" (93). And, just as "there has never been a more conciliatory or respectful total critique" (Deleuze 1983: 102) than Kant's, so too "belief in the power of computation – a set of beliefs I call here computationalism – underwrites and reinforces a surprisingly traditionalist conception of human being, society, and politics" (Golumbia 2009: 2).

To return to Chomsky, Golumbia (2009) convincingly argues that Chomsky's early linguistic theories, which were heavily influenced by Shannon's information theory, the first wave of

[195] After all, as Varela, Thompson and Rosch observe, remarking on the work of linguist Ray Jackendoff, a student of Chomsky's, "if consciousness has no causal efficacy, then it can have no effects and so 'is not good for anything' " (56). Jackendoff distinguishes between the "computational mind" and the "phenomenological mind", with the latter ostensibly emerging from the former, i.e., from cognition as computational process, in a manner that is at best epiphenomenal. A near-inverse argument to this is Searle's famous Chinese Room thought experiment, whose outcome, intended as a critique of cognitivism, Dupuy describes as the position that "the execution of a computer program cannot in principle enable the machine to understand what it does, to be conscious of what it does, or to give meaning to the world in which it functions". Just as computation does not, on the FCR view, necessarily give rise to consciousness, so too can we not ascribe consciousness, or properties like meaning making that we associate with consciousness, to computation.

cybernetics (e.g., McCulloch and Pitts 1943)[196] and the seminal work of Turing on general computing, among other things, and which viewed linguistic operations as transformations of finite-state machines, presented a view of human language as amenable to computational control and replication[197]. The transformations within Chomsky's various theorisations of grammar are "all logical formulae that do not simply resemble computer programs: they are algorithms, the stuff of the computer that Alan Turing, just prior to Chomsky and in some ways coterminous with him, had identified as the building blocks for an entire exploded mechanism of calculation" (Golumbia 2009: 39). Once this work intersected with the early functionalism of Fodor, Putnam and other analytic philosophers (42), the scene was set for the emergence of FCR as the generalisation of computational logic from linguistics to cognition, philosophical reason and beyond, along with a concomitant deployment of a particular form of reductionist instrumentalism that Chomsky favourably referred to as Cartesian (most blatantly in *Cartesian Linguistics*) and which he clearly viewed, as did many of those further down the computationalist path, as an individualist warding off of the messy complexities of the world (which were, for Chomsky, exemplified by philosophers like Quine, whose famous "Two Dogmas of Empiricism" had argued for a naturalist tempering – or at least contextualization – of meaning-making via the situated webs of empirical practice) in order to attain a pure, unsullied reason based upon "the conviction that pure form is something that can be studied in isolation from use, context, and social meaning" (41)[198]. The profound influence on myriad aspects of both the hard sciences and analytic philosophy of the paradigm fomented by Chomsky and extended by his fellow travellers, a paradigm that was developed partly in response to perceived threats to Enlightenment rationalism from within the social sciences, cannot be overstated. Golumbia observes:

> [B]y the 1970s the view that the brain itself must be something like a digital computer had become widely adopted throughout the academy. It is not even always clear what was meant by the comparison so much as that it had to be true, had to be that in some way the machine we had created was also a model of a more originary creation still in some ways beyond our understanding. But it is still remarkable the degree to which

[196] Notably, this seminal 1943 article, a progenitor of Turing machine models of mind, also inspired work on the connectionist models, grounded in distributed neural network structures, that are sometimes seen as an alternative to functionalism.

[197] As numerous commentators have observed, theories of mind often conform to the dominant technologies of the time, hence over the past few hundred years the idea that minds were like clockwork was replaced by a steam engine model, which was in turn replaced by a thermostat model, and then by a digital computing model. The current juncture, wherein computers are modelled on minds (e.g., adaptive neural networks) poses an unprecedented situation where our models of mind and computing recursively inform each other, as Hui (2019) has noted.

[198] Golumbia traces the roots of this back to Leibnizian rationalism. As he observes, for Leibniz, whose logico-mathematical system is viewed as a forerunner of computationalism, "[r]ationalism is … the application of the rules of formal logic – essentially, mathematical rules – to symbols … Reason is syntax: it is the accurate application of principles like *modus ponens* [affirming the antecedent] to any substance whatsoever" (2009: 91).

> philosophers in particular took hold of this idea and ran with it, and perhaps even more remarkable is the degree to which, just as Chomsky's ideas became a cultural lightning rod in linguistics … their extension in philosophy perhaps even more clearly came to define the boundaries of the field, and in a sense, thought itself (54).

While both linguistics and philosophy have moved on considerably from the jejune computationalism of the 1960s-70s, the overall FCR model remains near-hegemonic in analytic philosophy of mind and the overlapping field of cognitive neuroscience. In the age of convolutional neural networks, fMRI and complex whole brain modelling we have, undoubtedly, added several layers of complexity and nuance to Fodor's hoary "Representational Theory of Mind" and "Language of Thought". However, much of, for instance contemporary philosophy of action, with its focus on intentions[199] abstracted into mental symbols (or "tokens" of types) with syntactic-semantic value (the "aboutness" of semantic content that is often rendered in the clunky language of propositional attitudes, for instance "my belief that P causes P"), is not very far from Fodor explaining cognition as "suppose I intend to raise my left hand (I intend to make true the proposition [P] that I raise my left hand) … what I do is, I put in my intention box a token of a mental symbol that means "I raise my left hand" … [and] after suitable churning and gurgling and *computing and causing*, my left hand goes up" (Fodor 1987: 136; my emphasis).

The prevalence of the FCR model is not surprising. As Golumbia astutely observes, human beings are highly flexible[200] and can adapt to a wide range of basic existential positions; because of this, "the more we imagine ourselves to be like computers, the more computer-like we will become" and, just as pressingly, "the more we imagine computers can take over sociopolitical functions, the more we will give up our own influence over those phenomena – and the more they will pass into the domain of exactly the powerful agents (states, transnational corporations, and capital itself) that already dominate so much of social life" (2009: 221). Underlying this tendency is a more profound tendency towards "binarisms, hierarchy, and instrumental rationality" (222) which exemplify the discrete logic of digital

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[199] Dupuy compellingly, if somewhat provocatively, argues that the conceptualisation of intentionality as relating thought and objects in the world or "things in themselves", a view that is common in analytic circles and shared by philosophers as notable as Quine, relies on an egregious misinterpretation of Brentano's foundational work in this area (which profoundly influenced Husserl's noesis-noemata distinction). As Dupuy explains, once this mistake is made "[i]ntentionality is therefore no longer the mental act that goes beyond itself while remaining within itself, in the direction of an object that also remains internal to it – that "transcendence [sic] in immanence" that Husserl sought to detect; it now becomes a mental state endowed with a content, which in turn is related to an object whose existence is not guaranteed by the fact that the mental state itself exists. Therefore the content can only be intensional, and hence linguistic" (2000: 102). In other words, the slippage from noemata to things in themselves reinforces a view of intention as intension, which can be broadly constructed as the semantic relation between signified and signifier.

[200] As will become clear, this flexibility is itself an indictment of the FCR model in favour of an enactivist-individuative view.

computation as well as the endemic condition Deleuze referred to as the “dogmatic image of thought” (1994), to which I will turn in the next chapter. Over time, the philosophical foundations of the FCR model have been increasingly elided, with a near-exhaustive focus on cognitive science itself, which inherited much of its framework from functionalism and computationalism but which now itself purports to stand in as the sole legitimate arbiter of human thought and action. In this regard, Dupuy observes that:

> Cognitive science likes to represent itself as having reclaimed for science all the most ancient questions posed by philosophy about the human mind, its nature and organization, and its relations with the body (which is to say the brain), with other minds, and with the world. But the identity of this self-proclaimed science of mind remains profoundly philosophical. The science that speaks on behalf of the various disciplines that make up the field (mainly neuroscience, artificial intelligence, cognitive psychology, and linguistics), that provides these sciences d'esprit with the soul that ironically they would otherwise lack, is in reality none other than philosophy. But it is a peculiar kind of philosophy – a philosophy that crept into the Trojan horse of these sciences, as it were, in order to assert dominion over the realm of the mind and to chase out from it the intruders still to be found there: rival philosophies (especially the philosophies of consciousness, phenomenology and existentialism), rival psychologies (chief among them behaviorism and psychoanalysis), and rival sciences (the social sciences, particularly structuralist anthropology) (91).

If the FCR model was an unproblematic, scientifically and philosophically legitimate view of cognition, we could simply get on with matters of development and implementation. Since its inception, however, and increasingly in recent decades, the idea that cognitive processes, including consciousness, consist of abstract brain-bound, representationalist functions whose operational paradigm is the computer has been heavily critiqued, both from within philosophy of mind as well as by various contemporary theorists influenced by phenomenology. I will now examine these critiques before turning to some of the alternatives that have been proposed, specifically enactivism, and apply these to a reformulation of the key notions of set and setting.

4.3 After functionalism

> Functionalism is the default attitude researchers in psychology, neuroscience, and cognitive science adopt when studying cognition. Yet, it has failed in raising – never mind answering – the basic question of what makes an agent an agent; more generally, what makes a body a body. (Di Paolo 2020: 205)

Perhaps the single most fundamental challenge to the functionalist view is that it assumes a kind of stationarity that does not typify cognitive agents, which are necessarily, given that they are *living*[201], open-ended systems, systems that come into being, enact various processes in

[201] I am not here concerned with accounts of cognition pertaining to non-living systems like machine learning software. There is in fact something notably circular in the application of the FCR model to the activities of computers, whose mode of functioning is a cornerstone of this model itself.

order to maintain this being, and can transform in response to the conditions they find themselves in by enacting different processes or, more fundamentally, *being otherwise*. Simply put, an account of cognition needs to include some or other credible explanation of how cognizing systems come to be and how they adapt, and functionalism does not seem to provide such an account. Indeed, ontological questions around "individuality, agency, and subjectivity lie at a blind spot of functionalist approaches to cognition", which "must assume these notions as given and unproblematic" (Di Paolo 2018: 75) in order to function.

So, whereas questions around the cognizing – getting-to-know – activities of living systems demand "answers in terms of transformative (frame-changing, frame-establishing) processes, i.e., they demand a non-stationary story" (76), FCR approaches are forced to reify an *a priori* schematic architecture – a fixed structure within which cognition takes place that bears strong similarities to the innately grammatical structures thought by Chomsky to inhere in the human brain – and do not account for the fact that "to be a cognitive entity is to be a (generally) non-stationary organization in a (generally) non-stationary relation with the world" (77)[202]. In short, FCR relies on the relative stability of form (of syntactical structure, but also of referent, i.e., of the situation "represented" through the symbolic artifice of the computationalist view), "[b]ut form is precisely what is always changing in living systems, its "stability" in fact having an expiration date due to the precariousness of all living processes" (Di Paolo, Cuffari and De Jaegher 2018: 41)[203]. FCR's tendency to view cognitive agents as closed, linear systems where the relevant mechanisms – e.g., functions – are nearly-decomposable (meaning that these mechanisms can be understood in relative isolation from each other as a collection of mostly independent "modules" that can be plugged together in various ways), does not allow it to provide compelling answers to questions around, for instance, the acquiring of new skills or the changing of complex patterns of behaviour that are composed of various enmeshed cognitive acts and are best seen as irreducibly emergent properties of this enmeshment, nor can it explain intersubjectivity convincingly[204].

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[202] What I am here referring to as "non-stationarity" forms a core part of the enactive view that living systems are complex, non-linear and exist in precarious far-from-equilibrium conditions; this will become clear later in this chapter, when I present enactivism and dynamic systems theory.

[203] One could, in response to this, propose a kind of meta-functionalism whereby the dynamisms of system-world interactions generate an open-ended ecology of functions and syntactic architectures; the more closely this generative process itself is examined, however, as I will detail via enactivism later in this chapter, the more superfluous the language of functions, representation and so forth becomes.

[204] Di Paolo, Cuffari and De Jaegher, for instance, point to research on "interbrain synchronization in live interactions, where, on the contrary, evidence shows a deep entanglement of brain and interaction dynamics" (2018: 77), i.e., there is a complex imbrication of various brain dynamics that FCR would rather keep separate.

Earlier I described the ways in which the reliance on symbolic abstraction conflates two distinct ontological domains (the "mental" and the "physical"). Just as crucially, FCR does not produce, beyond this conflation, a viable account of the emergence of consciousness or subjectivity via the logic of computation. Once cognition is defined as "a complex architecture of connected boxes, each doing a particular information-processing job, in what sense can it be said that this aggregation of mechanisms constitutes an agent with concerns, motivations, and goals? As we pile up the boxes, at what point does the agent appear?" (Di Paolo 2020: 205). Furthermore, if we take a "passivist-materialist-cognitivist view of the brain as an input-dependent processor of information and representations" (Freeman 2000: 216) then accounting for "phenomena such as curiosity, self-improvement, and self-sacrifice" becomes near-impossible (214). In seeking scientifically legitimate answers to this question, however tentative, we also run into another key issue with FCR. By positing functional-computational activity as a discrete *kind*, it removes cognition, a property of living systems, from the domain of the natural sciences wherein all other properties of living systems can be located and thus perpetuates a mysterianism qua minds that reinforces the Cartesian dualism we discussed earlier, in some cases resulting in quasi-theological resignation or even panpsychism.

It seems parsimonious, however, to argue that "[g]iven a commitment to naturalism, our explanations of cognition must be continuous with the physical, chemical and biological mechanisms of living organisms, such as energy-levels and homeostasis, rather than appeal to hard-to-naturalize, representational 'strange power(s) invested in neural activity' " (Høffding 2019: 3, citing Di Paolo, Buhrmann and Barandiaran 2017: 24). The denaturing of cognition by FCR becomes even more plainly facile when we consider that "the most ordinary tasks are done faster when performed even by tiny insects than is possible when they are attempted with a computational strategy of the type proposed in the cognitivist orthodoxy" (Varela, Thompson and Rosch 2007: 86-7)[205]. Indeed, even on the most rudimentary level of fundamental physics, FCR relies on a "microphysics of elementary systems … a physics of philosophers, evidence for which is nowhere to be found today in actual physics laboratories" (Dupuy 2000: 8).

Closely related to this is the fact that natural processes are continuous, not discrete. If cognition is indeed a natural phenomenon, as I argue alongside the enactive theorists, then

[205] The reader may here remark that this is no longer the case given the powers of contemporary machine learning demonstrated, for instance, by large language models (LLM's) like ChatGPT. Here I defer to Bender *et al.*, who have pointed out the dangers of assuming that these models are anything more than what they term "stochastic parrots" (Bender *et al.* 2021).

any disembodied view of cognition as the linear, sequential juggling[206] of semantically well-defined tokens in some sort of abstract non-material domain called "the mind" begs the question of what exactly this domain is and how it could emerge from the material world. FCR, in short, fails "to account for the ways in which cognition depends on the specific character of the human body and brain, instead treating sense-making as the manipulation of abstract, amodal symbols by disembodied minds" (Short, Shearin and Welchman 2014: 241). Underlying all these assumptions is a particular ontology that assumes that reality "can be divided into regions of discrete elements and tasks", a necessary condition for a representationalist paradigm that "must, if it is to be successful, respect the elements, properties, and relations within these pregiven regions" (Varela, Thompson and Rosch 2016: 147). The outcome of this ontology, and of the endemic yet, upon closer analysis, remarkably counterintuitive idea that the cognitive domain somehow exists outside of the natural world is that we are left with a variety of explanatory gaps when it comes to fundamental questions around causation, change, the emergence of agency and so forth, and the disingenuous bridging mechanism provided by the tripartite structure of symbols in fact exacerbates these gaps by legitimising the very terms – and their strict discreteness – it purports to draw together.

These gaps are generalised into what is undoubtedly the most famous problem in philosophy of mind, the so-called "hard problem of consciousness" which asks why cognitive activity is, often anyway, accompanied by subjective experience, i.e., why it is "like something" for some cognitive acts to occur in a manner that gives rise to an experience of ongoing subjecthood. While on the FCR view this question seems coherent, even crucial, its framing also reiterates some of the assumptions of that view. If, for instance, we do not begin our inquiry as Cartesian dualists but instead view cognition as an emergent feature of the natural world, without separating "mind" and "body" into two discrete modes, then the problem becomes less hard – as tractable in principle as "why are the leaves green?" or "what gives rise to life on Earth?" It is worth citing Varela, Thompson and Rosch's seminal *The Embodied Mind* at length on the underlying assumptions that nurture the mind body dualism the hard problem tacitly relies on:

> … it is because reflection in our culture has been severed from its bodily life that the mind-body problem has become a central topic for abstract reflection. Cartesian dualism is not so much one competing solution as it is the formulation of this problem. Reflection is taken to be distinctively mental, and so the problem arises of how it could ever be linked to bodily life. Although contemporary discussions of this problem have become quite sophisticated – largely because of the development of cognitive science – they have nevertheless not departed from the essentially Cartesian problematic of

[206] The parallel non-linear processing of semantics-free connectionist models obviates some of these issues, but not the underlying ontological dualism (nor, arguably, a residual syntacticality).

> trying to understand how two seemingly distinct things are related. (Varela, Thompson and Rosch 2007: 30)

In response to the intractable nature of the hard problem that emerges from FCR, cognitivists who prefer not to go the panpsychist route (as I briefly mentioned earlier) have another equally unpalatable option available to them: dismiss consciousness, the "something it is like"-ness of cognition, as an essentially unnecessary side effect, vestigial or otherwise, of functional processes. The cart-before-horse reasoning of this move is concerning. Varela, Thompson and Rosch vividly describe those who accept this view: "They shrug their shoulders and say, 'So much the worse for experience,' as if experience could be blamed for not living up to the demands of a theory" (2016: 56). Indeed, Thompson notes in this regard that some theorists – the philosopher and cognitive scientist Zenon Pylyshyn, for instance – simply revise their domain of inquiry to exclude questions of subjectivity and consciousness[207], thus begging the question of what exactly their inquiry is aimed at, beyond the implementation details of a functionalist mechanistic system that, in strikingly circular fashion, has less to do with cognition qua living systems than with reifying the contrivances of computationalism itself. Far from resolving Cartesian dualism[208], the FCR model has in fact "perpetuated it in a materialist form by opening a new gap between subpersonal, computational cognition and subjective mental phenomena" (Thompson 2007: 6), a move whose disingenuity is amplified by a growing awareness of the inextricable connection between sentience and life or what enactivists, as I will discuss later, refer to as life-mind continuity.

The positing of intractable life-mind dichotomies is not defensible in the face of growing evidence from the neurosciences, as has been pointed out by, among others, Panksepp, Damasio and Solms (224). Similarly, such dichotomies, Thompson argues, rely on notions of life as strict materialism and mind as wholly idealist that are entirely mutually exclusive (225): given the ontologically disparate nature of materialism and idealism, aiming to reconcile them by answering a so-called "hard problem" of how the former gives rise to the latter is not simply futile – the question itself is poorly posed, rendering the hard problem *impossible* (ibid.). Besides the invocation of the hard problem in seeking to address the antagonism that emerges from rendering mind and life fundamentally incommensurate, FCR advocates also tend to elide the *life* side of the account, which results in the absurdities of brain-in-vat or "digital upload" thought experiments that simply forego all of material reality in order to more fully

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[207] This can be done, for instance, by steering attention away from *highfalutin cognition* (higher-order rational thought, etc.) towards progressively lower-order cognitive phenomena (Akagi 2017).
[208] Thompson in fact argues that Descartes himself would likely not have agreed with the specific form of dualism perpetuated by FCR given that for him, subjective experience was a necessary precondition for the construction of relations of meaning qua the symbolic (2007: 462, n2). Whether this view is obviated by recent developments in large language models is a hotly debated question.

valorise an abstract computational architecture of functions and meaning-laden symbols that emerges from and operates within an ostensibly immaterial void. “The world”, as Golumbia puts it, “is of little interest to computationalists” (46).

It is worth stepping back for a second to consider the trajectory I’ve just outlined. FCR originally positioned itself as providing insight into the functioning of minds post-behaviourism. It did so through the application of various computationalist models of cognitive function. As the incommensurability between these models and consciousness has grown, FCR has increasingly revised its scope away from consciousness and towards functionalist processes that do not entail any conscious, experiencing subject. This growing detachment from questions of mind qua life perhaps reaches its apogee in Pylyshyn’s dismissing of consciousness as a salient object of study for cognitivism, regardless of the fact that the fundamental notions of meaning, symbolisation and so forth come from the (inter-)subjective domain. Yet, FCR is still employed as a framework to discuss precisely the questions that, by the reckoning of some of its more strident advocates, it excludes in principle, thus, to put the matter slightly hyperbolically, purporting to want to discuss issues central to living cognitive systems *sans* consciousness. There are also, as noted earlier via Dupuy(2000: 91), strongly ideological aspects to this positioning.

This is remarkable when considering the roots of FCR I have cursorily mapped – a dubious transposition from first-order cybernetics and linguistics via early computer science to living cognitive subjects. To defend FCR as anything more than an instrumentalist model, of limited utility in producing data that, furthermore, necessarily conforms to its founding assumptions is in essence to argue that because “extremely complex computer simulations can help in predicting weather,” therefore “weather itself is a digital process or even a computational one” (Golumbia 2009: 75). If not weather, then why the brain? It is precisely at the point of transposition that the epistemological slippage occurs: because models generally function as difference reducers, drawing together disparate features of reality under a single equivalence class that is multiply realisable, they can, when their constructed nature is obscured or forgotten, obtain a transcendent status similar to a Platonic ideal form, thus inverting the model-reality ontological relation. Dupuy, however, argues that “the scientific model is a human imitation of nature, the scientist is inclined to regard it as a ‘model,’ in the ordinary sense, of nature”, with the result that “nature is taken to imitate the very model by which man [sic] tries to imitate it” (30). This problem is especially insidious when what is being modelled *is the capacities that give rise to modelling*. It must be kept in mind that FCR is not just based on the conviction that cognition involves representation; FCR *uses* representation to construct this conviction. To state the matter plainly, human beings qua users of representational

mechanisms, such as language, make use of this mechanism *when attempting to describe that which gives rise to this mechanism*. FCR "is therefore located on (at least) two logically interlocking levels: elementary representation and representation of the faculty of representation" (32).

What follows is a reification of modelling itself, which, as something reliant upon an FCR-style mode of operation, is situated both immanently vis-à-vis the material world (humans are physical beings and humans create models therefore modelling is a part of the physical world) and simultaneously transcendent thereto (models are equivalence classes instantiated in the physical world, which contains only inexact tokens of these ideal types) (ibid.). Models, in their transcendent sense as ideal equivalence classes, are often characterised as abstract structures bearing information, which in turn is expressed in instantiations of that model. The genocentric view of DNA, for instance, casts it as containing or being a kind of information or "code" that is made manifest in ontogeny. However, "[t]his notion of information as something that preexists its own expression in the cell, and that is not affected by the developmental matrix of the organism and environment, is a reification that has no explanatory value" (Thompson 2007: 187).

It should be clear from the example of DNA how the transposition problem I've been discussing affects not only cognitive science and the philosophy of mind it is entangled with, but even fields of inquiry, like genetics, that are grounded in the most fundamental aspects of living systems. This slippage, to put it as bluntly as possible, "is informational idolatry and superstition, not science" (ibid.). A related model-modelled conflation inheres in the so-called "homuncular fallacy", which consists of a kind of misleading vividness at best, and mereological category mistake at worst, whereby the representations computationally operated on by functional mechanisms simply recapitulate the mode of cognitive experience of subjects at a sub-personal level, leading to an infinite regress of homunculi as the supposed consumers of these representations and themselves operating with a functional structure in order to undertake this consumption (simply shifting the explanatory burden). This results "in a confusion of *explanans* and *explanandum* that can sometimes be kneaded into the shape of an explanation, provided nobody looks too closely" (Di Paolo, Buhrmann and Barandiaran 2017: 24), with defenders of various kinds of functionalisms hoping that the view can be blurred by appeal to definitional obfuscations such as Dennett's attempt to fix the mereology by explaining away sub-personal cognition as merely "hemi-demi-semi-proto-quasi-pseudo" (Bennett *et al.* 2007: 88-9).

There are myriad other critiques that can and have been made of FCR as a whole and of each of its components in isolation. These are live issues that still occupy a great deal of space in

debates in philosophy of mind and cognitive science. In many ways, however, FCR persists as a kind of default orthodoxy whose endurance reflects a perceived dearth of compelling alternatives, even though numerous potentially fatal critiques to various forms of this orthodoxy have remained unanswered for decades (e.g., Block 1980). This dearth is also, however, partly fabricated, often via elision, as a bulwark against increasingly widespread, realistic alternatives in the forms of ecological psychology, 4E cognition, affect theory and multiple other contenders that have been put forward, with varying degrees of rigour and development, since at least the 1970s. This elision is sometimes striking in its myopia: a summative text discussing contemporary views on cognition and philosophy of mind published as recently as 2022, for instance, strikingly omits a single citation of scholars working on the aforementioned alternatives and, like many such texts, instead occupies itself with increasingly narrow scholastic debates. It is hard not to invoke Dupuy's description of this dynamic and view it as a situation wherein the orthodox advocate of FCR, "lacking the power to reign over a part of the world as master and possessor, constructs an image of it that is simpler but at the same time as faithful to it as possible, acquiring in this way a mastery over the image – a kind of fetish, in effect – if not over the world" (2000: 138). Others have taken a more humorous approach, encouraging us to simply "upgrade" to the latest version of functionalism (version 31, i.e., 6.3.1, at time of writing), which will assuredly resolve any residual "bugs" (Maley and Piccinini 2013)[209]. Still others are more sanguine, and advocate for a pluralism of approaches. As they argue:

> The philosophy of mind is over. The two main debates in the philosophy of mind over the last few decades about the essence of mental states (are they physical, functional, phenomenal, etc.) and over mental content have run their course. Positions have hardened; objections are repeated; theoretical filigrees are attached. These relatively armchair discussions are being replaced by empirically oriented debates in philosophy of the cognitive and neural sciences (Chemero and Silberstein 2008).

Admittedly, focusing on the research and letting the philosophy emerge from it instead of unilaterally informing it is an appealing – and more empirically credible – way forward. Before proceeding down this meandering path, however, we need to countenance the most insidious assumption shared both by FCR and several of its would-be successors: the very idea that brains "process" the world by internalising various features of experience in order to produce knowledge of them. This view goes to the heart of the ontology of cognitive agents. In its various forms it "is the single, most influential assumption in the contemporary sciences of the mind, and it inevitably leads to some version of cognition as internal computations, typically occurring in the brain" (Di Paolo, Buhrmann and Barandiaran 2017: 13). This view deeply

[209] Maley and Piccinini are only half-joking; they do seem to view FCR as redeemable given enough patches. Others argue, as we will shortly see, that the entire codebase should be rewritten.

influences how we think about brains and minds, affecting everything from neuroscience (which, applying this assumption, looks for "processing" in the brain) to psychoanalysis (Lacanian psychoanalysis, which also has some deep roots in cybernetics and semiotics, presents, in some senses, an essentially functionalist account of the unconscious).

If one turns to the 20th and 21st century philosophical accounts of psychedelic experience and psychedelic therapeutic paradigms discussed in the previous chapter, most notably REBUS and other FEP/active inference associated views, it should now be clear how heavily inflected they are by the fragile orthodoxy of FCR. From Lilly to Letheby, an account of the how and what of psychedelic effects on consciousness that centres notions of function, computation and abstract representation will near-inevitably result in an entrenchment of the models of phenomenological experience, reflective thought and intersubjectivity that both underpin and naturalise this orthodoxy. There are, however, "alternatives if we look for ways of escaping the picture of cognition as internalization and seek to replace it with a picture of the living cognitive agent as moving outward into the world and navigating its possibilities" (Di Paolo, Buhrmann and Barandiaran 2017: 13) I now turn to discuss enactivism, the most radical and promising of these alternatives.

4.4 Enactivism

> Saying that cognition is just in the brain is like saying that flight is inside the wings of a bird. Just as flight doesn't exist if there is only a wing, without the rest of the bird, and without an atmosphere to support the process, and without the precise mode of organism–environment coupling to make it possible … so cognition doesn't exist if there is just a brain without bodily and worldly factors. The mind is relational. It's a way of being in relation to the world (Thompson 2014: 1).

4.4.1 The four E's

Enactivism, as I noted above, is usually viewed as part of what has come to be known as the 4E school of cognition. This broad school of overlapping but distinct post-FCR views sees cognition as variously embedded, embodied, extended and/or enactive (and sometimes also as affective or emotive)[210]. To describe cognitive systems, agents or acts as embodied, is simply to view them as involving physical bodies that exist in complex imbrication with brains and, by extension, minds. Embodiment poses an initial, relatively straightforward challenge to Cartesian dualism and to the disembodied conceptions of cognition that accompany it, arguing that everything from physiology to endocrinal processes to sensorimotor behaviour to proprioception, interoception and somatic markers form part of any given instance of cognition.

[210] Some scholars thus refer to "5E" or to "4E-A". 4E is the most popular moniker though, and the one I will, largely for reasons of convenience, default to here.

This view can range from the relatively innocuous idea that bodily dynamics – hormone levels, for instance – influence cognition to the stronger claim that cognitive agents just *are* all the various dimensions of embodiment, with the kilogram and a bit of grey matter housed within the skull occupying an important but not central or exclusive role in cognising, i.e. constructing knowledge. Embodiment is frequently coupled with embeddedness, which is the related idea that brain-bodies are embedded in a world and that this world similarly influences cognition; the two approaches are often jointly referred to as embodied embedded cognition (ECC) and described as the emergence of cognition from a feedback loop between bodies, brains and environments. On this view, the ways in which we are embodied and embedded matter – cognition is not a kind of ontological "view from nowhere" but is fundamentally informed by the specifics of our brain-body-world imbrications, something that, as will be elaborated later, is strongly resonant with Merleau-Ponty's phenomenological account of worlding. Essentially, ECC aims to re-embody cognition in general and consciousness more specifically, not just in the sense that cognizing agents inhabit a material world as singularly embodied living beings, but also in the more profound sense that this embodiment informs even the most abstract conceptual "offline"[211] thinking. Lakoff and Johnson, for instance, in their work in cognitive linguistics, describe how many of the most generalised conceptual frameworks we use to think about the world – moral valence, for instance – are informed by what they call "cognitive metaphors" that abstract from features of our embodied experience (Lakoff and Johnson 1980). As spatially oriented beings, for instance, the basic bodily distinction we make between up and down or left and right can subtly inform how we construe something as supposedly cognitively abstract as emotional experience; why, for instance, in Western culture anyway[212], do we tend to think of positive things like happiness, health and social status in terms of "UP" and negative ones, sadness, for instance, in terms of "DOWN"?

These so-called orientational metaphors influence the most fundamental ways in which we make sense of and parcel out the various features of our experience (14-21). In fact, Lakoff and Johnson argue that even "[s]o-called purely intellectual concepts, e.g., the concepts in a scientific theory, are often – perhaps always – based on metaphors that have a physical and/or

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[211] Cognitive scientists often divide cognition into "online" and "offline" modes, where online cognition involves immediate grappling with a present, unfolding experience (the elephant is charging towards me) and offline cognition involves reflective engagement with experiences that are no longer present (I wonder why that elephant charged towards me earlier). I will complicate this divide in later chapters, but for now it should be provisionally noted that, beyond what Derrida would call the metaphysics of presence inherent in this view, the presence/absence binary is not always the best way to conceive of any specific instance of cognitive dynamics; often there are complex distributions of degrees of presence and absence that obviate any simple divide.

[212] As Lakoff and Jonhson point out, "spatialization metaphors are root in physical *and cultural* experience" (1980: 18; my emphasis).

cultural basis" (18-19). Similarly, there are numerous ontological metaphors that inform cognition and which reflect the ways in which we encounter the world through our bodies (as well as how we encounter our own embodiment) in a manner that divides it up into distinct objects of experience. This encourages thinking about abstract emotional or cultural concepts like peace, fear, patience, fame and so forth as clearly ontologically circumscribed, i.e., as nouns demarcating well-defined entities (26-7). This includes, notably, the cognitive metaphor that "MIND IS AN MACHINE"[213], which "gives us a conception of the mind as having an on-off state, a level of efficiency, a productive capacity, an internal mechanism, a source of energy and an operating condition" (28). It is not difficult to see how this particular cognitive metaphor, an emergent feature of our embodied experience, somewhat ironically informs a view of cognition, FCR, that elides any meaningful reflection on embodiment.

Finally, structural metaphors form a third category of abstraction of analogies stemming from embodiment, this time by generalising a certain structure or mode of relation – the mode of relation between subjects and objects that typifies experience, for instance – and using this to conceive of a broader range of ontological and epistemological relationships. It is worth noting that the idea of conceptual metaphor still to some extent relies on a source to target mapping (feature of the world to abstract concept) with a one-to-many structure that is still very close to the notion of representation I critiqued above. It does, however, bring cognition "down to earth" (to use "DOWN" in a more positive sense) in a way that is further developed by enactivism. Before turning to this final E, however, I shall briefly discuss *extended* cognition.

Popularised by Andy Clark and David Chalmers in their famous paper *The Extended Mind* (1998), the extended mind thesis proposes that we outsource cognitive acts to our environment. The use of a notepad as an extension of memory or a calculator to perform calculations, are well-worn examples of extended cognitive acts. Importantly, extended mind theorists are not simply arguing that cognitive agents like human beings sometimes make use of tools; instead, they view pencils, calculators and so forth *as forming part of cognitive agents*. While this view has been met with the critique that there's a kind of misleading vividness at play (e.g., Adams and Aizawa 2010), in isolation it is in fact quite a modest form of FCR. A cognitive agent may be described as constituted by a brain and a cell phone, for instance, but such an agent, while slightly ontologically blurry around the edges, still performs computational operations on symbolic representations via various functions. For this reason, the extended

[213] Lakoff and Johnson employ the convention of writing cognitive metaphors in uppercase.

mind thesis is also usually referred to simply as extended functionalism (Clark and Chalmers 1998) and is by far the most conciliatory of the four E's.

If extended functionalism is the least radical variant of 4E, enactivism is undoubtedly its most cutting-edge. In many ways, enactivism incorporates the other three E's into its premises, and it argues that cognition is of course embodied, embedded and enactive, necessarily involving all sorts of messy distributions of brains, bodies and worlds. For enactivists, however, all of these features of reality also entail interaction: cognition is something that is *enacted.* In other words, it is through ongoing processes of engagement between brains, bodies and environments, as well as the accumulation of a sensorimotor history of past engagements – habits, or forms of practical "know-how" – that we are enabled to be in a meaningful relation to the world. In the most modest form of enaction[214], as Alva Noë explains, there is a kind of "sensorimotor understanding" of our own bodies, coupled with a sensitivity to the objects of experience (as things that can be potentially manipulated in enactive encounters) that gives rise to features of cognitive experience like perceptual consciousness (our ability to perceive objects as wholes, for instance, is reliant upon our knowledge that the partial perspectives on those objects afforded in any single perceptual encounter can be transformed by sensorimotor action, for instance by turning the object around to see its other side) (2012: 24).

However, there is also a more radically enactive approach that moves beyond Noë's focus on sensorimotor knowledge of enactive possibilities – as well as the other embedded, embodied and extended perspectives we have been discussing – and towards a complete reconceptualisation of agency itself. This is the approach first comprehensively put forward in Varela, Thompson and Rosch's seminal 1991 book, *The Embodied Mind* (2016), which inaugurated a school of thought that has become increasingly influential in contemporary philosophy of mind and? cognitive neuroscience (although it is still far from achieving anywhere near mainstream acceptance). It is also the approach most commonly associated with enactivism in the 21st century, and the one I will mostly rely on from this point on, although there are various competing strains of thought within this broad camp. Influenced by evolutionary-development biology, developmental systems theory and notions of biological

[214] Noë's specific version of enactivism is known as *sensorimotor knowledge enactivism* (2021), although it is different in several fundamental aspects – e.g., residual internalism and representationalism – to the original enactivist approach I will outline below. A third variant, "radical enactive cognition" (Hutto 2005), is closer in spirit to original enactivism and can, for the purposes of the current discussion, be viewed as a stringently minimalist programme aimed largely at holding enactivists to their word when it comes to anti-representationalism, while simultaneously encouraging them to provide more rigorous (analytic) grounds for their claims.

self-organisation, enactivists begin from a wholly different premise that seeks to situate cognition firmly within life as a material, biological process.

Instead of constructing sharp modal divides between mind and body, enactivism conceives of mind as an extension of natural processes, which it describes in terms of a "mind-life continuity" (this notion finds a succinct articulation in philosopher of biology Hans Jonas's observation that "the philosophy of life comprises the philosophy of the organism and the philosophy of mind" (2001: 282) and that "the organic even in its lowest forms prefigures mind … mind even on its highest reaches remains part of the organic" (1). Life, for enactivists, is a process of sense-making whereby for any living system to endure it must have some way of adaptively responding to its environment, which in turn entails making "sense" of that environment. Simply put, "living is sense-making and … cognition is a kind of sense-making" (Thompson 2011) – the kind that advocates of FCR would describe in terms of representations, functions and so forth, but which for enactivists is the ongoing embodied enaction that iteratively and reciprocally gives rise both to cognitive agents and their environments. In other words, for enactivists "human cognition is not the grasping of an independent, outside world by a separate mind or self, but instead the bringing forth or enacting of a dependent world of relevance in and through embodied action" (Varela, Thompson and Rosch 2016: xiix).

This shift from stable, skull-bound cognitive agents encountering an equally stable and separate world which they navigate through representation, to the mutual bringing forth of agency and environment through action, where cognition is in a sense this bringing forth itself, is strongly reminiscent of Kant's discussion of self-causing cause, but whereas he "relegates self-organization to the realm of reflective judgment" (Juarrero-Roqué 1985: 118) in a manner that has strongly theistic tones, enactivism instead draws on work in systems theory[215], and in particular Maturana and Varela's concept of autopoiesis, or "self-making". In order to better contextualise the enactive approach, I will briefly explain the idea of autopoiesis before returning to examine what we could think of as the modern enactivist synthesis where the crucial notion of adaptivity is added to the core notions of operational closure, self-production and so on.

[215] Later in this chapter I will return to Kant when discussing dynamic systems theory and Alicia Juarrero's mereological solution to Kant's anxiety around the problems posed by the idea of self-causing cause.

4.4.2 Autopoiesis

> [T]here is no neutral perspective on how we decide to study the human mind; nothing is just the way it is, untouched by an ideology. (Di Paolo, Cuffari and De Jaegher 2018: 309)

> We finally wanted to build a strong theory that would make the computer brain metaphor obsolete. Show, through science, that knowledge is not a matter of representation, but rather of creation, of the construction of reality. The brain builds its own world, while feeling it, that's what we suspected! We relied on the experimental observation of cellular life, and we invented the notion of "autopoiesis". The idea that there is minimal autonomy, an independent creative form, in every living organism (Varela 1993).

The notion of autopoiesis is frequently employed in popular culture in a loosely figurative way to describe any "self-making" system; thus, there is an entire field of self-creating music and "autopoietic" visual art, for instance. Taken in its more philosophically rigorous sense, however, the term originates[216] in Chilean biologist-philosophers Humberto Maturana and Francisco Varela's groundbreaking attempts in the 1970s to develop a definition of life that was scientifically realistic and did not tautologically define life via various synonymous concepts. The problem was that the FCR approach had permeated thinking in philosophy of biology at the time, and the dominant biological discourse was functional and propositional (2011: 4). Maturana explains: "I thought that it was not adequate to talk of biological phenomena in functional terms, not even metaphorically, because such manner of talking conceptually obscured the actual operations that constituted the biological phenomenon that one wanted to understand" (ibid.). Maturana's approach was to describe how living beings emerge, as unique, irreducible phenomena, from the operations of their components (the various processes of transcription, replication, DNA repair and so forth that form part of the functioning of cells)[217], but to underscore how this emergent living form was also what sustained the processes that gave rise to it, resulting in a circular operational dynamic of mutual presupposition of components and emergent form – hence life as a kind of self-making "machine"[218]. The textbook definition of this dynamic is found in Maturana and Varela's 1973

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[216] It is useful to note, given that I will later be developing an account that draws enactivism together with Simondonian and Deleuzoguattarian work that is inspired by French philosophy of science, that Canguilhem used the term *autopoétique* as early as 1951 in a broadly related way (1965).

[217] Importantly, the original scope of autopoiesis was limited to single cells; it was rapidly expanded, not without some contestation between Maturana and Varela, to account for more complex organisms too and, in a manner that is in some ways slightly more controversial, supra-individual organisations like communities, societies, ecosystems and so on. I will be using the term in the broader sense, with provisos where relevant.

[218] While the term *machine* is inspired by cybernetics, with both Varela and Maturana being hugely influenced – and influential – within second-order cybernetics, they move away from the machine metaphor in later work. Even here though, "machine" should be thought of in terms of organisation, not structure.

book *De máquinas y seres vivos. Autopoiesis: La organización de lo vivo*, translated in 1980 as *Autopoiesis and cognition. The realization of the living*, and is as follows:

> An autopoietic machine is a machine organized (defined as a unity) as a network of processes of production (transformation and destruction) of components that produces the components which:
>
> (i) through their interactions and transformations continuously re- generate and realize the network of processes (relations) that produced them; and
>
> (ii) constitute it (the machine) as a concrete unity in the space in which they (the components) exist by specifying the topological domain of its realization as a network (Maturana and Varela 1980: 78-79).

In other words, life can be conceived of as various processes that give rise to a concrete, emergent unity – a living being – which in turn sustains the processes that sustain it. What is crucial in this reading is that it is not the material *structure* of such a dynamic that is important but instead the network of relations or *organisation*. This is necessarily the case because "the same organization can be structurally realized in different ways, and a system can undergo structural change without necessarily changing its organization" (Thompson 2007: 97). Organisation is thus more ontologically central within the autopoietic account than structure, with an organism defined by its processes and relations, not the structural dynamics that are effectuated by and effectuate these. Being material systems, all living systems are thermodynamically or *structurally* open in the sense that they require flows from what is outside of them in order to sustain themselves, whether this is electromagnetic radiation in the case of plant photosynthesis or food in the case of fauna metabolism. Living systems are simultaneously organisationally closed because, on the autopoietic view anyway, which will become more complicated when I turn to Simondon, that organisation is what makes them what they are: if a different organisation emerged it would have fundamental ontological consequences. This dynamic interplay between structural openness and operational closure, or what contemporary enactivists refer to as a dialectical relation between self-production and self-distinction (Di Paolo, Buhrmann and Barandiaran 2017: 133), is described by Jonas as a condition of "needful freedom":

> This ontological individual, its very existence at any moment, its duration and its identity in duration is, then, essentially its own function, its own concern, its own continuous achievement. In this process of self-sustained being, the relation of the organism to its material substance is of a double nature: the materials are essential to it specifically, accidental individually; it coincides with their actual collection at the instant, but is not bound to any one collection in the succession of instants, "riding" their change like the crest of a wave and bound only to their form of collection which endures as its own feat. Dependent on their availability as materials, it is independent of their sameness as these; its own, functional identity, passingly incorporating theirs, is of a different

> order. In a word, the organic form stands in a dialectical relation of needful freedom to matter (Jonas 2001: 80).

This tension between self-distinction and self-production, or between the entropic structural principle all material systems succumb to and the emergence of negentropic, self-regenerating organisational order, necessitates ongoing action given that "[a]n organism is never bound to its material composition at any given instant, but by the same token it has to change because stasis means death" (Thompson 2007: 155). This is the *poiesis* or *making* from whence the enactive view emerges, whereas the *auto* or *self* is expressed in the closure of living systems that endure as systems, a closure effectuated by each component being reciprocally related only to other components within the system and which is often expressed in terms of membranes or boundaries such as the cell wall. This is foregrounded in a later, more succinct formulation of autopoiesis: "[f]or a system to be autopoietic, (i) the system must have a semipermeable [structurally open] boundary; (ii) the boundary must be produced by a network of reactions that takes place within the boundary [operational closure]; and (iii) the network of reactions must include reactions that regenerate the components of the system [self-making]" (Varela 2000 cited in Thompson 2007: 149).

I opened this chapter with a discussion of FCR, which I then provided some critiques of before moving to introduce 4E, with a focus on enactivism, whose origin I am currently tracing back to autopoiesis. It should be recalled that I am undertaking this task in order to develop a more adequate account of cognition and, by extension, a scientifically and philosophically credible, albeit provisional, description of consciousness that can be usefully applied to a consideration of the perturbatory and transformative effects of psychedelics on consciousness, and more generally on living systems, without perpetuating tenuous forms of dualism, resignatory panpsychism and so forth. At this point in the exploration, it may seem as though I have diverged into the depths of philosophy of biology, and, on a traditionally functionalist account, this would perhaps be the case. For enactivists, however, questions of life and questions of cognition *are almost entirely the same questions*. Maturana originally observed that "all living systems are autopoietic systems and that all autopoietic systems are cognitive systems", and on this view cognition is simply "the behavior or conduct of a[n] [autopoietic] system in relation to its environment" (Thompson 2007: 124). Cognition simply *is* the autopoietic system *in its ongoing autopoiesis* vis-à-vis its environment, an environment[219] that does not pre-exist the system but is co-defined in relation to the operational closure effectuated thereby.

[219] It is useful to distinguish the idea of an environment from the idea of the actual material world. The world is that within which all autopoiesis unfolds, but the environment is that aspect of the world that a

The above notion of an environment being defined in relation to a system has many forebears, from Kant's transcendental deduction to Husserl's phenomenological account of noemata. Even Heidegger's concept of *zuhandenheit*, or the ready-to-hand, is echoed in the idea that the organisation of an autopoietic system "defines a domain of interactions in which it can act with relevance to the maintenance of itself" and wherein "the process of cognition is the actual (inductive) acting or behaving in this domain" (Maturana and Varela 1980: 13). The crucial difference is that these earlier accounts rely, to varying degrees, on a set of ontological assumptions closer to the FCR notion that the environment is a distinct, fixed "out-there" flow that enters into the abstract cognitive domain of the mind via sensory input than to the idea that systems and environments emerge together; or are "mutually specified", through cognition understood as ongoing processes of sense-making as self-and-environment-making. Over time, this means that systems can be seen as embodying a history of reciprocal coupling that in turn defines the distinctions that are significant for this system. Couplings that reliably result in the maintenance of organisation come to have valence attached to them, producing a meaningful space of interactions[220]. This is captured in the succinct definition of cognition as "behavior or conduct in relation to meaning and norms that the system itself enacts or brings forth on the basis of its autonomy" (Thompson 2007: 126).

Perhaps the most profound aspect of this view is that if, as Jonas argued, there is a deep continuity between life and mind (128), then we are not as metaphysically isolated as we may think (2001: xxiii). In fact, "the great contradictions which man [sic] discovers in himself – freedom and necessity, autonomy and dependence, self and world, relation and isolation, creativity and mortality – have their rudimentary traces in even the most primitive forms of life, each precariously balanced between being and not-being, and each already endowed with an internal horizon of 'transcendence'" (ibid.). To return to the larger discussion, then, consciousness is an emergent feature of the living world and, more specifically, the dependent co-origination of systems and environments – a remarkably singular feature, to be sure, but not one that is ontologically distinct from life in the manner that is entailed by FCR and even by some more temperate 4E theorists. In this regard we no longer face a "mind-body" problem of the type exemplified by the hard problem; instead, when examining how consciousness

system is coupled to and regards as salient for its self-perpetuation. Biologist Jakob Johann von Uexküll's famous notion of the umwelt is, with some important distinctions, loosely analogous to Varela and co-authors' notion of the environment.

[220] Thus, "ontogeny is understood not as a series of transitions from one state to another but as *a process of becoming that is conditioned by past structures*, while maintaining structural integrity from moment to moment" (Varela, Thompson and Rosch 201: 121).

emerges from the living world, we're confronted with a more tractable body-body problem (Thompson 2007: 235-44).

One final aspect of autopoiesis – and of Varela's broader project – that is worth noting at this point is that enactivism seeks to move beyond what it regards as the false dilemma of idealism versus realism. The former is exemplified by Kant and the notion that experience is simply the result of a projected inner world, whether this takes the form of categories and schemata or a syntactic model, while the latter is typified by so-called naïve realism, which argues that we have direct experience of the world *as it is*. Instead, Varela and co-authors argue, with a nod to Buddhism, for a "middle way" that is not simply a zero-sum balancing of idealism and realism[221] but a wholly distinct understanding of how the world of experience is the result of an onto-epistemological entanglement whereby cognising agents simply are the world as expressed by the singular point of their ontological specificity. How we know the world (our epistemology) is defined by our ontology, which is reciprocally defined by the world, an ongoing process Varela refers to, via the incompleteness theorems of Gödel and the strange loop drawings of Escher, as a constitutive infinite or fractalline feedback loop (1984) wherein "[t]here is no world except that experienced though those processes given to us and which makes us what we are" (6).

Using the terms *idealism* and *realism* loosely, as a dynamic co-imbrication of world and system, cognition (along with our experience of self) is an expression of reality itself, but a singular expression that is thus idealist in the sense that it is an expression of *how we are*. A strange loop of realism and idealism that complicates their metaphysical separation. Varela, Thompson and Rosch's discussion of colour (2007: 157-71) is perhaps the most useful explication of this profoundly novel view. As they observe, colour is partly a feature of the physical properties of light, surfaces and other features of the world, but our perception of colour is influenced by how these features encounter our retina, visual cortex, patterns of cultural and linguistic association and so forth – dynamics that are themselves all features of the world: "Contrary to the objectivist view, color categories are experiential; contrary to the subjectivist view, color categories belong to our shared biological and cultural world" (172). This mutual specification "enables us to negotiate a middle path between the Scylla of cognition as the recovery of a pregiven outer world (realism) and the Charybdis of cognition as the projection of a pregiven inner world (idealism)" (ibid.). Once we move past what they

[221] Admittedly Varela and co-authors do sometimes refer to the middle way as a mediation between extremes (172), but the gist of their argument, shorn of its Buddhist rhetoric, suggests something more like a dimensional orthogonality – the alternative they propose traverses a completely different path to the terms set out along the single pole of realism-idealism.

regard as the constrained choice between realism and idealism, a different view of both ontology and epistemology as interrelated, groundless "paths that exist only as they are laid down in walking" (205). It is neither map nor territory, but construction. This groundlessness is not a tepid relativism but a recognition of grounding itself as a provisional practice; not a vicious circle but a virtuous one (Vörös 2017: 3).

Classic autopoiesis, although it is strikingly radical in relation to FCR, is still missing something crucial: an account of how cognitive agents – living systems – anticipate and adapt to changes in their environments. In order to address this limitation, a second wave of enactive theorists, arguably starting with Varela himself in his late work and continuing with Thompson, Di Paolo and numerous others, have developed an account of adaptivity and precariousness, to which I now turn.

4.4.3 Contemporary enactivism

> Bodies are better conceived as processes, practices, and networks of relations; they have more in common with hurricanes than with statues (Di Paolo, Cuffari and De Jaegher 2018: 7).

Although the original work on autopoiesis by Maturana and Varela was strongly anti-teleological, there is an immanent teleology implied in the very idea of a system that remains viable in the face of necessary structural openness to flows from the environment. In order to endure, that system must be capable of self-regulating or self-transforming in a manner that adequately responds to perturbations, and what drives this activity is a form of innate purposiveness. This purposiveness, however, does not necessarily entail any kind of external norm or transcendent teleological principle; instead it can be as simple as a bacterium swimming along a sugar gradient in order to maximise nutrient intake and changing direction (by tumbling) when the path along this gradient is no longer clear. In this example it is the dynamic relation of the bacterium to the gradient that constitutes a domain of significance or sense-making – a valenced environment where enaction is necessitated in order to maintain or adjust this relation. In other words, "[s]ense-making is the capacity of an autonomous system to adaptively regulate its operation and its relation to the environment depending on the virtual consequences for its own viability as a form of life" (Di Paolo, Cuffari and De Jaegher 2018: 33).

Living systems, as Varela originally argued (1991), establish their "own space of meaning by differentially evaluating encounters with the environment according to their consequences for its self-individuation" (ibid.). Thus, "although autopoiesis is necessary for sense-making, it is not sufficient, but autopoiesis and adaptivity are jointly necessary and sufficient" (Thompson

2007: 148)[222]. Adaptivity is therefore entailed by autopoiesis, even if this is left largely implicit in its original formulation. As will be explored later, adaptivity further entails the exploration of what can be provisionally thought of as an adjacent possibility space; immanent teleology suggests that "embodied action is always about or directed toward something that is missing" and that "actions of the system are always directed toward situations that have yet to become actual" (Varela, Thompson and Rosch 2016: 205). Earlier I mentioned the precarious nature of autopoietic systems. This can now be more fully explicated: it is the inherent openness I have just described – the unfinished nature of self-individuating systems – that makes them precarious; they are poised at the boundary of viability and dissipation, having to continually modulate their relation to the environment in order to endure. Di Paolo and Beer define precariousness as:

> [a] property of nonlinearly fluctuating material relations in far-from-equilibrium systems by which no single aspect of an isolated constituent process of the system is long-term stable at the same timescale as that of the whole system. This includes any putative functional properties. Precarious circumstances in an operationally closed system are those in which its isolated constituent processes will tend to run down or extinguish in the absence of the organization of the system in an otherwise equivalent physical situation (Beer and Di Paolo 2023).

This relation of precariousness is, from the perspective of the autopoietic system, an asymmetrical one: the system, as an immanently teleological or sense-making process, can iteratively change its relation to what constitutes its environment in a way the environment cannot. On a broader view, the environment-system distinction is relative – the domain of significance qua system, from a different perspective, comprises other systems for which the earlier system constitutes, potentially anyway, a part of the world regarded as salient, thus part of another system's environment. It should be emphasised that this dynamic self-modulation of an autopoietic system vis-à-vis asymmetrical relations of sense-making vis-à-vis its environment, is what gives rise to meaning, normativity, habitual behaviour, agency and temporality, among other central features of cognising beings (Di Paolo 2005: 430). This is remarkably far from the FCR approach I examined earlier; enactivism implies a view of a self qua autopoietic system defined not "in terms of inputs and outputs – as it is for functionalist cognitive science – but rather … as an adaptively autonomous and sense-making system … [that] brings forth or enacts relevance … Cognitive structures and processes emerge from and constitutively depend on recurrent sensorimotor patterns of perception and action" (Varela, Thompson and Rosch 2016: xxvi). And whatever putatively "functional" emergent properties an enactive system has, they are always provisional and subject to change, obviating any

[222] Thompson also notes here that sense-making can be understood as "intentionality in its minimal and original biological form" (2007: 148).

contrivance of a fixed functional architecture of the kind Chomsky, Fodor and others sought[223]. As Di Paolo, Cuffari and De Jaegher underscore, "information, in the functionalist view, implies an already interpreted and prejudged frame of reference whereas sense-making is precisely the ongoing activity of selecting, modifying, and even constructing such frames, by and for the autonomous sense-maker" (Di Paolo, Cuffari and De Jaegher 2018: 36).

Turning their attention to higher primates, Di Paolo and co-authors observe that for mammalian social species, particularly humans, there are at least three salient "mutually constraining and mutually enabling dimensions of embodiment" or cycles of sense-making and adaptive operation: organismic regulation, sensorimotor coupling between agent and environment, and intersubjective interaction that is reliant upon recursive operations of higher-order meaning making like language (Di Paolo, Buhrmann and Barandiaran 2017; Di Paolo, Cuffari and De Jaegher 2018). These three dimensions, which Di Paolo and co-authors refer to as three "bodies" – the organic, sensorimotor and linguistic – are intertwined with each other, forming various feedback loops and nested dynamisms. An organic illness, for instance, can transform the possibilities for sensorimotor action, which can affect how one participates in social life; a harsh word can cause a defensive postural response and the release of catecholamines. Enaction, in this revised view or "modern synthesis", is the ongoing equilibration and mastery of these precarious, entangled bodies through adaptive modulation in response to immanent norms that emerge from ongoing coupling with environments, and the construction of various complexly nested "schemes" that produce reliable relations of viability for a system.

Another way to conceive of these relations of viability is as *metastable* in the sense that different instances of system-environment coupling, including those that are unexpected, can draw on a range of historically accrued schemes or patterns of action that can be expressed situationally. An autopoietic system is thus in part the congealment of various historical expressions of coupling that can be re-actualised in possible future contexts – a repertoire of unexpressed potential that inheres not in an abstract possibility space but in the *actual* organisation of the system. Di Paolo explains that "[t]he operation of adaptive processes relies on the actual state-dependent conditions of the living body, but they both intervene in and are regulated by the virtual, not-yet-actualized possibilities present or created in a concrete situation" (Di Paolo 2019). This notion of metastability is evidently influenced by Simondon's idea of the pre-individual and Deleuze's notion of the virtual – a key overlap between enactivism and individuation/becoming. To reiterate an earlier point, it is precisely this dynamic

[223] In this regard, [o]Precariousness does not refer to a positive material property that could be captured functionally, but to the impermanence of any relevant positive property of the substrate" (Beer and Di Paolo 2023).

interplay between metastability and transient stabilisations that undermines any attempt to describe enactive systems in the machinic-cybernetic language of FCR. This, however, does not mean that there is no way to meaningfully articulate these dynamics; in fact, such an articulation will occupy a significant part of the next chapter, first via dynamics systems theory, then via Simondon, Deleuze and Guattari. For now though, I will look more closely at the complex entanglement of bodies at work in metastable processes. As Di Paolo explains:

> We can distinguish an organic dimension of embodiment instantiated as cycles of metabolic self-individuation and regulation of organic integrity and powers. There is also a sensorimotor dimension instantiated as loops of action and perception as well as internal autonomous patterns of neural, hormonal, and musculoskeletal activity. There is also an intersubjective dimension concerned with transpersonal individuation, ways of interacting and relating to others, participatory sense- making … and patterns of social becoming and identity. These forms of individuation become highly entangled during development, and their relation is not simply one of "progression" (organic – sensorimotor – intersubjective) (Di Paolo 2019).

Organic bodies

The account of organic bodies in contemporary enactivism is largely a reiteration of classic autopoiesis, whose focus was the self-individuation of systems at the level of biological operation. However, the revised account underscores an important proviso: regardless of the focus on closure and autonomy, "[t]he autonomy of concrete living bodies is … constituted through multiple loops of closure at different scales, often involving the interaction between different species" (Di Paolo, Cuffari and De Jaegher 2018: 31). The basic life-preserving functions of biological systems – metabolism, reproduction and so forth – necessarily entail ongoing and historically accumulative adaptive participation in a complex ecology of other such systems, including trophic cycles, parasitism, niche construction in multispecies environments and a host of endogenous and exogeneous symbiotic interactions, all of which unsettle the fixity and sharp edges of the structural boundaries that are typically thought to demarcate living organisms. While necessarily operationally closed, these organisms are structurally far more open than an exclusive focus on spatial discreteness suggests and are intersected by all manner of "biogeochemical relational networks" (Di Paolo, Cuffari and De Jaegher 2018: 31).

Enaction thus entails the ongoing processual stabilisation of durable yet metastable ecological relations – a reliable codetermination of system and environment or associated milieu that we previously discussed in terms of immanent normativity – in order to mediate this tension between ecological openness and agential closure. The historical accretion of these norms of mutual specification of system and environment qua enactive process provides, among other things, a novel descriptive framework for the modern evolutionary synthesis, particularly the

"dialectical" approach to system/environment codetermination proposed by Levins and Lewontin (1985) and to some extent by Jonas (1966) before them.

Sensorimotor bodies

The regime of biological-physiological flows and processes, including those of autopoietic self-individuation, thus constitute an initial dimension of organismic embodiment. In some instances, these ongoing adaptive dynamics give rise to a distinct albeit reciprocally imbricated dimension of enactive embodiment: sensorimotor bodies. While grounded in biological operation, sensorimotor life entails – and *is* – the instauration and open-ended exploration of action-perception loops as a way of cognising ongoing and contingent system-environment relations. Simply put, sensorimotor bodies are bodies that are able to perceive and act, specifically in a manner whereby perception is continually transformed by action and action is continually informed by perception in an ongoing feedback loop of adaptive participation in a world – "[w]hat the organism senses is a function of how it moves, and how it moves is a function of what it senses" (Thompson and Varela 2001: 424).

Action and perception are thus viewed as "intertwined, co-dependent, and co- determined" (Di Paolo, Buhrmann and Barandiaran 2017: 17) in a manner that challenges traditional FCR accounts that instead view the relation as a strictly linear, sequential affair whereby perception of a pregiven world flows inwards to the brain-mind, where it is abstracted into symbolic representations that can be functionally manipulated in order to determine a course of action. On the enactive view, cognition is instead just "the way an agent regulates these entanglements between action and perception" (ibid.). It is at the level of sensorimotor bodies that we can begin to discuss agency *proper*, without slipping into misleading vividness, as an emergent situatedness arising from the aforementioned sensorimotor equilibration loops[224]. Sensorimotor bodies comprise an ever-fluctuating network consisting of multiple nested cycles at different scales of emergent complexity: regularities in cycles of adaptive activity give rise to various "schemes" which in turn cluster together and are expressed as "activities" or, as Varela called them, "microworlds", that "correspond to regional powers, sensitivities, and norms that together make up a cognitive ecology of practices" (Di Paolo 2019) that intersects with organismic ecologies.

[224] As Thompson and Varela note, sensorimotor bodies are deeply enmeshed with organic bodies in this regard: "[t[he substrates of these cycles are the sensorimotor pathways of the body, which are mediated in the brain by multiple neocortical regions and subcortical structures. Transient neural assemblies mediate the coordination of sensory and motor surfaces, and sensorimotor coupling with the environment constrains and modulates this neural dynamics" (2001: 424).

Such a cognitive ecology can also be thought of in terms of habits, and habituation viewed as an emergent normativity that regulates adaptive behaviour, giving rise in the process to what we could consider a sensorimotor subject whose "activities become meaningful not only in virtue of their contribution to biological survival, but also in virtue of their contribution to the stability and coherence of a sensorimotor repertoire" (Di Paolo, Buhrmann and Barandiaran 2017: 39). The recapitulation of classic autopoiesis should be clear, as should the fact that sensorimotor schemes, like the organismic ones they are recursively coupled with, are grounded in action. Sensorimotor bodies – sensorimotor subjects – are enacted in the strong sense in which ontology itself is processual, and the various basic schemes, habits and so forth that cohere to produce such subjects themselves rely on ongoing exercise in order to endure, although some clusters of schemes can ostensibly persist even in periods of long absence if their components are enacted in other contexts. For instance, one quickly remembers how to ride a bicycle, even after a long period of abstinence, if the basic patterns of muscular activity and so forth – the rudimentary sensorimotor schemes collectively employed in the "microworld" of bike riding – have been adaptively maintained via other activities. The emergence of flexible, open-ended repertoires of sensorimotor dynamisms underscores the high degree of plasticity of enactive agents, as does the ability to provisionally enact different arrangements of schemes in adaptive response to context.

Plasticity, whether in a strictly neuroplastic or looser physio-plastic or socio-plastic sense, is closely related to metastability and is what allows systems to explore adjacent potentiality spaces and to contract new habits[225]. There is thus a tension – the same dynamic of needful freedom we discussed earlier via Jonas – at play between plasticity and habituation. In this regard it is important to remember that "[h]abits do not stand in isolation as egotistically self-sustaining behavioral patterns … [but] are nested in hierarchical, sequential, and ultimately networked relations in a kind of ecosystem, whereby a given scheme calls for, reinforces, inhibits, or subsumes others" (Di Paolo, Buhrmann and Barandiaran 2017: 147). One way of defining enaction is thus to view it as the navigation of this ongoing tension, specifically as "the transit between microworlds, the time between moments" (Di Paolo, Buhrmann and Barandiaran 2017: 181). This idea that enaction – and thus cognition – takes place in the temporal interstices between selected patterns of activity, the liminal zone of plasticity or metastability itself, has a basis in Varela's seminal neurophenomenological work on resonant neural assemblies – phase-synchronised patterns of whole brain activity that are also, increasingly, a subject of interest in psychedelic neuroscience. As Di Paolo and co-authors

[225] New schemes can also emerge "out of the differentiation of preexisting ones. This is indeed the process involved in the baby's transition from breastfeeding to drinking milk from the bottle for the first time" (Di Paolo, Cuffari and De Jaegher 2018: 51).

observe, underscoring the connection between sensorimotor and organic bodies, this means that “[s]ome relevant properties of sensorimotor networks might well be pictured as transition networks between large-scale brain patterns” (Di Paolo, Buhrmann and Barandiaran 2017: 152). This transiting is thus a fundamental property of embodied agency and may be the very locus of subjective experience grappled with by the hard problem.

As with the organismic, sensorimotor schemes are enmeshed with environments; repertoires of action often incorporate features of the environment, including other agents, into themselves. This can be as simple as the use of tools[226] and prosthetics, or as complex as milonga or tango; as specific as a nest or den, or as general as a territory. In a manner similar to extended cognition, enaction entails the extension of cognitive acts into parts of the environment, with the crucial difference that, for extended functionalists, these parts conform to a brain-bound functionalist apparatus. For enactivists, however, cognition just *is* this extension in this instance: “[s]ensorimotor schemes are by definition modes in which structures in the agent and structures in the environment meet and mutually stabilize. As such, it makes no sense to try to identify their physical boundaries” (Di Paolo, Buhrmann and Barandiaran 2017: 152). Di Paolo and co-authors argue that three conditions are necessary for defining agency, whether this pertains to organic, sensorimotor and linguistic bodies: individuation, asymmetry and normativity. In this regard, sensorimotor individuation unfolds from the immanent operations of mutual specification of system and environment exemplified by basic action-perception loops, which give rise to complex repertoires and sensorimotor subjects. Asymmetry is in turn entailed by these loops as an operational distinction, and normativity is expressed in the clustering of schemes into habits and microworlds.

Sensorimotor bodies are thus self-making – autopoietic – in exactly the same way as organic bodies: they emerge from initial system-environment distinctions that are then recursively unfolded into nested patterns of behaviour across multiple temporal and spatial scales, and these patterns of behaviour sustain the sensorimotor bodies that effectuate them. Far from simply supervening on organic bodies[227], the sensorimotor regime obtains a kind of provisional

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[226] Heidegger’s distinction between ready-to-hand and present-at-hand could be thought of as the encounter with an object in the world in the context of a schematic cluster and during a transit between different clusters of schemes respectively.

[227] That said, however, “[t]he importance of the material and temporal substrates of sensorimotor bodies must not be overlooked. The life of the sensorimotor agent emerges first as anchored in the organic body and depends on engaging with a complex temporality of flows of active matter not only to sustain the living body but also a sensorimotor way of life. Its rhythms include rapid and sufficiently frequent storing of energy and renewal of tissues for sustained and prolonged periods of activity punctuated by periods of rest, and the satisfaction of material and energetic needs according to developmental stage, intensity and timing of activities, and so on. These rhythms emerge from the circularities of the multiple autonomies involved and their forms of adaptivity” (Di Paolo, Cuffari and De Jaegher 2018: 59).

autonomy that, in a way that is even more pronounced in terms of linguistic bodies, entails more sophisticated notions of causality than the efficient causes that are thought to exclusively obtain in the physical world. A renewed notion of cause will be hugely consequential in developing an account of psychedelic experience as a singular point of intersection between (for functionalists anyway) mind and body; and I will thus touch on this notion in the next chapter, primarily via the work of dynamic systems theorist Alicia Juarrero. Before I turn to linguistic bodies, one final point worth noting is that on the enactive view, complex clusters of schemes of sensorimotor activity can emerge, endure and transform without any representation or abstract modeling taking place[228]. This can happen simply via the habituation and disruption of various perception-action loops that can become corporeally stabilised and destabilised both on the level of musculature and physiology, as well as, simultaneously, neurobiologically in the strengthening of various synaptic firing patterns via, for instance, Hebbian plasticity[229]. Di Paolo and co-authors summarise:

> [o]ur proposal is a world-involving, non-representational, meso-level account based on how actions and dispositions are organized as a network of precarious, mutually stabilizing sensorimotor schemes. A given act contributes to the ongoing regeneration of this organization to different degrees or fails to do so. It is the self-asserting logic of this network that determines whether an act belongs to the agent or not. Conversely, the ways in which an agent acts in the world individuate her as the agent she is constantly becoming. This meaningful relation between agent and world that can be established, lost, and regained, is what in our view best coheres with the phenomenology of the sense of agency (Di Paolo, Buhrmann and Barandiaran 2017: 217).

However, while organic and sensorimotor bodies account for a significant amount of the activity – and associated phenomenology – of living systems, they are not the whole story when it comes to human beings[230].

Linguistic bodies

The application of enactivism to language, symbolic culture and so forth – i.e., to all the things that supposedly make us human – is among its most ambitious claims[231]. After all, even if we

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[228] This would include modelling that occurs via Bayesian inference or predictive processing, suggesting a tension between enactive views and the popular active inference account of cognition. This will be explored further, with a view to developing a hybrid account, in the next chapter.

[229] As encapsulated in the well-known saying that neurons wire together if they fire together.

[230] And arguably various non-human beings too.

[231] As Di Paolo *et al.* openly acknowledge, "we must first recognize that the categorical gap between sensorimotor life and the life of language is not only big, but also largely uncharted. It is difficult, but not impossible, to look at theories of sensorimotor engagement as they are today and imagine how concepts like dynamics, couplings, coordination, environmental situatedness, affordances, and so on might be developed into ideas we can use to explain linguistic phenomena" (Di Paolo, Cuffari and De Jaegher 2018: 4).

accept the argument that basic organic and sensorimotor patterns of behaviour do not require the operation of a representationalist-computationalist architecture, and that these patterns are expressed in ways that oftentimes do not entirely overlap with the assumptions of ontological discreteness that tend to naturally emerge from considering physical structure in isolation from organisation, surely *language* works like language, in the sense that advocates of traditional functionalism argue for cognition being a broadly semiotic activity? There is an insidious slippage here that should be made explicit before continuing. The FCR account of cognition, as was indicated, first entailed the application of ideas from first-order cybernetics and general computing to linguistics, which in turn influenced cognitive science and philosophy of mind. Therefore, to take an account of language that emerges from the same milieu as computationalism as something that needs to be accounted for in-and-of-itself, is to make a category mistake.

Symbolic human culture, as expressed in writing, speech, artifacts and so forth, is one thing. The operational dynamics of the mind – and cognition more broadly – is another. The examination of linguistic bodies via enactivism, then, is focused on the former (a real feature of the world), with implications for the latter (an instrumentalist model of a specific aspect of the world). With this in mind, it should further be noted that, whereas organic and sensorimotor bodies were, qua organisation, oftentimes structurally distributed – partly imbricated with ecologies or other agents in complex dances of mutual becoming, for instance – linguistic bodies are inherently so: they are intersubjective from their very inception, embodying transindividual patterns of social normativity that can stretch back millennia. Di Paolo, Cuffari and De Jaegher explain:

> human bodies always already inhabit an intercorporeal dimension of experience, one that is historically structured in the shape of a lifeworld into which we are born but that is neither fixed nor independent of our activity. On the contrary, the lifeworld relies both on nonhuman materiality and on practices of participation, and it is here, in the moment-to-moment layer of participatory activity where social norms crystallize, that we must begin our search for an enactive understanding of the intersubjective dimension of human bodies (Di Paolo, Cuffari and De Jaegher 2018: 64).

To anticipate an argument whose broad architecture should be familiar by now, linguistic bodies are subjects and agents of meaning making at the level of culture – they both embody this intersubjective meaning as participants in linguistic communities and give rise to it by reproducing or instantiating norms and processes. This is a deeply processual view of language and culture, borne out in the idea that "[t]he middle stage between what goes on in the individual language user and the larger systemic and normative aspects of language is the stream of actual, lived, embodied *languaging*" (Di Paolo, Cuffari and De Jaegher 2018: 133; my emphasis). This languaging is inherently intersubjective simply because "[t]he bodies we

encounter there are not given to us as objects of contemplation but as powers of interpellation that can look at us or ignore us, question us or support us, move us and respond to us, smile, cry, and just be alongside us in sharing a world of concerns and activities" (Di Paolo, Cuffari and De Jaegher 2018: 62). Linguistic bodies operate through the production of utterances, and navigate a fundamental intersubjective tension in this regard: each utterance is expressed through a linguistic agent – a subject – but each utterance is also, in almost all instances, the reproduction of a broader collective agency; most utterances, after all, are expressions of cultural norms, habits and so forth. Di Paolo and co-authors refer to this as a dialectic between incorporation (making use of utterances as a participant in a linguistic community) and incarnation (manifesting that community itself, its norms and practices, through utterance), and argue that it is this dynamic interplay that gives rise to complex forms of linguistic life, just as sensorimotor schemes accrete into habits and microworlds.

As linguistic bodies, we braid utterances together and participate in various "genres", all the while reproducing both our own linguistic selves as well as transindividual forms of spatially and temporally highly distributed linguistic agency, i.e., *culture*. In this regard, "linguistic bodies are constantly putting themselves together out of the spare parts of others' acts and utterances; they are constantly fine-tuning, breaking down, needing something missing, in short, learning how to be what they are again and again" (Di Paolo, Cuffari and De Jaegher 2018: 218). Linguistic bodies are thus ongoing, open-ended, adaptive processes of languaging that give rise to and arise from enculturated schemes of language use in a manner that is recursive and self-making, i.e., autopoietic, as well as other-making – allopoietic[232]. they "navigate a sea of meaning-engendering and person-constituting utterances and relations, not all produced by them" (Di Paolo, Cuffari and De Jaegher 2018: 9)[233]. This navigating is, more often than not, a collaborative affair involving two or more linguistic agents braiding complex chains of utterances in order to constitute both themselves and the constitutive domain of the transindividual that provides the substrate for this ongoing constitution[234].

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[232] The notion of sympoiesis is perhaps apposite here; we shall examine this distributive inflection of autopoiesis – already somewhat accommodated by contemporary enactivism – in the next chapter.

[233] Di Paolo *et al.* refer to scientific research on mirror neurons via dual scanning experiments in this regard as part of developing what they term the interactive brain hypothesis. (Di Paolo and De Jaegher 2012).

[234] This interplay between linguistic bodies as constituted by clusters of utterances and the transindividual as that clustering of utterances itself is remarkably close to Simondon's view that the individual – in the sense of psychic individuation – is formed at the intersection of the sub-individual (living) and supra-individual (collective) individuation. This will be examined in more detail in later chapters.

This constitution is not only an endless recapitulation of sedimented cultural norms and practices but allows for spontaneity too, with each utterance in an intersubjective encounter potentially forging “new trajectories for collaborative sense-making” (Di Paolo, Cuffari and De Jaegher 2018: 10). Conceiving of the intersubjective in terms of linguistic bodies also allows us to view core aspects of the intersubjective encounter – and the kinds of shared worlds such encounters sustain – differently: sociality, on the enactive view, has more in common with the collaborative creation of potentially mutually enriching subjective experience than with the idea that, as FCR would have it, we first represent social encounters to ourselves in order to then choose an optimal course of action. Ethics, community, solidarity and various other essential features of collective life, both nurturing and destructive, can thus be said to emerge from the stabilisation of regimes of braided utterances that give rise to genres and then to entire worlds of shared being. The metastability and plasticity of these worlds are arguably even more vital than they are for the organic and sensorimotor bodies that are, in a manner that should be entirely clear by now, complexly, reciprocally imbricated with linguistic bodies – materially sustaining the emergent phenomena of linguistic embodiment and culture that in turn act to sustain or not sustain these immanent self-grounding grounds. For Di Paolo *et al.* “[i] is only with the appearance of the critical and person-constituting powers of linguistic bodies that questions of what kinds of worlds we are building, for whom, and under what constraints and possibilities, first become issues in the history of life. For this reason, linguistic agency is always a form of ethical agency” (Di Paolo, Cuffari and De Jaegher 2018: 10).

A summary of the enactive view may be useful at this point. Varela, although writing before the modern enactivist synthesis, succinctly describes this view as the idea that “organisms [or agents, or systems] are fundamentally a process of constitution of an identity” (1997: 73). Autopoiesis is this immanent process of asymmetrical constitution via the co-specification of system and environment, as well as the resulting ontological identity that results from this, and operates by maintaining organisational closure, or “autonomy”, in the face of necessary structural openness, thus producing order within a broader context of entropy. This context, being an ever-fluctuating environment full of potential novelty, renders autopoietic systems precarious, entailing that they are able to adaptively respond to their environments in order to endure. This adaptivity, on the modern view, is enacted by various entangled dimensions of organisation that constrain and enable each other while remaining underdetermined. For human beings, this includes organic, sensorimotor and linguistic bodies, each of which produce and sustain themselves via the process of sense-making, which in turn operates intentionally (in the sense of “aboutness”) by applying a distribution of valence to features of the environment in order to generate schemes, patterns, habits and microworlds that render a system more resilient.

Cognition – derived from the word *cognoscere*, which means "getting to know" – is precisely this process, as is agency; these are inextricably *world-involving* and emerge at the points of imbrication of system and environment *as a kind of worlding*. "The world, therefore, is not a mere source of information but an active participant in how bodies come to exist, develop, relate, and die" (Di Paolo 2019). History accrues to these worlding processes, meaning we need to understand adaptive autopoietic systems not just as they currently are, but in the broader context of their developmental history, a context that produces normativity. Ontologically, systems are better conceived in terms of their organisation than their material structure, as well as in terms of process, a view that centres ontogenesis and individuation.

As Jonas puts it, an organism "is never the same materially and yet persists as its same self, by not remaining the same matter" (2001: 76). Combining the ontogenetic view with the idea that systems are open-ended and contain latent individuative potential in the forms of unactualised patterns, schemes and so forth leads enactivism to gesture towards a philosophy of potentiality that is strikingly close to those of Simondon and Deleuze and Guattari, as some enactive scholars have begun to realise (e.g., Di Paolo 2019). Given that agency arises from enactive processes and that these processes are situated and take various heterogeneous forms, enactivism also has serious implications for our conceptions of agency and subjectivity, viewing these as similarly processual, fragmentary, distributed and multiple, including for instance "a sensorimotor agent constituted by a self-sustaining network of precarious sensorimotor schemes" (Di Paolo, Buhrmann and Barandiaran2017: 211). This view "coheres naturally with the phenomenological recessiveness of the feeling of agency as the absence of perturbations or instabilities in an agent's active assimilation of its environment. Conversely, the fact that we often become aware only of our loss of agency, when our intentions are thwarted or our sensorimotor engagements unexpectedly disrupted, is explained by the occurrence of violations of the assimilation conditions" (ibid.).

4.5 The three-body psychedelic problem

> The thing about bodies: we cannot separate what they are from what they do. Bodies are animated by flows of matter, open-ended, innumerable relational possibilities, potentialities, and virtualities. They also have points of view, commitments, personal experiences, joys, grievances, life projects. They change the world they live in. Bodies make history together (Di Paolo, Cuffari and De Jaegher 2018: 6).

Below, I will apply the enactive view to the psychedelic experience. The account developed will be provisional, and will be dramatically revised in the following chapters, but it should vividly demonstrate the merits of the enactive position for thinking about cognition and about life more broadly. What all three bodies share is that they "are path-dependent, plastic, nonergodic – in short, historical. There is no true averaging of them" (Di Paolo, Cuffari and De

Jaegher 2018: 97). What this means is that what the ongoing processes of self-making and self-changing bodies, and here "bodies" means "minds" too, *enact* is a precarious interplay between history – the accumulated patterns of past adaptivity – and the as-yet unactualised tendencies implicit in the present, and which could become futures. As was shown, these bodies are structurally entangled with each other while retaining some sense of organisational autonomy. Neither structure nor organisation, however, can be thought of as strictly spatially demarcated ontological units: in the former case, structure is frequently organismically collective, entailing ecologically complex couplings and flows, while in the latter case, organisation is not reducible to material structure. In either instance, individuation is a precarious "normative regulation of the coupling between an active, unfinished, time-extended body and its associated milieu" (Di Paolo, Cuffari and De Jaegher 2018: 87). This precarity is amplified by the nonlinear, far-from-equilibrium nature of material dynamisms, where small perturbations can have significant effects, something I will elaborate via dynamic systems theory in the next chapter. In short:

> Organic bodies are precarious processes of metabolic self-individuation and adaptive coupling to the environment; sensorimotor bodies are precarious processes of self-individuation in the network of sensorimotor structures; and linguistic bodies are precarious processes of self-individuation in the flow of self- and other-directed utterances in coupling with dialogic engagements and all kinds of social interaction (Di Paolo, Cuffari and De Jaegher 2018: 195).

These processes involve every aspect of our being: our living, biological bodies, our lived phenomenal experience, our social life and the long arc of history. We are a messy, turbulent flow of synaptic firings, biochemicals, musculoskeletal form, digestion, proprioception, sensory flows, reflective thought, intersubjective encounters, adaptive histories, material culture, geophysics and cosmic radiation. All of these imbricated dynamics influence who and what we are and inflect the ways in which we can even begin to pose these questions. We are more like hurricanes than Cartesian statues, both in the sense that we are necessarily in constant motion in order to sustain the viability of our negentropy in the face of the dissipative laws of thermodynamics and in the sense that we are wholly natural, emergent, immanent beings, not disembodied computers controlling bodies and reifying the most untenable forms of dualism[235].

[235] De Haan notes that enactive theorists do not simply wish to replace dualism with monism as this would elide different autonomous, albeit imbricated adaptive processes, e.g., the specificity of singular instances of organic, sensorimotor and linguistic organisation; she proposes in this regard to describe enactive ontology as "pluriform monism" (2020: 66), a term that is subtly reminiscent of Deleuze's univocity of difference.

Given this richly different onto-epistemological framework, how do we rethink the psychedelic experience? To begin, then, our understanding of set and setting requires drastic revision. If "set" traditionally refers to "mindset" and "setting" to the social and environmental context within which psychedelics are taken, it already becomes clear how, on a broader enactive view, matters are considerably more complicated. "Set" is viewed as a crucial factor in determining the nature of a psychedelic experience because it represents certain innate tendencies for the unfolding of that experience. Issues like stress about work, health worries, jealousy, or paranoia exacerbated by sleep deprivation are likely to manifest in hyper-amplified form when someone is under the influence of psychedelics. Psychological factors such as these, however, form only a small part of the unique embodiment we bring to such experiences. "Set", for enactivists, would include the organic register – the various metabolic and other basic processes that sustain life and which are likely to inflect an experience, with something as simple as the presence of tyramine-containing foods in the digestive system at the time of ingesting LSD, psilocybin or other monoamine oxidase inhibiting substances having a potentially significant effect on interoception.

Similarly, the sensorimotor body is likely to be affected by and to affect kinaesthesia or proprioception – the ways in which we navigate the dynamics of movement, posture and so forth. Not only the specific structure of organic and sensorimotor bodies but the organisation of those bodies – the autopoietic agencies – will also determine and possibly be determined by an encounter with a novel substance. Given the dramatic modulatory effects of psychedelics on the central nervous system, for instance, it is undoubtable that they can produce a state of heightened precarity and an increased adaptive urgency. Sense-making, after all, involves the incorporation of reliable patterns of behaviour into ongoing enaction and these patterns of behaviour adaptively emerge in response to a certain range of system-environment conditions. If these conditions shift outside of their usual bounds – neurochemically, for instance – then a system's usual modes of operation may cease to meaningfully respond to environmental conditions and it may be pushed into the exploration of adjacent possibility spaces and novel individuations.

Certain accumulated repertoires of organic and sensorimotor schemes may be sufficient for navigating a psychedelic experience, but some will not have the requisite metastability, resulting in a potentially dangerous brittleness that negatively impacts organisational integrity. Change is of course precisely the reason *why* many people consume psychedelics: they are viewed as producing a kind of temporarily heightened plasticity – a metaprogrammability – within which we can develop new schemes, revise or eradicate ones that have begun to impede our autopoiesis, or perhaps even become new autopoietic systems altogether. The

modification of schemes, habituated clusters of schemes and so forth, however, always entail a precarious interplay between the schemes we would like to change and the schemes with which we manage this change. To obliterate the entire schematic architecture is neither desirable nor how adaptivity works, and it is precisely a careful mapping out of the schematic space of organic and sensorimotor bodies, and the likely interrelations between schemes that may unfold when one or more schemes is perturbed, that ought to replace the traditional view of set.

This becomes clearer when we turn to linguistic bodies, which are perhaps those most centrally affected by psychedelics. Recall the intersubjective nature of these bodies, the ways in which they incorporate and incarnate collective utterances that simultaneously reproduce culture and reinforce our individual identities – our sense of subjecthood. As enactive psychiatry theorist Sanneke de Haan describes it, “the world is inextricably included in our mindedness … since as humans our world is a sociocultural world, this means that our mindedness must itself be socioculturally understood” (2020: 90). Thus, a single utterance at a precarity threshold within a psychedelic experience can be profoundly transformational but also something that elicits the emergence of various other collective utterances or genres – microworlds – that can substantially alter its trajectory.

Simply put, utterances solicit particular participation genres. A random insult from a stranger may trigger a conflictual microworld wrought from an individual’s singular adaptive history, which will in turn inform their response. A flirtatious look will possibly elicit a romantic participation genre, but not if the person ostensibly flirting does not adhere to the same sexuality or gender norms as the recipient, in which case a wholly different microworld may emerge. In either case, that microworld will be expressed as an imbrication of all three bodies – adrenaline or oxytocin, defensive or welcoming posture, hateful or kind words. In the heightened plasticity of the psychedelic state, the conditions of emergence of adaptive responses to the environment are more malleable, and the system and environment are themselves less grounded in adaptive history than usual, with the result that intersubjective encounters are open to far looser and more volatile braidings of utterances. This can be beneficial, allowing for novel insight into these adaptive histories themselves and a heightened capacity for transforming adaptive repertoires, but it can also result in the over-generalisation of a particular participation genre and a concomitant increase in its perceived valence – a runaway spiral of sense-making that conflates organisation and structure. For instance, the stranger who randomly insulted me invokes a fight or flight microworld wherein the actual material encounter is now generalised into a quasi-mythic conflict between the forces of good

and evil[236]. Thus, a stroll down a busy road is described by one of the interviewees in Masters and Houston's seminal *The Varieties of Psychedelic Experience* as "[i] t seemed that a horde of people came bearing down upon us – tides of gray automata threatening to engulf us. 'Don't worry,' I counseled R. 'I shall be Moses.' And, raising my arm, the crowd parted and we were free to enter the Promised Land" (Masters and Houston 1966: 23). An encounter with a cat is similarly vivid: "[h]e then stretched out one paw in a tentative movement and propelled himself into a mighty spiral, whirling into cosmic dust, then up on his toes for a bow to his creation … He was a cat no longer – but Indra, the primeval God dancing the cosmic dance in that time before time, setting up a rhythmic flux in non-being until it at last had attained to Life" (21).

On the enactive view, it is possible to see how this vivid experience of a creation myth being re-enacted by a playful cat is the result of a modest environmental trigger inaugurating a spiritual microworld that reflects the interviewee's specific metaphysical framework, which is the result of an entire adaptive history of participation in the intersubjective braiding of utterances from which culture is woven. Similarly, a stomach cramp could set off a cascade of adaptive responses from the organic body and then the sensorimotor body, before perhaps becoming amplified into a cosmic drama of life and death or a profound ontological crisis by the linguistic body. While there is a clear risk in fundamentally uprooting experiences of this nature, there is also a sense in which living through them, given their significant affective-salient charge, is likely to more powerfully reinforce the contracting of new patterns of sense-making or the eradication of old ones. Likewise, the schemes, microworlds and so forth developed within the salience-rich context of a psychedelic experience can become powerfully entrenched given the affordances of increased plasticity, in a manner that may lend them an increased tendency towards becoming actualised in other contexts where they are not strictly applicable – the common experience of psychedelic flashbacks could, like PTSD, be in part viewed as the triggering of linguistic, sensorimotor or organic schemes in inappropriate situations. Set, therefore, is at minimum the embodied organic, sensorimotor and linguistic history of a living being; it is both what informs, to a significant extent, the tone and unfolding of an experience, as well as what is potentially rendered more visible in the hyperplastic state and thus more amenable to interrogation and transformation.

Therapeutically, an exhaustive prospective modelling of "set" on the enactive view is impossible, and a system itself represents the best model of its set[237]; having some sense of

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[236] An embodied cognitive metaphor is encountered in its raw state, or via its most generalised instance: a trivial fight becomes ME VS THEM; a fleeting romantic glance BIRTH OF THE WORLD.

[237] In the same sense in which, as an old saying in AI robotics goes, the world is its own best model, referring to the idea that robots can navigate environments more successfully by directly sensing them than by representing them.

the dominant embodied modes of operation, however, can substantially impact on the ability to navigate difficult experiences. Knowing that an individual undergoing a psychedelic experience is likely to frame their unfolding experience in theological terms, for instance, can aid in creating an intersubjective space where utterances can be braided within the relevant microworld(s); similarly, posturally embodied distress can be engaged with by contracting different sensorimotor schemes – dance or capoeira, perhaps – that disrupt the detrimental intersection of bodies that has taken hold. The various typical features of a psychedelic experience are often described separately as phenomenal possibilities; in terms of linguistic bodies, for instance, one list notes experiences such as "enhanced awareness of linguistic nuances; increased sensitivity to nonverbal cues; sense of capacity to communicate much better by nonverbal means, sometimes including the telepathic; feelings of empathy; regression and "primitivisation"; apparently heightened capacity for concentration; magnification of character traits and psychodynamic processes; an apparent nakedness of psycho-dynamic processes that makes evident the interaction of ideation, emotion, and perception with one another and with inferred unconscious processes" (Masters and Houston 1966: 5). For enactivists, this gamut of experiences is simply a description of what linguistic bodies always do in imbrication with other bodies as part of ongoing processes of sense-making, albeit in a temporarily amplified and increasingly reflexive psychedelic form.

In like fashion, setting, on the enactive view, is not a pre-existing external world of objects encountered by a representing subject; it is the enacted, co-determined corollary of self-making. While setting up an appropriate context within which a psychedelic experience can unfold is undoubtedly beneficial, the environment an individual encounters during that experience will continually shift in salience as their sense-making redistributes features of the lived world in concordance with the expectations or associations coupled with the habits and microworlds they are enacting. This is not so much a result of *interpreting* the environment in different ways but emerges from ongoing enactive cognition itself: "[t]he metastable brain-body-environment system is critically poised in such a way that the resolution of a task requires no "overseer" but instead flows from the dynamic configuration. As a result, the agent compensates for perturbations or makes split-second decisions so quickly that no time is left for any "neural processing" of the cognitivist kind" (Di Paolo, Cuffari and De Jaegher 2018: 58). Setting is thus inextricably enmeshed with set or, said otherwise, set and setting give rise to each other within the phenomenal domain of the multiply embodied subject. The vividness or increased novelty – the heightened salience – with which features of the environment are encountered lends itself to an enactive articulation of this sort. While representationalist approaches would depict altered patterns of distribution of meaningfulness as largely the result of differences or increased predictive errors in sensory input, on a sense-making view it is

hyperplasticity itself which, again, gives rise to modifications in the salience gradients the environment consists of. This hyperplasticity can, while rendering everything more malleable, also entail the contracting of highly charged provisional schemes – a salience feedback loop where an everyday feature of the world can suddenly become the sole object of a perceptual hyperfocus. To conclude, set and setting are not simply a subject and a world and their possible encounters; instead, as Merleau-Ponty, a significant influence on enactivism puts it, "[t]he world is inseparable from the subject, but from a subject which is nothing but a project of the world, and the subject is inseparable from the world, but from a world which the subject itself projects" (Merleau-Ponty 1962: 499).

The nascent field of enactive psychiatry provides a helpful framework for thinking through the enactive description of set and setting just presented. If psychiatry and neuroscience have, due to the influence of FCR, historically relied on "a view of psychiatric disorders as problems with the capacity of an individual's brain to correctly represent the outside world and/or translate perceptual input into appropriate action", then on an enactive view, psychiatric problems instead "amount to something going wrong in someone's interactions with her world, in her sense-making" (De Haan 2020: 67). Adopting the former account encourages an approach to aetiology and treatment that reduces complex phenomena to a single causal-explanatory level – a chemical imbalance to be treated with an anti-depressant, for instance, or, where psychotherapy is concerned, a trauma that can be resolved through a representationally charged discussion of familial experience.

On the latter view, however, making sense of or intervening in the interactions De Haan describes, entails accounting for their multiplicity, i.e., their entangled organic, sensorimotor and linguistic nature, as well as the history of interactions (68) that has given rise to these entanglements and which carries implicit tendencies for other entanglements[238]. Similarly, Inara and Iñigo, with reference to a wide range of psychiatric and psychological phenomena, from autism to schizophrenia to OCD, argue that "mental disorders should not be described (only) in terms of their structural, static and individualistic aspects, but as processes that individuals undergo in interaction with their associated sociomaterial environment" (2022). In this regard they advocate for a "description of mental disorders as path-dependent, heteromeric, recurrent, and non-linear processes … [and a] move away from the static and reifying approach promoted by current classificatory systems" (ibid.). Pathologies like anorexia

[238] De Haan develops a slightly different enactive model to Di Paolo *et al.*, and distinguishes between basic and existential sense-making, which is broadly equivalent to organic-sensorimotor and linguistic bodies respectively. While her account of enactive psychiatry is invaluable, I apply this account selectively within the broader enactive framework detailed above.

and addictions to various substances are also clearly amenable to enactive descriptions as detrimental forms of sense-making that involve habituated patterns of behaviour across organic, sensorimotor and linguistic regimes[239].

Generally speaking, a viable application of the enactive view thus views "symptoms as consequences of a complex tensioned network involving multiple normativities that demand further changes and individuation", while simultaneously understanding these "symptoms as calls for individuation, as excessive tension that needs to be partially released in a meaningful and transformative way" (ibid.). This entails intervening on the levels of sense-making itself, indeed viewing psychotherapy as a form of participatory sense-making (xvi), in order to more fully understand where adaptive processes have gone wrong and to generate better ones. As Michelle Maiese observes, "when disruptions to agency occur among those with mental illness, what is disordered is not simply neurobiological dynamics, but rather the relationship between the embodied agent and their surroundings. Mental disorders pertain to persons who are bodily and reflexive beings and who cannot be understood apart from their interaction with the socio-cultural world" (Maiese 2022: 221). As for psychiatry and psychotherapy, so for psychedelic therapy – a modality that is increasingly proselytised as a panacea and thus stands to benefit greatly from integrating a naturalist, scientifically literate and philosophically credible account of cognition, and thus sense-making, into its practice.

4.6 Summary: beyond enactivism

> [T]he dichotomies between body and mind, subject and object, matter and experience, tend to reproduce the entities-first, relations-later, snapshot metaphysics that lurks in the very language used to describe them. It is hard to shake off this inheritance; it is maybe impossible to accomplish a full ontological reboot, short of reinventing both language and science (Di Paolo, Cuffari and De Jaegher 2018: 98).

The account of psychedelic experience presented above is necessarily incomplete and fleshing it out will occupy a significant part of the remaining chapters. Most significantly, while there have been several mentions of plasticity, metastability, individuation and similar concepts, these have until now been informal and allusive. Producing a philosophically formal account of these dynamics will be a crucial aspect of defending the enactive position, particularly in terms of the ontological and epistemological novelty it portends. This account

[239] Several enactivists have referred to the example of nicotine addiction as an exemplary form of pathological sense-making: the organic effects of nicotine can ameliorate anxiety; smoking can form part of a deeply entrenched sensorimotor habit; and the sharing of cigarettes can form a participation genre or microworld. This all despite the fact that smoking is simultaneously organically damaging and oftentimes intersubjectively frowned upon – here, as in many instances, there is tension between different schemes and bodies that could itself become pathological (Inara and Iñigo 2022).

will be developed via a full reckoning with dynamic systems theory, which is a mathematico-scientific framework that has been applied within enactivism. It is increasingly also being applied within cognitive neuroscience, including by advocates of the popular AI-FEP approach and, by extension, the REBUS model of psychedelic action. DST has also been employed, most significantly by Manuel DeLanda, in the elucidation of Deleuze and Guattari's philosophy and can thus serve as a useful mediator in drawing psychedelic neuroscience, enactivism and philosophies of individuation together.

DST is used to model the temporal behaviour of systems, particularly complex and non-linear ones by mapping out a phase space of trajectories, tendencies, points of rupture and bifurcation and so forth. The use of DST has significant ontological and epistemological implications; this is true of applications of DST within enactivism and also within philosophy more broadly. Here, as I will expand on in the next chapter, Juarrero proposes a strikingly different account of mereology and causation to the one Western philosophy has inherited from Aristotle, and this account is implicitly intuited in much of the work in enactivism from Varela onwards, as well as in closely related scientific fields like developmental systems theory (DEST)[240].

For Juarrero, systems – and this includes human cognitive systems – are always complexly enmeshed in worlds wherein multiple recursive flows, processes and feedback loops intersect in reciprocally presuppositional ways to enable and constrain systemic unfolding across various scales of emergent complexity and order in a manner that goes beyond culturally dominant notions of efficient causality. Although I do not undertake this work in any depth here, bringing Juarrero's account together with enactivism and Simondon's notion of individuation allows us to develop the alternative view of systems and causality they propose into a revised account of set and setting that fundamentally transforms how we think about cognition, consciousness and, more specifically, the effects of psychedelics on consciousness.

In the next chapter I also discuss the use of DST in a related field, biological autonomy, and explore the ways in which, via ideas like distributed agency and Simondonian individuation, contemporary life sciences are starting to encourage an even more radical view than the enactive one. Unpacking Simondon's project will occupy the bulk of the next chapter. Once this account has been developed, I present a revised Simondonian-enactive account of psychedelic experience. At this point, having outlined a messy assemblage of individuation,

[240] Both dynamic systems theory and developmental systems theory, which are only loosely related to each other (although I will be drawing them together), have been acronymised as "DST". To avoid confusion I refer to the latter as D*E*ST, but the reader should be aware of this when consulting the respective literatures.

biological autonomy, psychedelic neuroscience and enactive thinking, as well as the stakes qua cognition, I argue that this assemblage is strongly resonant with the immanent post-metaphysics developed by Deleuze and Guattari, particularly the account of ontogenesis/individuation and their important development of this notion into what they variously describe as vice-diction, counter-actualisation and the making of the Body without Organs. For reasons of scope, I am unable to address some related post-functionalist accounts of cognition. This includes ecological psychology, a field very close to enactivism, as well as Mark Solms's recent 4E-inspired attempt to resolve the hard problem, which draws upon research into the foundational role of affect in conscious experience that has been argued for by Panksepp, Damasio and others. Affect is commonly discussed in relation both to Deleuze and Guattari and to enactivism, and some theorists who straddle both fields (e.g., John Protevi) have proposed appending an "A" to the 4E moniker. However, I necessarily leave an engagement with this work to a future study.

Opening the circle

Enactivists often invoke *The Embodied Mind's* famous three-circle diagram (Varela, Thompson and Rosch 2016: 7) in order to mark out the differences between functionalism, connectionism/emergence and enaction. In preparation for the next two chapters, I propose a fourth circle of individuation, depicted below. This circle is not divided into separate fields of inquiry given the multidisciplinarity of many of the scholars, as well as the important fields, such as biology and philosophy of biology, that are not depicted.

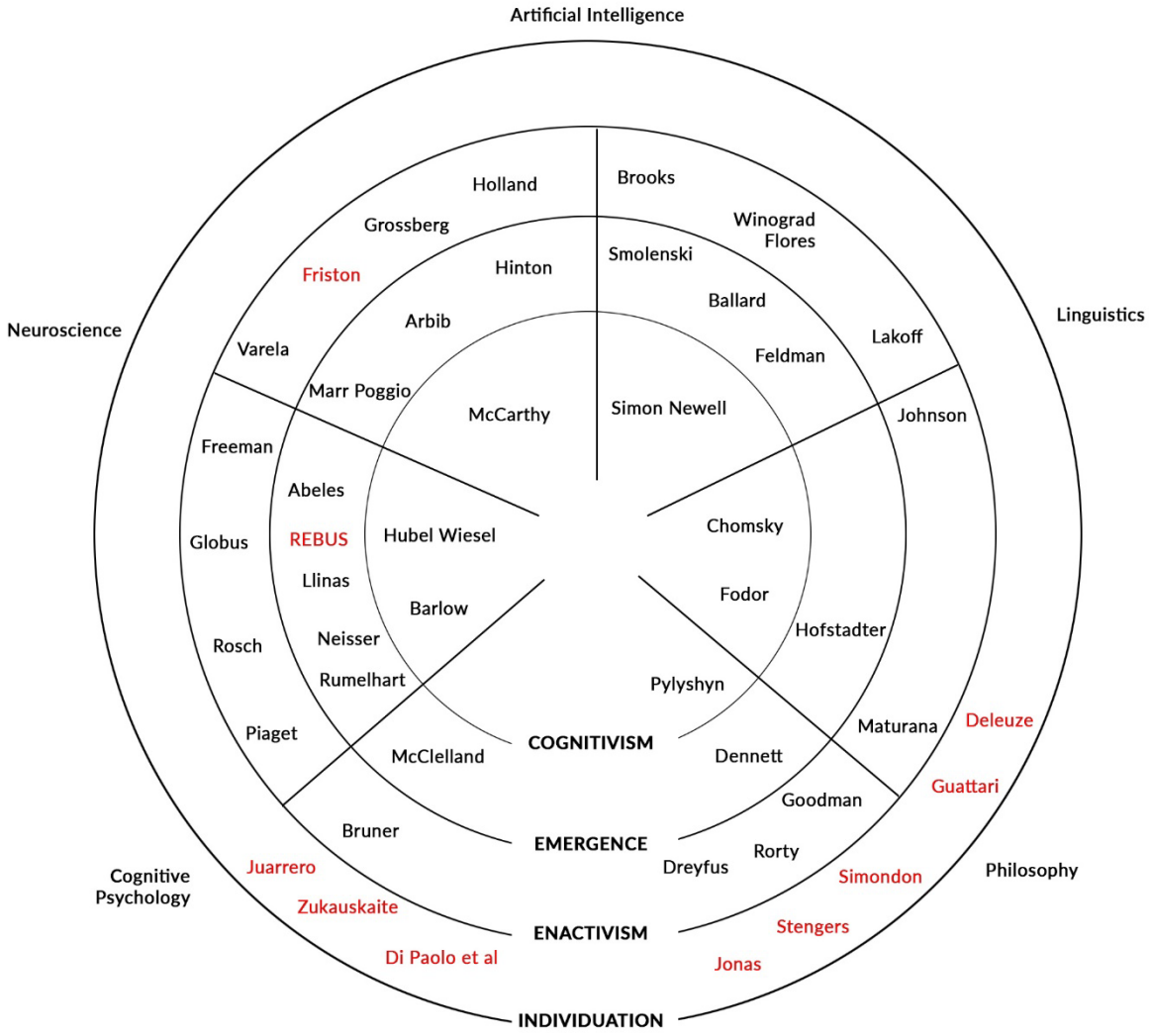

Figure 3: The four circles. Text in red notes my additions to Varela et al.'s original diagram, which contained three concentric circles.

Chapter 5

Psychedelic ontogenesis

5.1 Introduction: Fabulating the path ahead

In the last two chapters I traversed two different yet overlapping paths, both of which lead to the work I undertake in this final chapter. On the one hand, I examined research findings in contemporary psychedelic neuroscience, as well as some of the theoretical architecture being used to model these findings, including frameworks like connectome harmonics and REBUS, and arrived at the tentative conclusion that neuroscientific ideas about how brains work – and by extension how minds work – have moved away from neural reductionism towards a multi-scalar view that sees cognitive activity and subjective experience as arising from the complex interplay of multiple reciprocally entangled scales of emergent complexity. The spatiotemporal nature of this complexity was seen as crucial, as was the fact that much of it seems to be expressed in far-from-equilibrium conditions, i.e., *chaotically*, at near-critical zones close to phase transition thresholds past which systems have the potential to radically transform[241].

On the other hand, I examined the move away from the range of views in cognitive science clustered around ideas like functionalism, computationalism and representationalism (FCR) – views that are grounded, implicitly or otherwise, in mid-20th century attempts to think about brains in terms of cybernetics and information theory – and towards a conception of living beings as adaptive, autopoietic and precariously enacted stabilisations of nested asymmetries that reciprocally constitute "systems" and "environments". For both contemporary psychedelic neuroscience and enactivism, life and thought are typified by features like complexity, non-linearity/close-to-criticality, emergence, processuality and non-ergodicity. Similarly, in neither case is abstract symbol manipulation or computational logic the locus of either action or cognition. Instead, a strong life-mind continuity appears evident: thoughts are not ontologically or metaphysically separate from brains, just as brains are not profoundly separate from bodies, environments and the ongoing acts of reciprocal coupling through which these are co-constituted.

In this chapter, I formalise these ideas philosophically by introducing various ways in which biology itself is shifting towards a processual and emergent view. From Oyama's developmental systems theory (DEST) to Lyon's biogenic thinking to biological autonomy,

[241] Such as the radical transition between states of matter that occurs at the phase transition produced by bringing water to the boil.

chronobiology, systems biology and so forth, the genetic reductionism that held sway in the field for much of the 20th century, and which exemplifies the same computationalist reasoning we saw expressed in both FCR and the various forms of Bayesianism/predictive coding, is no longer viewed as a sufficient explanation of what living systems are and do. In short, across a wide range of scientific fields, we are beginning to think about life differently, in some cases reiterating very old ideas, and in other cases exploring novel conceptions triggered by cutting-edge technological affordances. While it is arguable whether this constitutes something like a new *episteme*[242] in the Foucauldian sense, it does call out for a philosophical framework able to generate concepts that will allow us to more sufficiently grapple with the implications – epistemological, ontological and otherwise – of what may turn out to be an emerging scientific consensus about the relationships between stasis and change or, more fundamentally, identity and difference themselves.

Crucially for the task at hand, such a philosophical approach would also allow us to think more deeply and meaningfully about the profoundly transformative processes facilitated by psychedelic substances, processes that are in many ways a synecdoche of our perennial philosophical grappling with questions of truth, meaning, mind, life and so forth. The psychedelic experience, with its powerful reviviscences, metaphysical-metaprogrammatic insights, ego dissolution and existential catharsis, each of these with the potential to greatly heal or harm, draws us closer to the metaphysical core of what it is to think and live and be, or at the very least renders deep reflection on such fundamental questions less avoidable, challenging us to philosophise differently. Indeed, such experiences, just like the shifts I have argued are underway in contemporary science, encourage us to think about being in its becoming: of ontology as a snapshot of ontogenesis; of the individual as merely a single frame of ever-ongoing individuation.

It is the work of Simondon, I will argue, that best exemplifies this type of thinking. In viewing the individuated – the enduring world of stable subjects and objects that is usually the purview of ontology – as merely a single *phase* of metastable being, just one actualisation of a pre-individual fund that is rich in creative potential, Simondon encourages us to look beyond what is given to us in experience in order to catch sight of the creative tensions immanent in the provisional unfoldings of ongoing transductive dynamisms underlying the established. After briefly introducing Simondon's notion of individuation and the broader conceptual cluster of which it forms part, I apply his thinking to psychedelic neuroscience and enactive cognition, demonstrating the utility of adopting an ontogenetic view on these fields. Simondon's work

[242] In other words, a new manner of construing of the relations between different parts of knowledge and how that knowledge intersects with reality.

had a profound influence on Deleuze; indeed, the final chapter of *Difference and Repetition* (1994) reiterates many of the notions put forward in *Individuation in Light of Notions of Form and Information* (2020), which preceded it by a decade.

Deleuze, however, develops these ideas much further in his elaboration of a philosophy of difference – of the heterogenetic as such. Crucially, Deleuze considers not just how things (objects, subjects, ideas, etc.) come to be, or into being – a thought, a living being, a political order – but how things can come to be otherwise: how through the process of counter-actualisation we can *redistribute the virtual*, arranging differently the pre-individual potential that underlies and gives rise to the provisional expressions of being it nonetheless remains immanently grounded in. Deleuze's concept of *counter-actualisation* is recapitulated in his later work with Guattari in such notions as *becoming*, *deterritorialisation*, the *Body without Organs* and *lines of flight*. This offers us a powerful way of thinking about and discussing the transformative aspects of psychedelic experiences – experiences which are precisely a way of rearranging virtual attractor spaces that define the space of passions – sad and joyous – thus marking out the parameters of what becomes a life.

Deleuze once said that his work was aimed at providing a metaphysics adequate to contemporary science. Several decades later, Simondon, Deleuze and Guattari's thought still affords us a great deal of metaphysical traction. In this regard, I turn to the increasingly common practice of describing Deleuzian ontology in terms of dynamic systems theory (DST) in order both to think more meaningfully about the rich complexity of living, sense-making systems capable of radical self-transformation (psychedelic or otherwise) and in order to more accurately reflect some of the details of Deleuze's philosophy, particularly the relation between the *actual* and the *virtual* and the process of differen*t*/*c*iation that underlies his transcendental empiricism. Finally, I turn to the task I have been setting up throughout the past few chapters: providing an adequate philosophical account of the psychedelic experience by bringing together psychedelic neuroscience, systems biology, dynamic systems theory, chaos and complexity, enactivism, individuation and counter-actualisation. My account is necessarily provisional and is intended as an initial foray into a new way of thinking, not just about the psychedelic experience, but about consciousness – and life – more broadly. Still, I intend to make a coherent and substantial case for thinking about the transformative aspects of psychedelics in this way, one that is potentially useful not just as a goad to speculation but in terms of actual therapeutic practices involving such liminal phenomena as drug-induced ego death.

The gist of my argument here is simple: by thinking in terms of difference and ontogenesis instead of identity and ontology, of what Simondon terms *polyphasic* being instead of just a

single phase of being, we are better equipped to grapple not just with the fundamentally transformative and processual nature of a psychedelic experience but with the more general fact, often obscured by our need for ontological fixity, of our radically far-from-equilibrium, non-linear and chaotic natures.

5.2 I am large, I contain multiplicities: From thermodynamics to teleodynamics

> Life is variability *and* constraints, and neither make sense without the other. (Longo and Montévil 2014: 6)
>
> I believe more in the future of molecular biology of the brain than in the future of information science or of any theory of communication. (Deleuze, *L'Abecedaire* – N for Neurology)

5.2.1 Unfolding life

In their joint work *Perspectives on Organisms: Biological Time, Symmetries and Singularities*, Longo and Montévil make the surprising claim that we do not currently have a satisfactory theory of the organism, or of biological organization more generally (2014: 3). In fact, they assert, "a genuine 'theory of biology' does not yet exist" (4). This may seem like a strange statement; after all, are we not living in the wake of the modern synthesis in the life sciences, which brought together Darwinian evolutionary theory with Mendelian genetics? Longo and Montévil argue, however, that while this may have afforded us insight into phylogenetics, it does not provide us with any great insight into organisms *qua* organisms, whether these be bacteria or psilocybin-ingesting human beings. Seeking to address this situation, they put forward a tentative proposal that encapsulates much of the work in contemporary philosophy of biology I draw together in this section[243], and which is, as I will show, strikingly Deleuzian: "life is the never identical iteration of a morphogenetic process" (2014: 51). By this they mean to suggest that we view living systems as what they term "extended critical transitions" (15): complex, nested spatiotemporal dynamics that result in what appear to be stabilised emergent forms of organisation – what Longo and Montévil describe as a "global coherence structure" (19) – but which are more accurately understood as ongoing processes of constitution and maintenance involving myriad recursively constituted heterogeneous flows, processes and interplays at various levels of organisational complexity, this all occurring in a manner that occupies criticality dynamics in an enduring way.

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[243] In this section I cursorily draw together work from a range of related fields, including process biology, systems biology, biological autonomy and developmental systems theory. For ease of reference, I usually refer to this cluster of views simply as "process" or "processual" biology; my use of the term should thus not be interpreted as referring to one unified field but instead to a motley but entangled set of perspectives that have come to challenge various norms in philosophy of biology, e.g., genetic reductionism and related information-theoretic approaches.

There are strong similarities here with contemporary enactivism, including the far-from-equilibrium nature of precarity-adapativity dynamics. Longo and Montévil make a further argument, however, that will become important here: the extended critical transitions they refer to are not singular events as they are for physical systems modelled using DST – the threshold dynamics and bifurcation points of water reaching a boil, for instance – but instead, as the term implies, "are 'extended' and maintained in such a way that they persist in the many dimensional space of analysis" (18). As they explain, "the critical transitions we look at are to be analyzed as taking place through an interval, not just a point, with respect to each control parameter.

Thus, a living object is understood not only as a dynamic or a process, in the various possible senses analysed by physical theories, but it is a *permanent critical transition*" (ibid.)[244]. This notion of the interval gestures towards everything from Bergsonian duration to Husserlian retention-protention[245], both these philosophers attempting to theorise, albeit in distinct ways, the irreducibly *lived* time of biological being. While Longo and Montévil do not go so far as to ascribe a foundational role to such intervallic-durational permanent critical transitions vis-à-vis consciousness, they do argue that these dynamics can be construed as anti-entropic tendencies which in turn typify living organisms.

Just as Schrödinger famously observed that life was surprisingly negentropic in the face of the general tendency of the universe towards entropy, and that these local emergences of order in the broader context of ongoing disordering required singular attention (1944), Longo and Montévil argue that it is the ongoing production of anti-entropy that allows living systems to endure (a point that is quasi-tautological in the sense that living systems are thus defined *as* anti-entropic)[246], where endurance entails that "living entities are not 'just' processes, but

[244] In technical group theoretic terms, "biological objects (cells, multicellular organisms, species) are in a continual transition between different symmetry groups; that is, they are in transition between different phases, according to the language of condensed matter. These phases swiftly shift between different critical points and between different physical determinations through symmetry changes" (2014: 173).
[245] Longo and Montévil acknowledge Husserl in this regard (2014: 96).
[246] Longo and Montévil in fact distinguish their idea of anti-entropy from earlier theorisations of negentropy as they are not seeking to merely argue that living systems are reverse-entropic dynamics, but that entropy and anti-entropy co-exist in permanent critical transitions as their jointly necessary condition. As they explain, in an admittedly highly speculative manner, "[t]ypically, when summed up, equal entropy and negative entropy give 0. In our approach, entropy and anti-entropy are found simultaneously only in the non-null critical interval of the living state of matter. A purely conceptual analogy may be done with anti-matter in Quantum Physics: this is a new observable, relative to new particles, whose properties (charge, energy) have opposite sign. Along our wild analogy, matter and anti-matter never give 0, but a new energy state: the double energy production as gamma rays, when they encounter in a (mathematically point-wise!) singularity. Analogously, entropy and anti-entropy coexist in an organism, as a peculiar 'singularity': an extended zone (interval) of criticality." (2014: 20)

something more: they are lasting, extended critical transitions, always transient toward a continually renewed structure" (2014: 162).

This notion of life being an ongoing stabilisation pattern as opposed to a stable essence – a becoming instead of a being – is echoed in the work of philosopher of science John Dupré, a prominent proponent of the process biological view. He observes that "organisms are not the discrete, autonomous, countable, and stable elements of the living world supposed by traditional substance ontology. They are, rather, structural stabilities in a deeply intertwined and interconnected set of processes, stabilities maintained by the constant withdrawal of energy from their abiotic environment" (2021: 47). This interplay of stabilisation and withdrawal of energy is what Longo and Montévil mean by the imbricated co-existence of anti-entropy and entropy and is also precisely the constitutive asymmetry that gives rise to system-environment distinctions in autopoiesis/enactivism.

However, this is not how all living systems are. If life as a stabilised emergent dynamic sought only self-preservation, in the Jonasian sense of "needful freedom" or the autopoietic sense of adaptive autonomy, living systems on earth would, as Longo and Montévil put it, still resemble bacteria. The broad variety and evolutionary complexity of life on the planet instead suggests that self-maintenance is coupled with an exploratory principle – the seeking out and cultivating of new niches in a manner similar to what enactivism, as we saw, described as the exploration of adjacent possibility spaces.

These spaces, formalised as phase spaces in DST, in turn cannot be defined *a priori* as they are for simple physical systems, given the co-constitutive asymmetries of living systems and their environments. For this reason, "[t]here is no way to predefine the space of future possibilities for life, as this is co-constituted by its own interactive dynamics, between the internal, organismal changing coherence and the ecosystem, which also changes" (Longo and Montévil 2014: 247). This entails a shift away from conceiving of system dynamics and topological transformation thresholds in terms of a simple enduring distribution of attractors on a stable manifold[247]; instead, attractor spaces are themselves in a state of emergence and transformation in a manner that renders them more closely immanent to the systems they aim to model. Any residual concern that a DST view of a living system could be construed as a

[247] Indeed, as Longo and Montévil argue, "[a]n immense literature has been tackling "emergence" in life phenomena. Yet, in the technical analyses, the strong and dominating theoretical frames inherited from mathematical physics (or even computing) do not seem to have been abandoned. In approaches from Artificial Life to Cellular Automata and various very rich analysis of dynamical systems, the frame for intelligibility is a priori given under the form, often implicitly, of one or more pre-defined phase spaces, possibly to be combined by adequate mathematical forms of products" (210-11).

kind of transcendental idealism is allayed when recognising that the exploratory, open-ended and anti-entropic properties of such systems are echoed in the dynamics of their phase spaces. I will return to the complexities ensuing from this view later, where I will ask, for instance, whether some kind of hyper- or *n*th-order phase space can model the space of transformations of first order phase spaces or whether the whole enterprise should be confined to the modelling of simple physical systems.

At this point, however, another concern emerges. If we agree with Dupré that "[l]ife is a process which we conceptually separate in various pragmatic ways; it is not a Noah's ark of discrete, countable, individual things" (2021: 47), and if we accept the notions of anti-entropy (or even just negentropy) and so forth, do we not still have to account for the remarkable fact that, in the fact of the second law of thermodynamics, systems – let alone cognising human beings – not only endure but complexify? In this regard, is there not a tacitly teleological principle underlying the very fact that systems exist at all?

Here, Terrence Deacon draws a useful distinction between three iteratively entailed and qualitatively distinct forms of emergent order, homeodynamic, morphodynamic and teleodynamic. While simple physical systems close to equilibrium can be construed as homeodynamic in that they reflect the basic thermodynamic principle of an increase in entropy, and morphodynamic or self-organised systems reflect a kind of stabilisation of dynamics that looks like emergent order (the patterned behaviour of many far-from-equilibrium systems that can be modelled using DST – the turbulent behaviour of liquids near critical thresholds, for instance) – teleodynamic systems involve, in Deacon's words, "recursive self-reconstitution and reproduction of systems of constraints" (2012: 270). While we tend to conceive of living systems as merely self-organising and far-from-equilibrium, i.e., morphodynamic, this does not account for the "characteristic end-directedness and consequence-organized features of such processes" (265), which entails in turn that "dynamical systems approaches limited to morphodynamic and chaotic non-linear dynamics are insufficient to account for living dynamics" (270). As with Longo and Montévil, we see here a call to reconsider our reliance on DST so that we are better able to countenance the fact that the phase spaces describing living systems emerge from the behaviour of those systems and thus transform along with them. AsDeacon argues:

> Teleodynamics is the dynamical realization of final causality, in which a given dynamical organization exists because of the consequences of its continuance, and therefore can be described as being self-generating. Specifically, it is the emergence of a distinctive realm of orthograde dynamics that is organized around a self-realizing potential, or – to be somewhat enigmatic – *it is a consequence-organized dynamic that is its own consequence*. (2012: 275; my emphasis)

For Deacon the teleodynamic supervenes on morphodynamics, which in turn supervene on homeodynamics, and it is thus a mistake to conceive of life as simply some or other kind of thermodynamic holding pattern.[248] It is clear in this regard that Deacon would, for instance, regard predictive coding or free energy type models as applying merely to homeodynamics (or at best morphodynamics) and not to living systems that are, as I argued via Nave and others several chapters back, simultaneously non-ergodic, in constant flux and immanently ends-directed or iteratively "consequence-organised". In fact, for Deacon, it is these features that give rise to what he describes as "ententional relationships", i.e., as phenomena that "are intrinsically incomplete in the sense of being in relationship to, constituted by, or organized to achieve something non-intrinsic" (2012: 27). While Deacon's specific take on teleodynamics as grounded in this incompleteness – i.e., the existence of teleodynamic phenomena "is determined with respect to an essential absence" (3) or *absentially* – does not concern us here, it does appear legitimate to draw a link between ends-oriented, self-maintaining living processes and cognition, as Deacon does and as Varela and many others have before him. Here, cognition is seen as simultaneously an emergent constraint and a perspective that emerges at the point of emergence via the interplay of various constitutive dynamisms. Before I do that, however, I will add some final detail to my account of living systems and the ways in which we construe and model them.

5.2.2 Nature is nurture, nurture is nature

So far I have argued, by briefly surveying some perspectives in closely related fields like systems biology, process biology and biological autonomy, that we can understand living systems as recursively stabilised, open-ended, non-ergodic, teleodynamic processes that, in the language of DST, endure via nested intervals of extended critical transition in such a manner that their behaviour cannot be captured by the notion of a stable phase space with a well-defined attractor layout or even a static number of dimensions. Deacon argues, slightly tautologically, that such systems are exemplified by developing towards "end-directed attractor dynamics", which may give the sense of a staple phase space topology, but then goes on to argue that this constitutes an immanent final cause (in the Aristotelian sense): teleodynamics realises final cause but itself iteratively gives rise to this final cause. This is Kant's classic self-causing cause, the strange loop discussed at length by Juarrero (1985; 1999; 2023) and naturalised by enactivists like Thompson (2007).

[248] Deacon argues, in fact, that "the emergence of teleodynamics from morphodynamics is what characterizes life and evolution" (2012: 324).

Three similar strange loops – which are, seen from a different angle, perhaps the same loop – also typify living systems: the loop between systems and environments, which I explored at length in the previous chapter, the loop between nature and nurture, and an ostensible loop between form and matter. The philosopher of biology Susan Oyama, who has pioneered the field of developmental systems theory (DEST), challenges the assumption that there are terms that are strictly separated in these loops in her theorisation of what she terms "constructivist interactionism" (2000b)[249]. Her account of systems and environments is similar enough to enactivism's that it does not require elaboration here. Her critique of the idea that form somehow pre-exists living systems *in their living*, whether it is "God, a vitalistic force, or the gene as Nature's agent that is the source of the design of living things and that initiates and directs the unfolding of the design" (2000b: 1) is, as I will show in the next section, strikingly Simondonian. It also seeks to situate any supposed teleology – or teleodynamics – firmly within the immanent foldings, unfoldings and refoldings of life itself. It is worth citing her argument at length:

> When the problem of explaining the emergence and persistence of form arises on the biological stage … the yoked ideas of preexisting form and teleological control travel together. They require each other, imply each other, even conjure each other out of the wings if separated, exchange places in successive performances. If form is latent inside it is innate, if it is impressed from without it is acquired; maturation and motivation supply the guiding forces. The re-creation of the creator inside or outside confers the same basic but finally unsatisfactory benefits ... It feels right, but it doesn't explain anything. It simply repositions the mystery. (Oyama 2000b: 159)

We then need an account of the emergence of form that does not simply surreptitiously – and with no small amount of contradictory reasoning – essentialise some transcendent mechanism of form as an *a priori* condition of form. Oyama provides just such an account in arguing that "the idea of ontogenesis applies not only to bodies and minds, but to information, plans, and all the other cognitive-causal entities … that supposedly regulate their development" (2000b: 3). In other words, the various forms of emergent dynamics we have been exploring in this section themselves rely on principles of emergence that are brought about through the exact same teleodynamic mechanisms: *ontogenesis and ontology are co-emergent* and "coming into being should not be understood as the instantiation of preexisting form" (160)[250]. In Oyama's most succinct formulation, "biological reality is not a kind of Platonic ideal imperfectly glimpsed in the phenotype" (94). DEST's critique of the ways in which "nature" and "nurture"

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[249] The term *interaction* may suggest that Oyama is merely interested in describing interactions between "nature" and "nurture"; as she clarifies, however, what she is aiming to point out is "the unwisdom of treating either independently of the other(s), the impossibility of having predefined natures or environments at all." (2000b: 202)

[250] Just as the virtual and actual in Deleuze are, as we will see shortly, in some sense reciprocally presupposing.

are commonly viewed as two distinct principles that are merely theoretically combined in a variety of ways (usually via the apportioning of causal power between these two ostensibly discrete terms using a zero-sum logic) follows from her critique of pre-existent form imbuing passive matter with its creative dynamism – a critique, in other words, of what Simondon refers to as hylomorphism, as I shall show.

For DEST, "[n]ature is not an a priori mold in which reality is cast. What exists is nature, and living nature exists by virtue of its nurture, both constant and variable, both internal and external" (148)[251]. Oyama often elaborates this point by describing nurture as "process" and nature as "product"; this is a useful heuristic, but one that may lead in turn to a process-product dualism that philosophers of process biology may be keen to avoid, and which may, despite Oyama's intentions, reify the idea that nature is what is "real" or "essential" while nurture is what is "contingent". In this regard, we can perhaps temper her description by referring to a continuum at the extremes of which are not "nature" and "nurture", but instead extrema of stabilisation and extrema of process. Living systems of course comprise many such intersecting and nested continua and are thus rightly viewed as ongoing immanent unfoldings of nature-nurture or, better, as multiple simultaneous stabilisations and processes. In Oyama's words:

> A view of the biological world that reduces cause to discrete genetic and environmental forces [nature and nurture] reduces living beings to infinitely thin membranes resonating to signals from within or without but lacking the substance to generate signals of their own. Seeing the organism as layered vital reality, on the other hand, allows us to see that lack of change at one level may conceal change in the dynamics of a lower one. In the same way a cell may be embryologically determined before it is visibly differentiated, a mind may be in a state of readiness before it processes in a visibly new way. This is not because the cell was always determined, and it is not because the mind always had knowledge of what it would encounter. It is because the way a cell or a mind engages the world is a function of its structure, a structure that emerges from activity at multiple levels. (Oyama 2000b: 162)

Notably, Oyama frequently cites Maturana and Varela in describing how nature and nurture are reciprocally brought forth in the kinds of dynamic patterns of ongoing worlding or sense-making I discussed in the previous chapter; this in turn leads her to critique FCR-type approaches to cognition in a largely similar fashion (e.g., 2000b: 214). Indeed, a broad view of the systems-biological approach I have been describing appears to largely obviate the appeal of computationalist-style models in its recognition of the processual and non-hylomorphic nature of teleodynamic systems; or, as Oyama puts it, "if natures are the result of

[251] While we cannot explore this further here, it is notable that Oyama, like several other thinkers I have discussed thus far, complicates Aristotle's four causes in her critique of these various essential-contingent dualisms (2000b: 13-14).

the continuous nurture of developmental construction, we ought to object when we are told that nature interacts with nurture (or biology with culture, etc.), just as we do when we read about material body-stuff interacting with immaterial mind-stuff" (2000a: 157). Simply put, "[i]f Descartes' ghosts are mischievous ones, they need to be exorcised- not only from our heads, but from their other places of refuge as well" (174-5).

Below, I take stock of what has been briskly argued in this section, after which I will present Simondon's notion of individuation as a way to philosophically tie the various threads of process biology, enactivism and spatiotemporal neuroscience (which, it must not be forgotten, is a set of *biological* phenomena) together. In essence, what I have been suggesting is that within these fields, "variability may be considered as the main invariant of the living state of matter" (Longo and Montévil 2014: 185). The nature of this primacy of variability has been explored in hugely diverse ways, both by the theorists I have introduced until this point as well as within the much broader fields of inquiry they form part of, and there is no one unproblematic monolithic account that emerges from all this work to challenge the hegemony of the various reductionist, essentialist, idealist and transcendent logics that are its objects of critique. In most cases, however, living systems can be broadly regarded as emergent and self-constituting processual entanglements of "system" and "environment" that are multi-scalar, non-linear, close-to-criticality (or perhaps straddling critical thresholds in a sustained manner, if Longo and Montévil are correct) and immanently teleological, i.e., productive of their own norms.

As the philosophers of biology Alvaro Moreno and Matteo Mossio describe it, "[b]iological organisation determines itself and, through this determination, grounds normativity, teleology, and functionality in a naturalised way" while, simultaneously, "[b]iological autonomy also has an interactive dimension through which biological systems promote their own maintenance by acting on their environment" (2015: 196). In this regard, "biological individuality cannot be severed from a wider collective organisation: as the individual organisation unfolds, it creates and supports a more encompassing historical and collective network, which in turn sustains and facilitates its evolution in a changeful environment" (138)[252]. Notably, Moreno and Mossio share the critique of hylomorphism that is common to several of our interlocutors; as they argue, "the watertight separation between 'matter' (i.e. the material basis, including the energy-related aspects) and "form" (the "abstract" organisation) can be misleading when studying living systems … [and] an adequate understanding of biological organisation should reconcile form and matter, insofar as many fundamental features of biological organisation

make sense … only in relation to the conditions of their realisation in nature" (7). Conceiving of living systems in this radically different way entails thinking about the cognitive aspects of such systems – including consciousness – differently too.

Ideally, if we are to hew to the life-mind continuity that is strongly suggested by the foregoing and not lapse into Cartesian dualism or Kantian transcendental idealism, we should be able to think about the full range of expression of such systems, from the rudimentary chemotaxic-teleodynamic behaviour of a bacterium swimming up a sugar gradient to the complex conceptual architecture of abstract human thought and its psychedelic perturbation, using the same set of naturalistic philosophical resources. In this regard, I will turn to the work of Gilbert Simondon below.

5.3 It's just a phase – Simondon and individuation

> Nature in its entirety is not composed of individuals and is not itself an individual: it is composed of domains of being that can or cannot harbor individuation. (Simondon 2020: 54)
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> [T]o live is to perpetuate an ongoing relative birth. (Simondon 2020: 325)

5.3.1 Against the hylomorphic model

Simondon's philosophy of individuation anticipates – and arguably goes beyond – many of the 21st century shifts in biology, neuroscience and cognitive science I have been discussing, hence the central role of his work – as well as that of Deleuze, for whom Simondon was a major influence –in my theorisation of the psychedelic experience. Simondon's project is especially remarkable given that *Individuation in Light of Notions of Form and Information*, the work in which his philosophy is most substantially developed, was written well over half a century ago, in 1958, as part of his doctoral dissertation. Simondon's ambitious task in this book is no less than the complete rethinking of ontology and life. In this regard, he proposes that to truly understand being we need to conceive of it not just as it is given in experience, but instead in its coming-to-be, i.e., in its individuation. Simondon argues that in order to consider being ontogenetically or as *becoming*, we first need to confront two different ways in which individuation is thought via the *already-individuated*: substantialism and hylomorphism. The first of these, Simondon says, "considers the being as consisting in its unity, given to itself, founded on itself, not engendered and as resistant to what is not itself" (1); in other words, this manner of thinking what gives rise to being begins with being as given in experience as ontologically discrete, well-defined and enduring.

This, however, is a philosophically illegitimate move: by thinking ontogenesis from the perspective of ontology, we commit a similar mistake to the one Deleuze astutely recognises

in Kant: the tracing of the conditions of possible experience from experience itself – a dangerously circular form of reasoning wherein it is assumed, without justification, that what gives rise to experience resembles experience. For Simondon, tracing the ontogenetic from the ontological relies upon analogously fallacious reasoning. Hylomorphism, to which I alluded in the previous section, and which Ezequiel di Paolo[253] describes as "the Aristotelian doctrine that individuals come to exist as a combination of matter and form, typically meaning the active effect of form on inert matter" (2021), can be understood as a variation on this logic: by assuming a split between passive matter upon which active form is imposed, we conceive of individuation as a type of "form-receiving" of matter, but this, again, relies on the tenuous extrapolation of form as presented in experience to a transcendent(al) principle and, more so, sets up an unjustified dualism between form and substance. Specifically, "[t]he hylomorphic schema improperly replaces the knowledge of the genesis of a real; it prevents the knowledge of ontogenesis" (Simondon 2020: 351). This assumption of the *a priori* nature of form thus leads us to leave it untheorised and in turn to elide or obfuscate a coherent account of individuation in our thinking. In this regard, as Simondon puts it, "[t]he hylomorphic schema includes and accepts a dark zone, *which is precisely the central operational zone*" (ibid.; my emphasis). In short, in both cases, substantialism and hylomorphism, we are left unable to think individuation qua individuation but are instead left granting an illegitimate "ontological privilege to the constituted individual" (Simondon 2020: 1) as well as assuming an *a priori* principle of individuation that precedes and is thus somehow metaphysically excluded from individuation[254].

Recognising this dead-end, Simondon offers us another approach entirely by proposing that "[t]o seek the principle of individuation in a reality that precedes individuation itself *is to consider individuation strictly as ontogenesis*" (2; my emphasis). It should be clear in this regard why, throughout the previous few chapters, I have used the terms individuation and ontogenesis near-interchangeably when intimating what I am now unpacking: if we consider onto*genesis* as how the onto*logical* (i.e., both knowledge of being and also being *qua* being)

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[253] Notably, Di Paolo argues that enactivism is, in part, premised upon an implicit critique of hylomorphism.

[254] In other words, we situate this principle outside of our thinking of the becoming of being, rendering it tacitly transcendent. Simondon makes a compelling case in this regard that "all the schemata that seek to explain the inherence of a transcendent principle in man or, on the contrary, that want to show that everything emerges genetically from experience, ignore the initial reality of the operation of individuation" (2020: 299).

comes to be, then individuation is the individuation of both thought and its objects (including, notably the thoughts of transcendence and immanence). Simondon asserts:

> Before posing the critical question prior to any ontology, philosophical thought must pose the problem of complete reality, which is anterior to the individuation from whence the subject of critical thought and of ontology emerges. Veritable first philosophy is not that of the subject, nor that of the object, nor that of a God or Nature searched for according to a principle of transcendence or immanence, but that of a real anterior to individuation, a real that cannot be sought in the objectivated object or in the subjectivated subject but at the limit between the individual and what remains outside it, i.e. according to a mediation suspended between transcendence and immanence. (2020: 300)

Specifically, by employing the terms individuation and ontogenesis in roughly analogous ways in my discussion of the psychedelic experience going forward, I mean to suggest that both the experience itself *and* how we conceive of the experience are inextricably linked in that *both are individuations*[255]. Simondon is clear in this regard when he observes that "classical logic cannot be used to think individuation, for it forces us to think the operation of individuation with concepts and rapports among concepts that merely apply to the results of the operation of individuation considered partially" (2020: 13). In developing an account of the psychedelic experience, therefore, we should "try to grasp ontogenesis in the whole unfolding of its reality and *to know the individual through individuation rather than individuation starting from the individual*" (2020: 3; emphasis in original)[256]. As Andrea Bardin argues, "[w]hy then should only an 'individuation of the subject's knowledge' grasp ontogenesis? Because it is precisely in the 'individuation of the subject's knowledge' that the process of knowledge can be grasped in its … becoming, i.e. as a part of the 'real' process structuring both the subject and the object, and not simply as a process 'internal' to the subject" (2015: 57).

Thinking in terms of individuation as ontogenesis in turn allows us to conceive of the individual not as the locus of being, but instead as merely one provisional expression of an individuative process. To employ Simondon's language, such an individual would be a single individuated

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[255] Merleau-Ponty, in a late seminar in which he discusses Simondon's work, makes a similar case (Merleau-Ponty 1959: 41; cited in Bardin 2015: 226).

[256] Said more fully, "According to this perspective, ontogenesis would become the starting point for philosophical thought; it would really be first philosophy, anterior to the theory of knowledge and to an ontology that would follow this theory. Ontogenesis would be the theory of the phases of the being, anterior to objective knowledge, which is a relation of the individuated being to the milieu after individuation. The existence of the individuated being as subject is anterior to knowledge; a first study of the individuated being must precede the theory of knowledge. The science [savoir] of ontogenesis is prior to any critique of knowledge [connaissance]. Ontogenesis precedes ontology and critique." (Simondon 2020: 319)

"phase of being", a transiently stabilised instance of a metastable[257] dynamism that Simondon in turn variously refers to as a pre-individual field or a multi-phased being[258]. Such a phase of being is transient precisely because, as Simondon puts it, "individuation does not exhaust in a single stroke the potentials of pre-individual reality" (3) – individuation is an ongoing unfolding of this pre-individual reality, various provisional resolutions of pre-individual dynamisms. The parallels between this notion of the pre-individual and the process philosophical view of living systems should be clear, as should the further parallels with both the spatiotemporal neuroscience I described using the resources of chaos mathematics and DST and, likewise, the notion of adaptive sense-making core to contemporary enactivism: stated bluntly, the pre-individual is precisely the *fons et origo*.

What is suggested by all these disparate fields is that we err in thinking of change as secondary relative to established being, i.e., relative to the individuated, and that we should instead consider change as that from which the established is always transiently emerging; becoming is the primary reality; being is an always provisional expression of this reality. This is especially true in the case of the psychedelic experience, which I have explored in various registers as quintessentially processual and transformative. To fully grapple with the implications of Simondon's philosophy in terms of how we conceive of such an experience, we first need to examine more closely the idea of the pre-individual and multi-phased being. Specifically, what exactly is the dynamic whereby the former gives rise to the latter without therein exhausting itself – without the individuative resolving itself fully within the individuated? Here, Simondon introduces his important ideas of *disparation* and *transduction*, which describe the operational reality of the pre-individual. What is also striking here is the way in which the enactivist emphasis on *asymmetry* is echoed in Simondon's notion of *disparation*, even though Simondon takes the philosophy much further.

5.3.2 Disparation, transduction, resonance: the metastability of being

For a provisional sense of what these terms mean we can turn to Simondon's description of individuation as "a partial and relative resolution that manifests in a system which contains

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[257] While I have already defined metastability in previous chapters, it is worth noting its specific inflection within Simondon studies, where "[m]etastability describes systems macroscopically stable but internally characterised by an uneven distribution of potentials and hosting processes that make that stability only apparent. Metastable systems enjoy a 'stability far from equilibrium' in which the aleatory 'encounter' with a minimal quantity of energy or information can trigger a brusque alteration of equilibrium, and lead to the invention of new structures and hence to a new 'metastable state'." (Bardin and Ferrari 2022: 256)

[258] These terms are not entirely analogous, but as I will elaborate, given that the relation between living systems and environments itself individuates, nor are the pre-individual field and multi-phased being strictly distinct either.

potentials and includes a certain incompatibility with respect to itself, an incompatibility that consists of forces of tension and the impossibility of an interaction between the extreme terms of the dimensions" (2020: 3-4). This incompatibility is disparation and its partial resolution occurs via transduction, which Simondon sometimes describes as a progressive structuration (9).

Disparation is usually described by analogy with depth perception in vision: while the visual field appears as a two-dimensional surface when viewed through only one eye, it gains depth via binocular vision. This is due to the differences in the light reaching each eye and it is these differences, which Simondon, in a manner closer to the second-order cybernetician and psychedelics research ally Gregory Bateson than to the communication theories of Shannon, Weaver and first-order cybernetics, describes as information or "the signification that emerges from a disparation" (16), thus as a difference that makes a difference[259]. The perception of depth, in other words, is a transductive process unfolding from an initial disparation – a difference or tension that gives rise to the resolution of a metastable dynamic, or the visual field as more than the unity we perceive, into a stable perception of depth. In a similar manner, to cite Simondon's most famous example, the process of crystallisation unfolds by virtue of a seed crystal placed into a supersaturated solution.[260] Such a solution exists in a metastable or disequilibrium state, a state of tension or disparation between the physical dynamics at the surface of the crystal and the solution it is immersed in that is resolved by an ongoing process of crystallisation – a transduction.

As Simondon argues, "the genesis of the individual is a discovery of successive patterns that resolve the incompatibilities inherent to the basic pairs of disparation" (229). If the initial situation of incompatibilities, whether in light reaching the eyes or a seed crystal placed in a chemical solution, can be viewed as a state of metastability – a pre-individual field – then "becoming is not a framework in which the being exists; it is the being's dimension, the mode of resolution of an incompatibility that is rich in potentials" (4). The philosophical consequences of this "more than unity" pre-individual field – which is anterior to the laws of identity, non-contradiction and the excluded middle via which we usually conceive of being in that discrete terms are precisely the transductive *result* of individuation – become even clearer in

[259] "[I]nformation is therefore an initiation of individuation, a requirement for individuation, for the passage from the metastable to the stable, it is never a given thing; there is no unity and identity of information, for information is not a term; it supposes the tension of a system of being in order for it to be adequately received … information is that through which the non-resolved system's incompatibility becomes an organizational dimension in the resolution" (Simondon 2020: 12).
[260] A supersaturated solution is one in which the amount of solute, e.g., sugar, exceeds the solubility threshold of the medium, e.g., water.

Simondon's discussion of wave-particle duality in quantum physics, a field in which measurement itself is the disparation that triggers the individuation of either a wave or a particle from a metastable quantum state. Wave-particle complementarity, as Simondon explains, "would then be the epistemological reverberation of the initial and original metastability of the real" (6). This original pre-phased metastability is also occasionally described by Simondon as *problematic being*[261], by which he means something strikingly close to Deleuze's concept of virtual problems that are provisionally solved by processes of actualisation[262], as I will show in the next section.

This all said, living beings are not crystals or subatomic particles. Whereas simple physical systems exhaust themselves in their resolution of initial disparations – the crystal eventually reaching a state of equilibrium with the surrounding solution, for instance – it is evidently the case that "the living being conserves within itself an ongoing activity of individuation; it is not merely a result of individuation, like the crystal or molecule, but a theater of individuation" (Simondon 2020: 7). As the citation with which I opened this section underscores, and as the various forays into process biology, enactivism, connectome harmonics and so forth render even more vivid, *life is ongoing ontogenesis* – we are, as living systems, continuously individuating, not as seamless ontological wholes but as entangled ontogenetic dynamisms, various intersecting and multi-scalar transductions of the incompatibilities or adaptive tensions that life affords. We are precarious autopoietic becomings bringing forth worlds that in turn bring us forth – provisional resolutions of metastable potential.

In short, "the individuating and the individuated are in a prolonged allagmatic relation in the living being" (33)[263]. Simondon distinguishes sharply between physical systems and living ones in this regard, noting that "unlike that of the physical individual, the whole activity of the

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[261] For instance, "[t]he state of the living being is like a problem to be resolved, to which the individual becomes the solution through successive assemblages of structures and functions." (Simondon 2020: 226)

[262] It should also be noted that relation is a transductive result in the same way as being, i.e., terms, forms and so on. As Simondon puts it, "[r]elation is a modality of being; it is simultaneous with respect to the terms whose existence it guarantees" (2020: 12). Similarly, "the individual is in relation neither with itself nor with other realities; it is the being of relation and not a being in relation" (50).

[263] *Allagmatics* is Simondon's term for the metastable spatiotemporal dynamics – "the processes of exchange between spatial configurations and temporal sequences" (Simondon 2020: 253) – that are extended in living beings through an interiorisation of pre-individual tensions or the "associated milieu" (think here of the supersaturated liquid milieu within which crystallisation takes place – in living systems, as I shortly describe, this milieu is internalised as an anti-entropic dynamism that grounds their metastability). As Simondon describes it, "form-taking can only be effectuated if matter and form are joined in a single system by an energetic condition of metastability. We have called this condition the system's internal resonance, which institutes an allagmatic relation during the actualization of potential energy. In this case, the principle of individuation is the state of the individuating system, this state of allagmatic relation within an energetic complex that includes all the singularities" (2020: 49).

living being is not concentrated at its limit; in the living being there is a more complete regime of *internal resonance* that requires ongoing communication and that maintains a metastability, which is a condition of life" (ibid.; my emphasis). Whereas a crystal is situated within a solution that is its external milieu and individuation occurs solely at the surface of the crystal, living beings, being complexly topologically imbricated with – and indeed, *reciprocally in becoming with* – their exteriors or milieus at many orders of emergent complexity or magnitude, interiorise their milieus too, thus carrying charges of pre-individual tension within them – internal resonances being the transductive dynamics of relation of these tensions across these orders of magnitude[264]. It is precisely this that renders living beings non-ergodic and teleodynamic, and also co-emergent with their milieus.

Emilien Dereclenne observes in this regard that "[t]he enactive principle of co-emergence, according to which mutually constraining domains dialectically emerge and shape each other as part of a dynamic individuating process, certainly resonates with Simondon's concept. The individual and the milieu mutually shape each other; adaptation engages organisms' ability to change and to invent the internal and external conditions of their viability" (2021: 452)[265]. Just as living systems adaptively respond to precarious conditions as a process of ongoing sense-making, so too is living individuation a prolongation through action of metastability, of the pre-individual tensions necessary for the ongoing unfolding of life. In this regard, Simondon, in a remarkably prescient critique of the homeodynamic logic of predictive coding, the free energy principle and other cybernetics-inspired approaches, underscores that "the living being cannot be compared to an automaton that would maintain a certain number of equilibria or would seek compatibilities among several requirements based on a formula of a complex equilibrium composed of simpler equilibria; the living being is also a being that results from an initial individuation *and amplifies this individuation*, which is something that is not done by the technical object to which cybernetic mechanism would want to functionally compare it" (2020: 7; my emphasis). Simondon was in fact an early critic of cybernetics; he did not wholly dismiss it, but sought to reform some of its founding principles – including its epistemological convictions – in order to account for the novelty posed by living systems as well as to push

[264] "[A] suitably deep psycho-biological analysis would reveal that the relation to the external milieu for a living being is not merely spread out on the external surface of itself. Through the mediation that it constitutes between the exterior milieu and the being, the notion of interior milieu … indicates on its own that the substantiality of the being cannot be confused with its interiority, even in the case of the biological individual." (Simondon 2020: 132)

[265] Conceiving of the co-emergence of being and milieu in this manner is necessary given that "[t]he individual individuates and is individuated before any possible distinction of the extrinsic and the intrinsic" and thus the "milieu or constituting energetic system, should not be conceived as a new term that would be added onto matter: the milieu is the very activity of relation, the reality of the relation between two orders that communicate across a singularity." (Simondon 2020: 50)

back against the “physical paradigmatism” (16) that was, as was pointed out in the critique of FCR, in vogue in the 1950s.

5.3.3 Individuating minds

Again, Simondon’s views can be critiqued through the lens of both teleodynamics and precarious sense-making when he argues that

> the automaton can only adapt in a manner convergent with a set of conditions by increasingly reducing the gap that exists between its action and its predetermined end; but it does not prevent and does not discover ends during its action, for it does not carry out any veritable transduction, since transduction is the expansion of an initially very restricted domain that increasingly takes on size and structure; biological species are endowed with this capacity of transduction due to which they can indefinitely expand (172).

In other words, transduction in living beings is not exhausted in a kind of thermodynamic equilibrium[266] but is instead a kind of anti-entropic motor – an anti-entropic teleodynamic that functions precisely through the ongoing structuring of a domain in which metastability can be conserved through the incorporation of tensions into an emergent constraint regime, i.e., a set of internal resonances (“the individual always appears as the bearer of polarization” (Simondon 2020: 82)). The organic, sensorimotor and linguistic bodies I discussed in the previous chapter are perfect examples of this temporally extended metastability in living systems[267]; they are “successive patterns that resolve the incompatibilities inherent to … disparation” (229). In summary:

> Only death would be the resolution of all tensions; and death is not the solution to any problem. The resolving individuation is one that conserves the tensions in the equilibrium of metastability instead of nullifying them in the equilibrium of stability. Individuation makes tensions compatible but does not relax them; it discovers a system of structures and functions within which tensions are compatible. The equilibrium of

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[266] Simondon sees the reduction of the behaviour of living systems to adaptation to an existing set of conditions as exemplary of hylomorphic logic and asserts instead that “individuation is anterior to adaptation, and the latter does not exhaust the former.” (Simondon 2020: 231)

[267] Indeed, in discussing these matters Simondon comes remarkably close to defining autopoiesis; he observes, for instance, that in living systems “[i]t could be said that the living substance within the membrane regenerates the membrane but that the membrane is what guarantees that the living being is alive each moment, since this membrane is selective: it is what maintains the milieu of interiority as a milieu of interiority relative to the milieu of exteriority” and that it could thus “be said that the living being lives at the limits of itself, on its limit” (Simondon 2020: 251). Similarly, he will argue that “the structure of a complex organism is not just integration and differentiation; it is also this establishment of a transductive mediation of interiorities and exteriorities going from an absolute interiority to an absolute exteriority through different mediators of relative interiority and exteriority” and that “ the characteristic polarity of life is on the level of the membrane; it’s here that life essentially exists as an aspect of a dynamic topology that itself maintains the metastability through which it exists… but this metastability requires a topological condition: structure and function are linked together, since the deepest and most initial vital structure is topological” (252). One way of accounting for these striking parallels is to recall the significant influence of Merleau-Ponty on both Simondon (his student) and autopoiesis/enactivism.

> the living being is an equilibrium of metastability, not an equilibrium of stability. Internal tensions remain constant as the cohesion of the being relative to itself. The being's internal resonance is the tension of metastability; it is what confronts the pairs of determinations between which there is a disparation that can only be significative through the discovery of a higher structural and functional ensemble. (Simondon 2020: 226)

Physical and living systems, however, do not exhaust the possibilities of individuation. There are also what Simondon describes as *psychic* individuations, which are in turn closely reciprocally coupled with what he terms *collective* individuation, and it is in examining these forms of individuation – as well as, importantly, what can go wrong with them – that the full potential of the philosophy of individuation for thinking about the psychedelic experience becomes evident. Simondon makes an ambitious argument for the emergence of the psychic from within living systems that relies in turn on the role of affect as a regulative vital[268] function. Whereas in the regulation of simple organic life there is a relatively unmediated unfolding of affection-perception-action tensions (the autonomic nervous system is an example here, although we should not conceive of the resolution of these tensions in the simple cybernetic sense of the minimisation of a free energy function), Simondon claims that psychic life arises when living individuation can no longer resolve these tensions – specifically when the latter become a problem posed to life (2020: 178)[269].

While Simondon's view in this regard is largely speculative, I have shown in previous work (Eloff 2022) that it is analogous to views held within contemporary affective neuroscience – by Damasio, Panksepp and Solms, for instance. It is thus worth taking Simondon seriously, even if he does not, from the vantage point of 1958, offer a rigorous defence of his position. As Simondon explains, "when affectivity can no longer intervene as a power of resolution, when it can no longer carry out this transduction which is an individuation perpetuated within the already individuated living being, affectivity gives up its central role in the living being and becomes situated alongside the perceptive-active functions; a perceptive-active problematic and an affective-emotional problematic then suffuse the living being" (2020: 177)[270]. Simondon

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[268] While I do not have space to unpack this here, it should be underscored that Simondon's philosophy is emphatically *not*, as he himself avers, a form of vitalism. There is no mystical force underlying life and giving it impetus – to think in this way would be to think via a variation on the hylomorphic schema. Instead, the vital is simply what emerges within a complex, natural field of dynamic tensions.

[269] Simondon spends some time defining affection, perception and action in this regard, but the details are not of great importance here.

[270] While I do not have space to provide a full account of the emergence of perception and emotion from sensation and affect, Pascal Chabot offers the following clear summary of Simondon's account: "[h]uman beings orient themselves to the world by sensing relative heat or cold, softness or roughness. Sensations enable them to form a summary image of their environment. Perception complicates this sensual relationship with the world. It localizes the source of warmth in a stone heated by the sun. It understands the cause of a tingling sensation when it sees the object that has been touched. It is

describes this as a slowing down of individuation that, in the language of his secondary 1958 doctoral dissertation, *The Mode of Existence of Technical Objects* (2017), results in a lesser degree of concretisation, where the terms *abstract* and *concrete* can be loosely viewed as the respective extrema of the individuation-individuated continuum. Psychic individuation thus conserves a greater metastability or individuative potential (it is more *abstract*), just as organic life in turn internalises its individuative charge to a greater extent than physical systems, in which this charge is usually exhausted once an initial individuation is complete. In Simondon's terms, "the psychical intervenes as a slowing down of the individuation of the living, a neotenic amplification of the first state of this genesis … psychical life is therefore … a new plunge into pre-individual reality followed by a more primitive individuation" (2020: 177). This emergence of the psychic is also the emergence of the *psyche* – the unification of the living being as subject[271].

Crucially, Simondon understands psychic individuation as the transduction of a disparation between living individuation and the transindividual. It is not the case, in other words, that subjectivity merely emerges as the expression of a certain degree of organisational biological complexity coupled with the above-mentioned slowing down of the living; instead, the psyche emerges precisely at the threshold between preindividual living dynamisms (we could consider enactivism's organic bodies as exemplary here) and the broader social world that Simondon refers to as a process of *collective* individuation (enactivism's linguistic bodies, not to mention the natural and technical environments more generally).

Simondon avers that "the psychical is the nascent transindividual; for a certain amount of time, it can appear as the pure psychical, an ultimate reality that could consist in itself; but the living cannot borrow the potentials that produce a new individuation from the associated nature without entering into an order of reality that makes it participate in an ensemble of psychical reality which surpasses the limits of the living; psychical reality is not self-enclosed" (2020:

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through perception that human beings engage with the world: we attach a mental signification to material sensations. Affect gives rise to a second orientation: that of the human being in relation to himself. Pleasure, approval, discomfort or pain: affects are fleeting and unconscious. They are the signals that indicate the state of our inner world. Emotion takes hold of this primitive material and gives it meaning. It brings together an affect of discomfort, another of pain in the foot and a third of frustration; it stabilizes them, interprets them, and gives them a consistency that can be formulated: an emotion of anger. Emotion persists. It is conscious. It frees the individual from the proximity to himself that mute affect imposes upon him, allowing him to explore the signification of his feelings." (2013: 95-6)

[271] "The psyche continues vital individuation in a being that, in order to resolve its own problematic, is itself forced to intervene as an element of the problem through its action as subject; the subject can be conceived as the unity of the being qua individuated living being and qua being that is the representative of its action through the world as an element and dimension of the world." (Simondon 2020: 9)

179)[272]. The "associated nature" to which Simondon refers here is another term for the pre-individual charge or "associated milieu" that all living systems retain – the internalisation of their individuative milieu that I discussed earlier as a form of internal resonance and which ensures their ongoing metastability[273]. The psyche, and the psychic individuation from which it emerges, comprises a singular form of individuation, and has a provisional degree of autonomy qua unified subject, just as all living individuation is autopoietic, but in both instances, psychic individuation and autopoiesis, there is a necessary imbrication of system and environment entailed where each of these give rise to each other, i.e., are reciprocally ontogenetic or part of an ongoing transductive dynamism. As Muriel Combes underscores, "[t]o say that psychic individuation and collective individuation are reciprocal to some extent amounts to making them into poles of a single constituting relation" (2013: 25)[274]. This said, psychic individuation is understood by Simondon to perform an important integrative function – one that arguably gives rise to cognition, or at the very least *meaning*[275]:

> The individual lives to the extent that it continues to individuate, and it individuates by way of the activity of memory as well as the imagination or abstract inventive thought. In this sense, the psychical is vital, and it is also true that the vital is psychical, but on condition of understanding the psychical as the activity of the construction of systems of integration within which the disparation of pairs of elements takes on a *sense*. (Simondon 2020: 230-1; my emphasis)

Recall that Simondon describes pre-phased or metastable being as *problematic*, and that individuation can be understood as a provisional resolution of a particular problem (or

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[272] Di Paolo observes the close parallels between Simondon and enactivism in this regard: "[t]hree dimensions of embodiment have been the focus of work in the enactive approach: organic, sensorimotor, intersubjective. The overlap with Simondon's organic, psychic, and collective forms of individuation is not exact, but the ideas are compatible." (2021: 797)

[273] It may be intuitively appealing to view the associated milieu as broadly analogous to the view in active inference that systems that endure can be understood as necessarily curating a model of their environments (which they are, recall, ostensibly separated from by a Markov blanket), but this results in a conflation of the individuated and the pre-individual, i.e., of ontology and ontogenesis. It is *ontogenetic potential* that typifies the associated milieu, not the post-hoc ascription of modelhood, any model *stricto sensu* relying on a distribution of terms – or what Simondon would call a single logic, of identity, non-contradiction and so forth, for instance – that begs the ontogenetic question. As Simondon puts it, "[i]ndividual and milieu should be taken only as the extreme, conceptualizable, but not substantializable, terms of the being within which individuation takes place" (2020: 361). Even if we limit the scope to ontology, however, there are stark differences between the discretely parcelled out system-environment relations proposed by active inference and Simondon's description of individuated being as "a dynamic web, an organization of separations and reunifications of structures and functions" (227).

[274] Combes further argues in this regard that we should not view psychic (or collective) individuation as a *substance* but as an individualisation of living individuation that functions as one of its modes of perpetuation (2013: 26-30).

[275] Simondon's closely related description of perception as an integration (transduction) of disparation is an especially clear explanation of this dynamic. As he explains, "far from retaining what is mutual, perception retains everything that is particular and incorporates it into the whole; furthermore, it utilizes the conflict between two particulars in order to expose the superior system within which these two particulars are incorporated; the perceptive discovery is not a reductive abstraction but an integration, an amplifying operation." (2020: 230)

disparation) that does not exhaust it. It is clear in this regard that such resolutions, tentative, immanent and without normative criteria as they are, can go wrong. In some instances, this could be the result of contingencies expressed by the milieu that psychic or living being has no capacity to incorporate; as Simondon puts it, "a certain risk or happenstance from outside therefore exists in every life; the individual is not self-enclosed, and there is no destiny contained in it, for what it resolves is simultaneously the world and itself, the system of the world and itself" (2020: 237). Such is life, perhaps – a returning call to practice *amor fati*. However, problems can also be posed and resolved badly *by the psyche*: we can cultivate maladaptive habits, strategies or modes of thought that negatively affect our capacity to access – or even exhaust – our associated milieu or pre-individual charge and become locked into a single phase of being – crystallised.

5.3.4 The anxious and the exhausted

Simondon describes this situation, which has clear resonances with the notion of being trapped in an overly steep energy landscape or crossing an attractor threshold, with the unusual term "aestheticism", which for him connotes a form of repudiation of ontogenesis in favour of the result of a particular individuation. Specifically, "the subject in the state of aestheticism is a subject that has replaced its affectivity with a reactivity of action and information according to a closed cycle that is incapable of accepting a new action or a new information" (176)[276]. Simondon goes on to argue that this closed cycle imposes an "artificial" and "cyclochronic" time on the vital time of creative becoming – a notion I will return to when I discuss Deleuze but which for Simondon connotes the over-concretisation of a particular resolution: trapped in a rut, we loop endlessly, repeating without changing the conditions of our repetition and slowly exhausting ourselves. For a living or psychic individual who has resolved a problem badly in this way, the eventual result is what Simondon vividly describes as a kind of *passive death*. Such an individual

> is burdened with the weight of the residues of its operations; it is passive by itself; it is to itself its own exteriority; its activity weighs it down, charges it with an unusable indetermination, an indetermination in stable equilibrium whose nature is exhausted, deprived of potentials, and can no longer be the basis for new individuations; the individual little by little takes on elements of stable equilibrium that charge it and prevent it from going toward new individuations. The entropy of the individuated system increases throughout the successive operations of individuation, particularly in those that are not constructive. The results of the past that lack potential accumulate without becoming the seeds for new individuations; this heatless dust and this unenergized accumulation are the rise of passive death within the being, a death which does not

[276] Simondon also describes this as "an internal structuration of the individual that is irreversible and forces it to conserve within itself, along with the schemas discovered in past situations, the determinism of these very situations." (2020: 261)

> originate from confronting the world but from the convergence of internal transformations. (Simondon 2020: 237-8)[277]

In terms strikingly apposite in the context of psychedelics, Simondon discusses this passive death as a *loss of plasticity* – an over-structuration that reduces an individual's capacity to respond to novel problems or to produce novel solutions or individuations for entrenched ones (2020: 262).

To some extent, this is the natural arc that all life follows, from the DNA-accumulated damage associated with aging to the habituality and existential fixity that often accompanies old age. Our organic, sensorimotor and linguistic bodies become congealed into specific repertoires; the nimble fingers that could once have learned to play the piano are now stiffened from decades of manual labour; the sharp mind that has spent too long in the tow of a dogmatic ideology is unable to fathom any other way of understanding the world. This, Simondon says, "is merely the consequence of very complex forms of individuation, wherein the consequences of the past are not eliminated from the individual and provide it with an instrument for resolving future difficulties and also with an obstacle for accessing new types of problems and situations" (ibid.). We can, however, intervene in this dynamic to some extent, renewing the pre-individual funds by seeking new and always provisional resolutions to problems. By recognising and enacting our metastability. And in this regard, it is precisely the transduction between the living and the transindividual that we need to cultivate, something that frequently goes via what Simondon describes with the unusual term *anxiety*[278].

Simondon presents anxiety as a two-fold dynamic: on the one hand, he describes it as a recognition – or feeling – of the problematic nature of being; the fact that the individuated subject is a particular expression of a pre-individual nature that cannot be exhaustively determined. This experience motivates an attempt to resolve transduction via the unified individual, misrecognising the disparation between the pre-individual and the transindividual as one between the pre-individual and the psyche. Simondon explains that "in anxiety, the subject would like to resolve itself without going through the collective; it would like to come to the level of its unity by way of a resolution of its pre-individual being into an individual being" (2020: 282). This, however, is unsuccessful because "the psyche cannot be resolved at the

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[277] The use of the notion of entropy here is worth noting, given that what Simondon is describing is essentially an impoverishment or collapse of anti-entropic dynamisms. In fact, this is an impoverishment of psychic individuation itself, because "whereas biological finality is homeostatic and seeks to obtain a satisfaction for the being in a state of greater equilibrium, psychological individuality exists to the extent that this biological equilibrium and this satisfaction are judged insufficient." (2020: 317)

[278] This term appears to be a provocative allusion to Heidegger's notion of *angst,* although Simondon does not himself make this link explicit, and his use of the idea is, as David Scott has pointed out, wholly distinct from Heidegger's (2014: 83-6).

level of the individuated being alone; it is the basis of participation in a vaster individuation" (11). It is, in other words, the transindividual relation that resolves the problematic inherent to psychic individuation. On the other hand, however, this experience of anxiety can, precisely by being "the experience wherein the individual discovers itself as subject by discovering in itself the existence of a preindividual share" (Combes 2013: 33), give rise to a renewed attempt to enrich the pre-individual funds by contracting new relations with the transindividual. Recall Grof's discussion of BPMs in an earlier chapter: in the second basic perinatal matrix, a sense of ungrounding opens the subject to the possibility of their own dissolution. If this experience is not worked through, within the context of a psychedelic therapy session for instance, what results is a desperate attempt to ground the ego in certainty and stable meaning.

Simondon describes this as a "universal counter-subject that develops… like a night that constitutes the very being of the subject in every point" (284). In order not to become locked into this errand concretisation, it is precisely by confronting what is larger than oneself that one can move past this BPM in order to enter the cycle of death, rebirth and transformation – effectuating a new disparation that can bring about a psychic individuation. Simondon's description of this near-paradoxical tension of anxiety, in which, as Igor Krtolica describes, "the anxious being desires its own dissolution, its own death, but in order to arise better from its ashes" (2012: 75), is surprisingly resonant with descriptions of the psychedelic experience, and is thus worth citing at length:

> [A]nxiety already contains the premonition of this new birth of the individuated being starting from the chaos that spreads out; the anxious being feels that it might be able to be reconcentrated within itself in an ontological beyond that supposes a change in all dimensions; but in order for this new birth to be possible, the dissolution of the previous structures and the reduction of the previous functions in potential must be complete, which is an acceptance of the annihilation of the individuated being. This annihilation as an individuated being implies a contradictory movement through the dimensions according to which the individuated being poses its perceptive and affective problems; anxiety begins with a sort of inversion of significations; close things appear distant without a link to the contemporary and the actual, whereas distant beings are abruptly present and all-powerful. The present becomes hollowed out while losing its actuality; the plunge into the past and into the future dissipates the weft of the present and deprives it of its density as something lived. The individual being flees itself, deserts itself. And yet in this desertion there is a sort of underlying drive to go recompose oneself elsewhere and otherwise by reincorporating the world such that everything can be lived. The anxious being becomes universe to find another subjectivity; it exchanges itself with the universe, plunges into the dimensions of the universe. (Simondon 2020: 284)

Anxiety thus affords the subject a recognition of its possibilities for individuation, but the experience is not always fully resolved[279]; fleeing, the subject takes the first, albeit necessary step; in this first step it follows "the inverse course of ontogenesis; it unravels what has been woven, it goes backwards in every sense" (2020: 284-5).

It is the second step that is crucial for any becoming, however: "[f]or the individuated being submerged by preindividual being, anxiety is a relinquishment and the acceptance to cross the destruction of individuality to venture toward another unknown individuation. It is the being's departure" (285). Here, it is crucial, Simondon argues, not to mistake a merely *inter-individual* relation for a transindividual one. Whereas the former is a normative dynamic between individuated subjects that validates the ego through a kind of rapport of the established – a dynamic close to what Deleuze describes as the *dogmatic image of thought*, as I elaborate in the next section, and which Chabon glosses as "the individual as *zoon politikon*" (2013: 98) – it is only by calling oneself into question that the latter is effectuated. In other words, it is by accepting the annihilation of the individuated being in order to release the pre-individual flow – the potential to become otherwise than one is – that one is able to contract (or rather weather, because the process entails less a voluntarism than an involuntary event one elects how to countenance) a new transduction. That is, it is the ontogenetic dynamism that underlies the subject, psyche, ego and so forth that is brought together with the broader collective reality which exceeds these emergent individuations that recursively produces them[280]. As Simondon, puts it, "there must be a communication of the *conditions of consciousnesses* for there to be a communication of consciousnesses" (295; my emphasis)[281].

5.3.5 The traversal of solitude

In a manner close to Nietzsche[282], Simondon presents this calling into question of oneself in order to individuate otherwise as a kind of transvaluation of values that entails what he vividly

[279] It is worth noting that Simondon views perception and emotion as operating in an analogous way: "perception and emotion are metastable: a perception clings to the present, resists other possible perceptions, and is exclusive; an emotion also clings to the present and resists other possible emotions; the disruption of this metastable equilibrium is what allows for one perception to replace another; one emotion only comes after another emotion due to a sort of internal breakage" (2020: 290).
[280] It is important not to conflate the collective and transindividuation. As Combes astutely points out, the transindividual is a *relation*, specifically "the mode of relation to others constitutive of collective individuation" (2013: 35).
[281] In this regard, "[i]t is fundamental to perceive the asymmetry of the distinction between transindividual relations and interindividual connections, the latter being only the objective sediment of the former, their stabilization in a culture" (Krtolica 2012: 82).
[282] Indeed, Simondon discusses Nietzsche's Zarathustra and the encounter with the tightrope walker in making his argument. As he says, "it is with solitude, in this presence of Zarathustra to a dead friend abandoned by the crowd, that the trial of transindividuality begins" (2020: 313).

albeit confusingly describes as a traversal of solitude[283] and which, in its nascent desire for self-transcendence, he views as the basis of the religious impulse. As he observes, "[s]pirituality is the signification of the relation of the individuated being to the collective and therefore also the signification of the foundation of this relation, i.e. the fact that the individuated being is not entirely individuated but still contains a certain charge of non-individuated, pre-individual reality that it preserves and respects, living with the awareness of its existence instead of retreating into a substantial individuality, a false aseity" (278). Solitude may be a strange way to describe the contracting of the modes of relation of the transindividual, but as Combes explains, for Simondon solitude represents the eschewal or suspension of normative inter-individual relations in favour of those that are properly transductive (2013: 37-8). As was shown, when one is confronted by anxiety, one can either halt the process of disindividuation by seeking a locus of security in the individual subject, or can simply disindividuate without a subsequent individuation. It is, however, by accepting the journey through solitude, which Simondon tellingly describes as a kind of spiritual ordeal, that we are able to renew the ongoing psychic individuation that we are and which is the expression of forces anterior to – and both within and beyond – the subject.

I shall make the argument more explicit vis-à-vis the psychedelic experience. It is clear that what Simondon describes throughout his work on psychic individuation bears strong similarities with the core mechanisms of psychedelic ego death and transformative rebirth. The pre-individual field can, as mentioned earlier, be understood as the *fons et origo* – a field of potential anterior to the individual which provides the latter with its ongoing metastability. Any residual doubts as to the veracity of the connection that I am drawing between psychic individuation and DIED may be laid to rest by considering Simondon's fascinating references to Jung, particularly to the concept of *Nigredo*, the first stage in the alchemical process that is typically understood as a de-differentiation/disindividuation (Chabot 2013: 115). While Simondon is not interested in the florid metaphysics that accompany Jungian analytical psychology, he does draw an explicit parallel between his notion of individuation and Jung's when he argues that the latter "discovers in the Alchemists' aspiration the expression of *the operation of individuation* and of all the forms of sacrifice, which suppose the return to a state comparable to that of birth, i.e. a return to a richly potentialized, not-yet-determined state, a

[283] This traversal of solitude could also be viewed as the transvaluative overcoming of nihilism, a point underscored by Igor Krtolica's reading of this crucial part of Simondon's thesis. "Anxiety tends towards an annihilation of all the structures and functions of the individual without permitting a new individuation, due to the solitude of the subject. On the contrary, rather than being solely concerned with the annihilation of the individual, the disindividuation implicated in the encounter with the transindividual is only provisional and constitutes the condition of a new individuation in the collective." (2012: 83-4)

domain for the new propagation of Life" (2020: 697)[284]. This state, which entails a loss of individuality, is followed by "a new differentiation; this is albification, followed by the *Cauda pavonis* or peacock's tail, which makes objects emerge from the confused night, just like the dawn distinguishes them by their color" (ibid.). Beyond its descriptive vividness, the quasi-alchemical dynamic Simondon develops exemplifies psychedelic ego dissolution, whether viewed through the lens of Grofian BPMs or the de-differentiation of top-down regulatory brain dynamics like the DMN.

An increase in hyperplasticity, richly potentialised, generates a shock or crisis in being: a confrontation with the pre-individual and transindividual tensions of which one consists; this in turn produces a dissolution of the subject followed by, if the journey through solitude is successful and one does not become stuck in anxiety, the bad trip, a new individuation: from lead into gold; and from night into all the colours of the peacock's tail. This is the paradox of unselfing as the transvaluation of the self. A new connectome harmonic series is elicited from the exploratory improvisations of the pre-individual.

While the parallels are clear, it is also the case that Simondon, in moving beyond ontology in order to fathom ontogenesis, goes further than any model of transformation, psychedelic or otherwise, that posits the primacy of static being on either side of a transformative process seen as secondary. Indeed, as was shown, the opposite is the case: the psyche, the subject, is what Whitehead would call a transient concrescence, an interference pattern emerging from the disparation between the pre-individual and the transindividual, both of which are themselves imbricated dynamic processes[285]. This is why "[i]ndividual and milieu should be taken only as the extreme, conceptualizable, but not substantializable, terms of the being within which individuation takes place" (Simondon 2020: 367). Simondon pushes this view – which anticipates and goes beyond Lyons's biogenic account presented in an earlier chapter – to its limits; just as process biology and, to some extent, spatiotemporal neuroscience view space and time as emergent expressions of immanent processual unfoldings, so too does he argue that time and space are dimensions of individuation itself, not abstract schema within which individuation unfolds[286]. In this regard, Simondon argues that transduction is in part a

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[284] The discussion of Jung takes place in the concluding section of "Form, Information, and Potentials", a lecture Simondon delivered in 1960 that presents an overview of his theory of individuation in much the same manner as Deleuze's famous presentation "The method of dramatization" is an encapsulation of the ontological argument contained in the second half of Difference and Repetition.

[285] "The epistemological postulate of this study is that the relation between two relations is itself a relation" (Simondon 2020: 76).

[286] In this regard, "[t]he true schema of real transduction is time, the passage from state to state that is formed by the very nature of the states, by their content, and not by the exterior schema of their succession: time thus conceived is the being's movement, real modification" (Simondon 2020: 324).

form of spatiotemporal emergence (2020: 13-14), that “time itself is considered as an expression of the *dimensionality of the being that is individuating*” (15) and that time thus “*emerges from the pre-individual just like the other dimensions according to which individuation effectuates itself*” (16).

Indeed, “the pre-individual is the source of chronological and topological dimensionality” (160). Notably, in his considerations of time, and particularly of the past and social memory, Simondon again turns to Jung and his well-known discussion of the mythic-archetypal dynamics that populate the unconscious. For Simondon, these dynamics are not, in some hylomorphic sense, perennial forms, but instead simply the accumulated affective-emotive themes of collective life that form the basis of inter-individual relations (as norms, shared representations and so forth); they are also tendencies within pre-individual and collective reality that condition individuation, “a bundle of feelings relative to the becoming of being” (276).

Interestingly, Simondon does not spend very much time examining how these affective-emotive themes influence individuation. While it can be understood how they variously constrain and enable particular transductive operations, populating a pre-individual tensional landscape, the topology of this landscape remains relatively underexplored. At one point towards the end of the book on individuation, Simondon even seems to acknowledge this:

> It then would be more appropriate to study if there are modes of the pre-individual, i.e. the different aspects of nature that subjects include. The ἄπειρον [ápeiron] is perhaps undetermined only with respect to the individuated being: there are perhaps various modalities of the undetermined, which would explain why specific cases and specific tensions are required for the birth of the collective and in order to have a certain number of chances of stability in all cases. One could perhaps define in this way classes of *a prioris* in possible significations, categories of potentials, stable pre-relational bases.

Here, as in several other places in Simondon’s discussion of individuation, there is a sustained push to move beyond the Kantian legacy of transcendental idealism to ground space and time not in the *a priori* intuitions of a subject but instead to view spatiotemporality and the subject as reciprocally emerging from the same pre-individual milieu. Similarly, “[i]f knowledge rediscovers the lines that allow the world to be interpreted according to stable laws, this is not because in the subject there are a priori forms of sensibility whose coherence with the raw data emerging from the world through sensation would be inexplicable; this is because the being as subject and the being as object arise from the same initial reality, and because the thought that now seems to establish an inexplicable relation between the object and the subject in fact merely extends this initial individuation; the *conditions of possibility of knowledge* are in fact the individuated being’s *causes of existence*” (292-3). Simondon’s view is also, while clearly influenced by Bergson, especially the notion of lived duration (although this is not the duration of a subject but the duration that emerges with a subject) and the critique of the reduction of time to space, strangely different from the latter’s understanding, with Simondon arguing, for instance, that “the *future* is like an immense possible field, a milieu of virtualities associated with the present through a symbolic relation; on the contrary, the *past* relative to this very present is an ensemble of individualized, localized, defined points” (ibid.; my emphasis). I do not have space (or time) to explore these matters further here.

> *The concepts to carry out such a study are lacking*. (Simondon 2020: 348; my emphasis)[287]

From the vantage point of 1958, the concepts to carry out such a study – ostensibly a study of phase space and the various attractor-repellor distributions that describe the tendencies of systems – truly were lacking[288]; while Poincaré's work on singularities would soon prove to be foundational in defining the dynamics of nonlinearity, Simondon was writing at a time before Thom's catastrophe theory, Lorenz attractors and the fields of chaos maths and dynamic systems theory that emerged in the 1960s and 1970s. It seems clear though that Simondon was seeking some way to describe pre-individual potential, prephased being; not as indifferentiation or a merely abstract field of possibility, but as the fully real adjacent possible. This is an uneven ontogenetic landscape that constrains and enables individuations without being reducible to simple efficient causation. It would be precisely this liminal zone in Simondon's philosophy that Deleuze would take forward in his theorisation of the virtual and the intensive, and the process of different/ciation through which individuation-actualisation takes place. Before turning to Deleuze, however, I must reiterate the core features of the Simondonian account of psychedelic experience, variations of which I have unpacked in previous work (Eloff 2022; 2023)[289].

Clearly, the experience of anxiety and the traversal of solitude, which entail a dissolution of the psyche/subject in order for a new individuation to take place, provide a useful philosophical framework for describing DIED. Ego death is a way of potentially enriching the metastability of being by fomenting new transductions, countering the passive death of accumulated habit and overstabilisation with the destabilisation of the other death: the death of ontology on behalf of ontogenesis. The experience of anxiety that frequently opens this process exposes being to its pre-individual charge, the affective-emotive myths that constitute its terrain of potential, affording the subject in dissolution a metaprogrammatic experience of a hypersalient, quasi-archetypal reviviscent topology become hyperplastic – a malleable attractor landscape. We can also understand this process as an unravelling of the narrative subject towards the core self that is, on a Simondonian account, not so much a unified being as a multiplicitous flux of

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[287] Simondon makes this observation in the specific context of a discussion about the transindividual nature of signification, but it seems clear that it is more broadly consequential.

[288] Although it must be said that Simondon, by describing space and time as topological and immanent and attempting to describe their processual unfolding comes quite close. He even describes a prototypical phase space at one point when he notes that "potential energy, which is measurable by a scalar magnitude, can be captured by a structure, a bundle of polarities that can be represented vectorially. The genesis of the individual is effectuated by the relation of these vectoral magnitudes and these scalar magnitudes." (2020: 93)

[289] Note that in this earlier work, I still saw some utility in attempting to combine an account of psychedelic individuation with a FEP-style framework. I am no longer convinced by this approach, as I made clear in an earlier chapter.

pre-individual dynamisms, in turn deeply imbricated with the collective. The dramatic alterations of space and time frequently experienced on psychedelics for their part reflect the fact that spatiotemporality *emerges* from the being in becoming *as a dimension of this becoming*; it is not that our perception is altered so that we encounter an a priori framework of spacetime differently in some or other idealist manner, but instead that individuation is a real individuation both of the psyche and of the spatiotemporality that perception is an immanent expression of[290]. Synaesthesia, eidetics, increased vividness of experience, proprioceptive idiosyncrasies are, similarly, expressions of novel becomings, the contracting of different transductive dynamics. From the biochemical dynamics of organic bodies to the sensorimotor to the collective braidings of transindividuation, set and setting are also profoundly transformed on the Simondonian view.

5.3.6 A Simondonian set-setting

At first glance, "set" can be cast as the pre-individual, setting as the collective and psychic individuation as their meeting point, but this does not account for the entangled, reciprocal nature of the transindividual, the fact that it is a becoming relating two becomings and that the unified psyche/subject is merely a provisional expression of these ongoing processes. Simondon argues that "[b]ecoming is not the becoming of the individuated being but the becoming of the being's individuation" (2020: 364). More coherently, set-setting is transduction itself – not simply the mapping out of established terms in relation but the diagramming of relation and terms in their individuation. One way of thinking about this would be to consider set-setting as a more-than-unity tension of conjoined verbs, not a stable distribution of distinct nouns. If traditional notions of set and setting? operated within the ambit of an ontologically discrete and stable world, set-setting here become ontogenetic and metastable, and a grasping of set-setting becomes itself an individuation in thought, for as Simondon says, "[b]eings can be known through the knowledge of the subject, but the individuation of beings can only be grasped through the individuation of the subject's knowledge" (2020: 17).

In sum, it is hopefully by now clear that the Simondonian account of psychedelic individuation provides a philosophical framework within which we can meaningfully think about the full

[290] As Simondon has it, "physical reality involves topologically interlocking scales of magnitude, each of which has their own becoming and their own particular chronology. Indeterminism would exist in a pure state if there were no correlation between the topology and the chronology of physical systems" (2020: 159). Simondon's speculative account of a kind of topological time is especially fascinating; while I do not have space to unpack it here, it anticipates several moves Deleuze makes in *Difference and Repetition*. As Simondon argues, "in addition to a topology of the living being, it would be necessary to define a chronology of the living being associated with this topology, which would be as elementary as it and as different from the physical form of time as topology is different from the structure of Euclidean space" (2020: 254).

scope of psychedelic experiences in a manner that is metaphysically parsimonious, even as it may appear profoundly novel in its ontogenetic valences. Such an account is broadly naturalist, in a way that reflects both the mind-life continuity enactivism grounds itself in as well as the moves towards emergence, chaos, complexity and process in the contemporary life sciences, from systems biology to spatiotemporal neuroscience. Finally, such an account does not seek to tacitly import various anthropogenic assumptions – from laws of identity to representational abstractions to ontology itself. It also gains by situating itself within the biogenic instead of seeking to surreptitiously trace, via hylomorphic or other paths, the conditions that give rise to the established from the established itself[291]. But just as the path is made by walking, enactivists say, so too do "the paths do not preexist action: they are the very individuation that makes a structural and functional unity appear in this conflictual plurality" (Simondon 2020: 234). When we take psychedelics we are seeking to undo being in order to become otherwise. To ground this process in being is to eschew the polyphasic in favour of a single phase; to forego metastability for the shallow comforts of the apparently stable[292]. But "[t]he living being is an agent and theater of individuation; its becoming is an ongoing individuation, or rather, *a sequence of the manifestation of individuation* advancing from metastability to metastability" (Simondon 2020: 9-10) and "individuation is an event and an operation within a reality that is richer than the individual that results from it" (53). Below, I turn to Deleuze and Guattari to examine and formalise this event and operation, this reality, in more depth.

5.4 Counter-actualising the self: Deleuze and the invisible landscape

> Every death is double, and represents the cancellation of large differences in extension as well as the liberation and swarming of little differences in intensity. (Deleuze 1994: 259)
>
> Thought lags behind nature. (Deleuze and Guattari 1987: 5)

[291] As Simondon says, "[t]his charge of the undetermined can be called nature; it must not be conceived as pure virtuality (which would be an abstract notion arising to a certain extent from the hylomorphic schema), but as a veritable reality charged with potentials actually existing as potentials, i.e. as an energy of a metastable system. The notion of virtuality must be replaced with that of a system's *metastability*." (2020: 352). Note that Simondon is using the term virtuality here in a quasi-Bergsonian sense, but is, perhaps confusingly for readers of Deleuze, arguing in favour of precisely the account Deleuze presents via his own loosely related notion of the virtual.

[292] "[T]he perfect individual (totally individuated, substantial, deprived and emptied of its potentials) is an abstraction; the individual is undergoing ontogenetic becoming, it has with respect to itself a relative coherence, a relative unity, and a relative identity." (Simondon 2020: 159-60)

5.4.1 From Simondon to Deleuze

Towards the end of his book on individuation, Simondon uses the pre-Socratic term *ápeiron* to refer to what he has up until that point described as pre-phased being or the pre-individual funds – the pluripotent metastable tension within which disparation takes place and transductions unfold, giving rise to processes of individuation. The term *ápeiron* comes from Anaximander and is usually translated as "limitlessness" or "boundlessness". For Anaximander, Aristotle and other ancient Greek philosophers, the *ápeiron* connotes an initial eternal condition from which everything emerges and to which everything returns and it is clear why Simondon finds this term appealing. As was shown, however, he wonders whether it is sufficient to simply regard this pre-individual boundlessness as undetermined; if this were the case then there would be no disparation – no differences that make a difference – and no individuation, and so the *ápeiron* cannot simply be the entirely undifferentiated. However, for Simondon to assert determination here would be to undermine his critique of hylomorphism and to surreptitiously trace the establishing from the established. Lacking the resources to explore this further, he moves on.

A decade later, however, this same problem would imbue the entire conceptual architecture of Deleuze's *Difference and Repetition* (1994). In part, this work can be seen as a sustained critique of the tracing of the transcendental from the empirical – of erroneously assuming that it is possible to grasp the conditions that give rise to experience, the world and so forth from the conditioned nature of these phenomena. For Deleuze, to think in this way is to fall prey to an aspect of what he calls the dogmatic image of thought and specifically to "the ultimate, external illusion of representation … that groundlessness should lack difference" (277). To think representationally is to think via the manipulation of discrete terms and to draw them into relations with each other – relations of identity, similarity, analogy or opposition, for instance – and thus to assume a particular parcelling out or distribution of reality – a good sense, along with a common sense in an ostensibly unified subject that undertakes this conceptual exercise.

The reason this gives rise to the so-called ultimate 'illusion of representation' is that thinking conceptually in this manner merely affords us access to "difference already mediated by representation" (27) – we are able to conceive of the diverse, of the ontologically different as presented in phenomenal experience, but not of that which gives rise to the diverse, simply because to think *conceptually* about the conditions of experience in this way is, again, to fall prey to thinking the transcendental from the empirical. Thus, we are seemingly forced to choose between this circular reasoning or to circumscribe the ground, the established, and posit what lies beyond it as simply undifferentiated. We are, in a word, able to think diversity,

or the given, but unable to think *difference*, “that by which the given is given, that by which the given is given as diverse” (222).

To remain within the ambit of the dogmatic image is to be able to think ontology, but not ontogenesis, a situation that has always been unsatisfactory for philosophy, from Plato through to Hume and Kant, even if each of them, as Deleuze observes, succumbed to the dogmatic image in their own ways. In fact, Deleuze argues that philosophers have *never* been able to think difference qua difference, i.e., to wholly extricate themselves from the trap of thinking the transcendental from the empirical, and he thus commits himself to this ambitious task, the stakes of which are not simply to understand difference in its ontogenetic-individuative primacy as what gives rise to the individuated and to identity, but also, and perhaps even more importantly, to be able to conceive of how the truly new is possible. As Deleuze describes it elsewhere, “[t]he task of a philosophy which does not wish to fall into the traps of consciousness and the cogito is to purge the transcendental field of all resemblance” (1990: 123). For, if we are simply understanding the given *qua* given, then our conception of the new, of creation, of things not being the way they are, is limited to an eternal rearrangement of the given, in all its glorious diversity, that is unable to grasp how the given could be given otherwise. We remain within a bare repetition, shorn of difference. This is why, Deleuze says, “[t]he domain of laws must be understood, but always on the basis of a Nature and a Spirit superior to their own laws, which weave their repetitions in the depths of the earth and of the heart, where laws do not yet exist” (25).

Deleuze occasionally describes his project as a “transcendental empiricism”[293] – a seemingly oxymoronic play on Kant’s transcendental idealism that provocatively draws it together, transductively we could say, with the Humean empiricism whose ostensible limitations it was meant to address. He also describes this transcendental empiricism as a “science of the sensible” (56) and argues that if we want to understand the genesis of real experience as opposed to merely the conditions of possible experience (this being the Kantian project that falters in tracing the transcendental from the empirical) then we need to plunge into the depths of the earth and of the heart in order to seek out difference qua difference. Deleuze’s argues:

> Empiricism truly becomes transcendental, and aesthetic an apodictic discipline, only when we apprehend directly in the sensible that which can only be sensed, the very being of the sensible: difference, potential difference and difference in intensity as the reason behind qualitative diversity. It is in difference that movement is produced as an "effect", that phenomena flash their meanings like signs. The intense world of

[293] This term, while it has become something of a standard descriptor for Deleuze’s thought, is not one he himself uses particularly often; indeed, in *Difference and Repetition* it only appears a handful of times and within his broader oeuvre it is mostly limited to his engagements with Kant.

> difference, in which we find reason behind qualities and the being of the sensible, is precisely the object of a superior empiricism. (1994: 56-7)

This description of Deleuze's science of the sensible in many ways repeats Simondon's theory of individuation, albeit a repetition with difference. Like Simondon, Deleuze is arguing that "[b]eneath the actual qualities and extensities, species and parts, there are spatio-temporal dynamisms" and that these "are ordinarily hidden by the constituted qualities and extensities" (1994: 214) – that we mistake a single phase of being for polyphasic becoming. Similarly, Deleuze describes an initial disparation – of differences between differences – that gives rise to the sensible or qualitative diversity by generating an effect: transductive unfolding or movement. This intense, dynamic world of difference and becoming in turn cannot be thought representationally given that "in the dynamic order there is no representative concept, nor any figure represented in a pre-existing space" but instead "a pure dynamism which creates a corresponding space" (20).

5.4.2 Difference differing

If we cannot think representationally, however, then how do we think about these differences between differences? To pose the same question as Simondon, how do we practice a rigorous transcendental empiricism – "a liberation of thought from those images which imprison it"? (Deleuze 1994: xvii) Deleuze employs a vast and motley array of resources, from domains as far afield as differential calculus and American literature, in this ongoing experiment, and the solutions he provides, both alone and together with Guattari, differ substantially across a career that spanned half a century. *Difference and Repetition* is, however, his most sustained and well-known attempt, and is thus as good a place as any to begin. In the introduction to this book, Deleuze explains that he has attempted to "constitute a philosophical concept from the mathematical function of differen*t*iation and the biological function of differen*c*iation" (xvi) in order to think the genesis of experience. There are two near-identical terms involved here: differen*t*iation and differen*c*iation. For Deleuze, the differen*c*iation studied by biology, which examines the diverse ways in which life is expressed, its various qualities and extensities, is the outcome of a process of individuation that itself relies on an initial dynamic of disparation – of difference differing. Individuation, in other words, "is the act by which intensity determines differential relations to become actualised, along the lines of differen*c*iation and within the qualities and extensities it creates" (246). Deleuze coins a remarkably clunky term to describe this dynamic: *indi-drama-different/ciation*. I will return to the idea of *drama* below, but for now, it should provisionally be thought of as a literal acting out or expression of pre-individual tensions as these become progressively embodied in an individuated being. Here is how Deleuze summarises the full ontogenetic scope of indi-drama-differen*t*/*c*iation:

> (1) the depth or spatium in which intensities are organised; (2) the disparate series these form, and the fields of individuation that they outline (individuating factors); (3) the "dark precursor" which causes them to communicate; (4) the linkages, internal resonances and forced movements which result; (5) the constitution of passive selves and larval subjects in the system, and the formation of pure spatio-temporal dynamisms; (6) the qualities and extensions, species and parts which form the double differenciation of the system and cover over the preceding factors; (7) the centres of envelopment which nevertheless testify to the persistence of these factors in the developed world of qualities and extensities. (Deleuze 1994: 277-8)

While this highly condensed and terminologically rich encapsulation of 300 pages of densely argued philosophy is undoubtedly abstruse, especially out of context, it should be noted how closely it hews to Simondon's account of individuation. We have the depth or tensional pre-individual field which comprises a kind of self-differing difference; these differences form disparations, differences between differences that generate, in Simondon's terms "signs" or "information" – communication. This gives rise in turn to transduction, which operates, as we saw, via what both Simondon and Deleuze term resonances; there is a subsequent phasing or iterative becoming of being that is simultaneously a spatiotemporal emergence; the ensuing individuated being, a single phase of being, is differenciated (it enters into the diversity of the world as a term among other terms and, in its givenness, comes to occlude that by which it is given). Finally, individuated being, if it is a living being, retains an associated milieu, operating as a centre of envelopment for the metastability that remains unexhausted in this unfolding. Perhaps this is still somewhat obscure. In that case, consider the egg, a beloved example frequently employed by Deleuze and Guattari. An unfertilised egg cell or gamete can be thought of as a pre-individual field rich in biological potential; fertilisation of the gamete acts as a "dark precursor" that transforms it into a zygote – a bringing together of disparate series (in this case including the DNA of the respective parents) that results in the forced movements of cellular division, folding and so forth that in turn distribute intensities across the embryo, the various polarities, gradients and so forth constituting spatio-temporal dynamisms that eventually concretise into a fully extended, differenciated being that retains various individuating functions – metabolic, for instance. In this regard, Deleuze says, "the egg, in effect, provides us with a model for the order of reasons … differentiation-individuation-dramatisation-differenciation" (1994: 231). He continues:

> We think that difference of intensity, as this is implicated in the egg, expresses first the differential relations or *virtual* matter to be organised. This *intensive* field of individuation determines the relations that it expresses to be incarnated in spatia-temporal dynamisms (dramatisation), in species which correspond to these relations (specific differenciation), and in organic parts which correspond to the distinctive points in these relations (organic differenciation). Individuation always governs *actualisation*: the organic parts are induced only on the basis of the gradients of their intensive environment; the types determined in their species only by virtue of the individuating intensity. (Deleuze 1994: 231; my emphasis)

Above, I emphasised three terms: *virtual*, *intensive* and *actual*. Deleuze occasionally describes the virtual – a term he appropriates from Bergson, for whom it describes, roughly, the accumulation of the past that inheres in and haunts lived duration, as memory, for instance – as *potential*, which may suggest that it is equivalent to the notion of the *possible*. This, however, is entirely the opposite of what Deleuze intends by the term: the modality of possibility merely extrapolates from the given in order to imagine other ways in which the given can be distributed – it is contrasted in this regard with the reality of the given. The virtual, on the other hand, is fully real, albeit not actual or yet actualised, though it could, at any given time become so, depending on contingent factors. In this regard, the virtual and the intensive can be provisionally understood as replacing Simondon's notion of the pre-individual or metastable. As Deleuze explains, "genesis takes place in time not between one actual term, however small, and another actual term, but between the virtual and its actualisation – in other words, it goes from the structure to its incarnation, from the conditions of a problem to the cases of solution, from the differential elements and their ideal connections to actual terms and diverse real relations which constitute at each moment the actuality of time" (1994: 183). In other words, the virtual is a contingent "structure" consisting of differentiative dynamisms within which disparations emerge (the "conditions of a problem"), via *dark precursors*[294] that transductively – intensively – give rise to processes of individuation-differen*c*iation – with a *c* – which, in turn, establishes the *actual* ("solutions" to the mentioned virtual problems), including spatiotemporality itself.

The interplay of the virtual, intensive and actual is therefore analogous to the whole dynamic of indi-drama-different/ciation. As Deleuze puts it, "[w]hereas differen*t*iation determines the virtual content of the Idea as problem, differen*c*iation expresses the actualisation of this virtual and the constitution of solutions" (209). What is important here is that Deleuze describes the virtual, which he regards as being "real without being actual" (213), as contingently structured. Clearly, however, this cannot be the structure of actualised identity and good sense – as a well-established spatial and temporal distribution of discrete terms. Instead, Deleuze will argue, by way of the differential calculus, that the virtual comprises reciprocally determining differential relations, meaning structure here denotes dynamic relations and processes rather than something that is static or an essence.

[294] The classic example of a dark precursor Deleuze provides (1994: 28; 118) is of the production of lightning, which is preceded by a disparative bringing together of different orders of electrical potential between sky and ground – this being a virtual problem that is resolved by the electrical discharge represented by a bolt of lightning.

The use of the calculus here, while it may seem arcane, is ingenious. Differential calculus is used to calculate the instantaneous rate of change of quantities, i.e., to study these rates *continuously*. The example of a function that plots a sine wave on a 2D graph can be held in mind here. At any moment in time, this sine wave has an angle – or rate – of curvature relative to any one of its axes. For such a differentiable function we can find the derivative, i.e., the instantaneous rate of curvature, by calculating the slope of the tangent via *dy/dx* (the dimensions of the graph) where the quantities in question become infinitesimal (i.e., an infinitesimally small number that is still greater than zero). In this way, the formalism of *dy/dx* is nothing other than a way of signifying difference in itself. Dan Smith helpfully explains that "the relation continues even when the terms of the relation have disappeared" (2012: 53). Furthermore, *dy* and *dx* are wholly undetermined until they are brought into this relation of disparation, at which point they become a difference that makes a difference that may in turn form part of a transductive determination of the actual wherein *dy* and *dx* gain particular values. In Deleuze's words, "a principle of *determinability* corresponds to the undetermined as such *(dx*, *dy*); a principle of *reciprocal determination* corresponds to the really determinable (*dy*/*dx*); a principle of *complete determination* corresponds to the effectively determined (values of *dy*/*dx*). In short, *dx* is the *Idea* – the Platonic, Leibnizian or Kantian Idea, the 'problem' and its being" (171; my emphasis).

5.4.3 Multiplicities, vice-dictions and the power of dy/dx

What Deleuze has accomplished in this move is to conceive of the virtual – as that by which the given is given – in a manner that does not fall prey to tracing the transcendental from the empirical, as Plato, Kant and so on do. There is no identity in *dy/dx*, but merely a principle of differentiation. In fact, "[e]ach term exists absolutely only in its relation to the other: it is no longer necessary, or even possible, to indicate an independent variable" (171) and it is this that constitutes the structure of the virtual[295]. Let me make this clearer, especially what is meant by the notion of the Idea, by returning to our discussion of the egg. Here, consider the role played by genes in the individuation of an organism. These "genes express differential elements which also characterise an organism in a global manner, and play the role of distinctive points in a double process of reciprocal and complete determination; the double aspect of genes involves commanding several characteristics at once, and acting only in relation to other genes; the whole constitutes a virtuality, a potentiality; and this structure is incarnated in actual organisms" (185). It is not that the physical genes are themselves

[295] "We have seen that a double process of reciprocal determination and complete determination defined that reality: far from being undetermined, the virtual is completely determined." (Deleuze 1994: 209)

somehow “virtual”, but that the genetic code is a differential dynamism expressed in embryological unfolding. Such differential dynamisms, the structures of the virtual, are described by Deleuze as Ideas. There is thus an Idea of the being that is individuated from the fertilised egg that virtually inheres in the real – but not yet actual – differential relations comprising the genome. Such an Idea is not a transcendent ideal form but wholly immanent to being, just as we carry genes and all their transformative potential in every cell of our individuated bodies. Deleuze will also variously describe Ideas as problems, in a manner that has already been shown, and, more importantly, as *multiplicities*. He gets this term from the mathematician Riemann and, as Sarti *et al.* point out, the French term *multiplicité* comes from the German *mannigfaltigkeit*, which is usually translated into English as *manifold* (2022: 33). The mathematical notion of a manifold, as we will soon see, acts as an important mediator – a dark precursor – making it possible to bring Deleuzian philosophy together with systems theory, psychedelic neuroscience and several other domains we have discussed.

How exactly does Deleuze define multiplicities though? First of all, “multiplicity must not designate a combination of the many and the one, but rather an organisation belonging to the many as such, which has no need whatsoever of unity in order to form a system” (1994: 182)[296]. To think in terms of the one and the many is to think from the established, to mistake a single phase of being for multiphased becoming; thus, “[i]nstead of the enormous opposition between the one and the many, there is only the variety of multiplicity – in other words, difference” (ibid.). Multiplicities are thus neither one nor many nor a combination thereof, but the *more than unity as such* – the *metastable*[297]. They comprise disparate series, which they draw together as virtual Ideas. The most straightforward example of such a multiplicity is colour: if “[a]n Idea is an *n*-dimensional, continuous, defined multiplicity” (one dimension for each of the series) then “[c]olour – or rather, the Idea of colour – is a three-dimensional multiplicity” (ibid.)[298]. Given that the virtual is not a metric space comprising discrete identities, however, it is the case that “Ideas are complexes of coexistence. In a certain sense all Ideas coexist, but they do so at points, on the edges, and under glimmerings which never have the uniformity of a natural light” (186) – they are “perplicated”. The reality of the virtual is simply the reality of imbricated multiplicities. There is no containing dimension or space within which they exist (“the multiplicity is intrinsically defined, without external reference or recourse to a

[296] Technically, to extend Deleuze’s use of mathematical concepts, “[a] manifold overcomes the dichotomy between the multiple and the one because it is a unique geometrical object and a union of local charts.” (Sarti *et al.* 2022: 34)
[297] “It was a decisive event when the mathematician Riemann uprooted the multiple from its predicate state and made it a noun, ‘multiplicity.’ It marked the end of dialectics and the beginning of a typology and topology of multiplicities.” (Deleuze and Guattari 1987: 482-3)
[298] Three dimensional for humans that is, given that we enjoy trichromatic vision, i.e., we have, loosely speaking, three distinct colour-sensing cones for red, green and blue.

uniform space in which it would be submerged" (183)). Instead this space, which is sometimes described by Deleuze as the plane of immanence or consistency, is entirely exhausted by the multiplicities in which it consists[299].

I will briefly return to the Idea of colour. No given experience or expression of colour, in all its glorious trichromatic diversity, exhausts the Idea of colour. Actualisations of virtual multiplicities are non-exhaustive in this way, just as a single individuation of being does not exhaust the pre-individual funds. This does not mean, however, that these multiplicities are eternal Platonic forms; instead they are what Deleuze describes as concrete universals: wholly immanent to the actual but in excess of it[300]. Or, then, real but not actualised or perceived. Colour would not exist outside of its various actualisations, but nor do these actualisations exhaust colour. It is a concrete universal – a differential relation that is "actualised in diverse spatio-temporal relationships" (183). In this sense, a multiplicity is, Deleuze argues, a reconciliation of genesis and structure, "a system of multiple, non-localisable connections between differential elements which is incarnated in real relations and actual terms" (ibid.). Ideas, virtual multiplicities, problems, are, in short, the ontogenetic dynamisms that give rise to everything from "mathematical relations and realities … to physical laws and facts," while still others "correspond to organisms, psychic structures, languages and societies: these correspondences without resemblance are of a structural-genetic nature" (183-4).

Deleuze will go on to define virtual multiplicities[301], and by extension the virtual, in great detail using a number of mathematical resources, and he will also present a method he calls *vice-diction* via which we can "follow and describe" these multiplicities (189). More importantly, he elaborates a process he terms counter-actualisation that occupies a difficult part of his conceptual terrain given that it has been interpreted variously as an ethical imperative (to change the conditions that lead to actualisation) or a merely passive vice-dictive

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[299] As DeLanda puts it, "[a] Deleuzian multiplicity takes as its first defining feature these two traits of a manifold: its variable number of dimensions and, more importantly, the absence of a supplementary (higher) dimension imposing an extrinsic coordinatization, and hence, an *extrinsically defined unity*." (2002: 5)

[300] "Ideas are by no means essences. In so far as they are the objects of Ideas, problems belong on the side of events, affections, or accidents rather than on that of theorematic essences." (Deleuze 1994: 187)

[301] I use the term v*irtual multiplicity* as a cautionary reminder because Deleuze also occasionally discusses the actual in terms of multiplicities; in the former case, multiplicities are *continuous*, in the latter, *discrete*.

countenancing (or "becoming worthy of") ongoing ontogenesis[302]. I will briefly examine both these terms.

As multiplicities are not Platonic ideal forms, the aim of vice-diction is not to determine their essence, but instead to evaluate them in terms of what is important; specifically, in terms of "the distribution of singular and regular, distinctive and ordinary points" (ibid.). Earlier, it was noted that Deleuze describes multiplicities as systems of connections between differential elements and recall that the virtual can be understood as an ongoing process of differentiation; what this means is that these differential relations that comprise multiplicities should not be thought of as static snapshots, but as *series*. In the sine wave, for instance, there is a continuous series of shifting relations between dy/dx as we traverse the curve. Most of the points in these series are "ordinary" in the sense that they represent merely a slight change in the relation – a small change in an upward angle, for instance – but at some points, at the peaks and troughs of the sine wave, we can find "singular" points where the curvature changes direction (e.g., the upward arc of the wave now arcs downwards). Alternatively, a square may be considered: there are four singular points (the edges) and innumerable ordinary points between them (on the lines). If this seems trite, consider a more complex phenomenon like a desert flower that blooms only once every year. If we consider this flower and its ecological context, in which climate and other intersecting conditions form part of the virtual multiplicity that comprises series of differential relations, then we can see that most values of these relations are ordinary but at a certain threshold of values something remarkable happens. Singular points thus mark out transformative thresholds in a series, liminal zones past which the respective multiplicity expresses itself qualitatively differently[303].

Deleuze also describes the breaching of these thresholds as *events*: the desert flower expresses the infinitive event *to bloom* – an event that has both an actual (this flower) and a virtual (a singularity, a point of flowering) side. By extension, to practice vice-diction is to

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[302] It is surprising that neither of these terms – vice-diction or counter-actualisation/counter-effectuation – appears in the two highly commendable Deleuze dictionaries/glossaries (Parr 2010; Bonta and Protevi 2004). While these terms fall away in the later collaborative work with Guattari, they are part of the core conceptual apparatus of *Difference and Repetition* and *Logic of Sense* and it is surprising that they are not paid much attention in the secondary literature, perhaps being neglected in favour of more polemically charged concepts like becoming and the Body without Organs.

[303] Technically, if we view the virtual as a differential continuum of heterogeneous but coexistent – perplicated – multiplicities, then "[t]he singularities of a complex curve are the points in the neighborhood of which the differential relation changes sign (focal points, saddle points, knots, etc.); the curve increases, the curve decreases. These points of increase or decrease are the singular points of the curve; the ordinary points are what constitute the series between the two singularities … the continuum is the prolongation of a singularity over an ordinary series of points until it reaches the neighborhood of the following singularity, at which point the differential relation changes sign, and either diverges from or converges with the next singularity." (Smith 2012: 56)

attempt to grasp the ontogenetic dynamisms that give rise to being in terms of these thresholds – to know being not in terms of how it is given but in terms of the metastable potentials structuring how it could be given otherwise. According to Deleuze, vice-diction technically has two faces. On the one hand, we determine the conditions of the problem (multiplicity) by mapping out its singular and ordinary points through the "specification of adjunct fields", which simply means that we determine the relevant disparative dynamics at play, i.e., which entanglements with other multiplicities are relevant (the multiplicity comprising the weather is imbricated with the multiplicity comprising the flowering desert plant, for instance)[304]. On the other hand, "we must condense all the singularities, precipitate all the circumstances, points of fusion, congelation or condensation in a sublime occasion … *which makes the solution explode* like something abrupt, brutal and revolutionary" (Deleuze 1994: 190; my emphasis). In other words, if my emphasis is correct then the second step in vice-diction is, arguably[305], to act as a dark precursor that brings together disparate series in order to effectuate transduction. In another sense, these two aspects of vice-diction can be understood as what I earlier described as reciprocal and complete determination[306].

5.4.4 Counter-actualising the present

What, then, is counter-actualisation? Deleuze provides a particularly allusive description in *Logic of Sense*, where he avers that to counter-actualise is "to be reborn, to have one more birth, and to break with one's carnal birth – to become the offspring of one's events and not of one's actions, for the action is itself produced by the offspring of the event" (1990: 149-50).

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[304] "[W]e must in effect discover the adjunctions which complete the initial field of the problem as such – in other words, the varieties of the multiplicity in all its dimensions, the fragments of ideal future or past events which, by the same token, render the problem solvable; and we must establish the modality in which these enclose or are connected with the initial field." (Deleuze 1994: 190)

[305] I use the word *arguably* because there are divergent readings of vice-diction and Deleuze is not always consistent in how he presents the term. For some readers, the situation is roughly how I described it, with vice-diction constituting a "moving from the differenciated event token to the differentiated
event type" (Protevi 2013: 12), whereas others view it more as an ethical imperative ("The concept of vice-diction is Deleuze's answer to the question of how to live with the way virtual Ideas and, therefore, pure differences condition our actions. This leads to answers to the question of how to act" (Williams 2003: 168)), while still others gloss vice-diction as a merely passive ontological procedure (equivalent to Deleuze's "static ontological genesis" in *Logic of Sense*, whereas in this text it is in fact associated more closely with *dynamic* genesis), i.e., as "a metaphysical process, movement or procedure through which identity is produced from difference" (Tissiander). I do not find this last reading convincing as it seems to conflate vice-diction with different/ciation itself, whereas Williams's reading elides possible differences between vice-diction and the closely related counter-actualisation, which to me seems to hold more specifically ethico-political valence.

[306] Complicating matters, the term condensation of singularities was coined in 1927 by the mathematicians Stefan Banach and Hugo Steinhaus and was developed within the field of functional analysis, which studies various kinds of vector spaces. They define the term as "a method … which consists in constructing an object enjoying an infinity of singularities from objects (in infinite number) which each have only one singularity" (1927: 50; my translation).

Simply put, if we remain stuck within the established and limit transformative potential to a rearrangement of what surrounds us in actuality, thus, if we view the given as delimiting the scope of change, then we are not able to be reborn. We cannot change the conditions by which the given is given or our relation to them: we remained trapped within a single actualisation of the event. If, on the other hand, we practice vice-diction in order to determine the metastable conditions of the problems that we are, then we can *counter-actualise* – willing the two faces of the event differently in a practice that is less a voluntarism than a rigorous practice of *amor fati*. As Deleuze explains, "[t]o the extent that the pure event is each time imprisoned forever in its actualization, counteractualization liberates it, always for other times" (161). The ethical imperative here seems clear: instead of succumbing to what we saw in Simondon was the passive death – the exhaustion of the pre-individual funds – we are able to undertake a different kind of death, a counter-actualised death of the currently individuated on behalf of new individuations. Here, "[e]ach individual would be like a mirror for the condensation of singularities and each world a distance in the mirror. This is the ultimate sense of counter-actualization" (Deleuze 1990: 178)[307]. As Leonard Lawlor points out, "[m]aintaining the unlimited nature of the event or sense is always the aim of counter-actualisation" (2022: 121)[308].

As I argued earlier, the notions of vice-diction, and more so counter-actualisation, are alluded to by Simondon, but he did not pursue the matter further. In fact, as Audronė Žukauskaitė has recently observed, this marks an important difference between the Simondonian conception of the pre-individual and the Deleuzian conception of the virtual: "for Simondon the shift from the pre-individual to the process of individuation is necessary, one-directional and irreversible, whereas for Deleuze the transition from the virtual to the actual is quasi-causal, multiple, and can be followed by counter-actualisation" (2023: 64). Importantly, she continues "[t]his double relationship between the virtual and the actual organises the whole theoretical structure of Deleuze and Guattari's *A Thousand Plateaus*" (ibid.). In shifting our gaze to this later book, it can be seen how counter-actualisation is transformed into better-known concepts like the creation of the Body without Organs, lines of flight and becoming. To allay any concern that I

[307] Deleuze describes counter-actualisation as dynamic genesis, in contrast with the static genesis that gives rise to individuated being through indi-drama-different/ciation.
[308] Lawlor, in one of the most sustained attempts to grapple with the full meaning of counter-actualisation, describes it has having five senses: "beatitude against resentment … denouncing any one determinate answer … the embodiment of plural hopings and rememberings against the embodiment of one hope and one memory … 'just enough' against 'too much' (against suicide) … universal freedom" (2022: 112-3).

have been singularly focused on this aspect of Deleuze's thought, I will demonstrate how psychedelics are quintessential agents of counter-actualisation.

5.5 The whispering of the nagual: Deleuze, Guattari and the psychedelic Body without Organs

> The wisdom of the plants: even when they have roots, there is always an outside where they form a rhizome with something else – with the wind, an animal, human beings. (Deleuze and Guattari 1987: 11)

> I prefer the people who eat right out of the earth the delirium that gave
> birth to them,
> I am speaking of the Tarahumaras
> who eat Peyote straight from the soil
> while it is born,
> and who kill the sun in order to establish the kingdom of black night,
> and who split the cross so that the spaces of space will never again meet
> or cross. (Artaud 1995: 286).

5.5.1 Naturalising the virtual

A Thousand Plateaus (1987), written just over a decade after *Difference and Repetition* (1994), in collaboration with Félix Guattari, is sometimes seen as a move away from the tripartite structure of the virtual, intensive and actual in favour of a more naturalist and generalised view of becoming. If the conceptual architecture is considered in terms of synthesis, for instance, it is the case that in the later book, the authors "explicitly thematize that the syntheses are no longer bound to 'experience', however widespread, but are fully material syntheses, syntheses of nature in geological as well as biological, social, and psychological registers" (Protevi 2011: 50). In short, as John Protevi notes, the former book can be viewed as "the full naturalization of the somewhat still Kantian notion of a transcendental philosophy in which objects 'incarnate' Ideas," with vice-diction, "whereby 'thought' moves from an actual product to its transcendental conditions" is replaced by material dynamisms (2013: 214;fn5). At first gloss, these dynamisms can be understood in a manner similar to Simondon's distinction between concrete and abstract, or indeed between individuated and individuating, via their degrees of fixity or flux respectively. Deleuze and Guattari thus discuss systems, bodies, thought and so forth in terms of how stratified or destratified they are, with various other pairs of terms fulfilling analogous roles in different registers: territorialised-deterritorialised, smooth-striated, rhizomatic-arboreal and so forth.

Deleuze and Guattari are not positing binary oppositions here: they are instead marking out the extrema of continua that can be occupied in various ways by spatiotemporal dynamisms (which is what systems, bodies, thoughts and so forth consist of), which, as Protevi notes, in the later work shift from being "schemalike dramatizations mediating virtual Ideas and actual

objects" to being "simply immanent material haecceities, compositions of the movements and affects of bodies" (ibid.)[309]. In a sense, *A Thousand Plateaus* shifts the relation between virtual, intensive and actual by seeing the virtual and actual not as no longer two separate entirely domains but instead as the respective limits of the intensive – extremes of the speeds and slownesses of which everything consists: "[s]peed and slowness, movement and rest, tardiness and rapidity subordinate not only the forms of structure, but also the types of development" (Deleuze and Guattari: 1987: 255).[310] This is not to say that the dynamic of indi-drama-different/ciation simply disappears, but it gains a different valence, with less focus on the transcendental genesis of experience and more on how, from experience, one can attain transcendental genesis; how, in a word, one can counter-actualise. As Alberto Toscano puts it, "[t]he individuations that Deleuze and Guattari foreground in *A Thousand Plateaus* are not of the sort that engender individuals; rather, they traverse already constituted individuals, drawing them towards impersonal becomings, compositions of one multiplicity with another" (2006: 176).

Crucially, these "individuals" are not simple unified wholes, but instead, as we saw with Simondon, living beings that are transductively constituted by the pre-individual charge they have internalised as an associated milieu in relation – or resonance – with the transindividual. Living beings are thus better viewed as messy, entangled and structurally open – precariously adaptive system-environment asymmetries. Deleuze and Guattari use the term mac*hinic assemblage*[311] to describe the complex status of such living beings, although there are all manner of other assemblages too, from the inorganic to the linguistic to the political. An assemblage can be thought of as a provisional, incomplete arrangement of various forces and dynamisms that has gained a certain degree of stability, but which simultaneously houses potentially destabilising forces. All of being is like this. Deleuze and Guattari assert that "[y]ou

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[309] The term *haecceity*, which comes from Duns Scotus and which is employed frequently by Deleuze and Guattari, is synonymous with "thisness" or "uniqueness" and is meant to point out the singular nature of a particular being, event or so forth *in terms of the eventality it expresses – the way it limns a particular intersection of individuative forces*. "There is a mode of individuation very different from that of a person, subject, thing, or substance. We reserve the name haecceity for it. A season, a winter, a summer, an hour, a date have a perfect individuality lacking nothing, even though this individuality is different from that of a thing or a subject. They are haecceities in the sense that they consist entirely of relations of movement and rest between molecules or particles, capacities to affect and be affected." (Deleuze and Guattari 1987: 261)

[310] As Protevi notes, "[n]either the organism nor the BwO exists as a transcendent entity; both are the limits of intensive processes." (2018: 107)

[311] *Assemblage* is, notably, a translation of the French term *agencement*, or "agency-ing", which in turn connotes the idea they're aiming at more accurately with its processual sense. As several others have, Taylor Adkins argues in his translator's preface to Axel Cherniavsky's recent *Deleuze, Philosophy and the Creation of Concepts* that "arrangement" is a more accurate translation if we are to "avoid the mechanistic overtones of 'assemblage' and the implication that it joins together elements that already resemble one another, thereby violating the rhizomatic principle of the connection of *heterogeneous* singularities." (Adkins in Cherniavsky 2024: x)

will never find a homogeneous system that is not still or already affected by a regulated, continuous, immanent process of variation" (1987: 103). In this regard, "[o]ne side of a machinic assemblage faces the strata, which doubtless make it a kind of organism, or signifying totality, or determination attributable to a subject; it also has a side facing a *body without organs*, which is continually dismantling the organism, causing asignifying particles or pure intensities to pass or circulate, and attributing to itself subjects that it leaves with nothing more than a name as the trace of an intensity" (Deleuze and Guattari 1987: 4).

An assemblage is thus a way of thinking about reality as *intensive process*; on the one hand, we have non-exhaustive actualisations of being (stratifications), while on the other we have counter-actualisation, the creation of a Body without Organs (BwO) that is the pre-individual funds from which particular organisations of the given arise and to which they return. Assemblages express and reflect the multiplicities – the resonating series of singular and ordinary points, or 'abstract machines' – of which they consist[312].

To reiterate an earlier point, the BwO or pre-individual is not the undifferentiated – the equivalent of some kind of homogeneous abstract solution at equilibrium. Instead, it "is permeated by unformed, unstable matters, by flows in all directions, by free intensities or nomadic singularities, by mad or transitory particles" (40) that come to be captured through processes of stratification, of "giving form to matters, of imprisoning intensities or locking singularities into systems of resonance and redundancy, of producing upon the body of the earth molecules large and small and organizing them into molar aggregates" (ibid.). The creation of a BwO is thus the fight against this imprisonment, an opening up to metastability: the BwO is polyphasic being and to cultivate it is to undertake a careful practice wherein the aforementioned speeds and slownesses are curated in such a way as to bring about transformations that go not from actual to actual but from the virtual to its actualisation.

5.5.2 Awakening the *nagual*, making the Body without Organs

There is something profoundly psychedelic about chapter six of *A Thousand Plateaus*, beginning with its title: "November 28, 1947: How Do You Make Yourself a Body Without Organs?" This date marks the end of the recording of Antonin Artaud's notorious radio play, *Pour en Finir avec le Jugement de Dieu* (To have done with the judgment of God). Artaud and

[312] Technically, the machinic assemblage "effectuates the abstract machine on a particular stratum" (Deleuze and Guattari 1987: 71) – effectuation is equivalent to actualization in Deleuze's work. The abstract machine, for its part, "is pure Matter-Function – a diagram independent of the forms and substances, expressions and contents it will distribute" (141). Elsewhere, they are described as "plateaus of variation" (511) and "cutting edges of deterritorialization" (510). Regardless, "[t]here is no abstract machine, or machines, in the sense of a Platonic Idea, transcendent, universal, eternal. Abstract machines operate within concrete assemblages" (ibid.).

his peyote experiences with the Tarahumaras in Mexico were introduced in an earlier chapter and it was seen how he interpreted these experiences along the lines of the death, rebirth, transformation dynamic that I have argued is the core feature of the psychedelic experience (as well as, we are discovering, the core dynamic of individuation and counter-actualisation). In Artaud's play, he rages against the organisation of the body, about the imposition of a particular stable form or what he elsewhere calls "provisional stratifications of states of life" (1964: 148). Artaud would like to craft for himself a BwO in order to be done with this "judgment of God" that consigns being to a single phase while eliding the pre-individual.

While Michaux, who was also encountered earlier and who similarly appears in this chapter, was strongly averse to such transformative experiences, Artaud, it seems, would have liked to – and very likely did – leap headlong into the wildest of counter-actualisations. As Artaud's biography reminds us, however, creating the BwO is not without risks. Indeed, we need to exercise great caution in how we approach this task. Here, Deleuze and Guattari turn to one of the most unlikely figures, albeit one that haunts a surprising number of chapters in *A Thousand Plateaus*: the controversial Western anthropologist Carlos Castaneda, whose books written the late 1960s and early 1970s, including *The Teachings of Don Juan*, *A Separate Reality* and *Journey to Ixtlan*, couched psychedelic guidance within fiction within pseudo-ethnographic accounts of his supposed tutelage under the shaman Don Juan. At first blush it is strange that Deleuze and Guattari would want to have anything to do with this kind of Anglophone hippie literature, but upon closer perusal, it is clear why they choose Castaneda as one of their preferred mediators in the development of their own guidebook, specifically his concepts of the *tonal* and the *nagual*.

These terms are introduced to Castaneda by the most likely fictional Don Juan as part of his apprenticeship as a psychedelic sorcerer: "The *tonal* is the organizer of the world … Perhaps the best way of describing its monumental work is to say that on its shoulders rests the task of setting the chaos of the world in order." (Castaneda 1974: 122). In fact, "[t]he *tonal* is everything we know … And that includes not only us, as persons, but everything in our world. It can be said that the *tonal* is everything that meets the eye. We begin to groom it at the moment of birth. The moment we take the first gasp of air we also breathe in power for the *tonal*. So, it is proper to say that the *tonal* of a human being is intimately tied to his birth." (124)

However, "[t]he *tonal* makes the world only in a manner of speaking. It cannot create or change anything, and yet it makes the world because its function is to judge, and assess, and witness" (125). The tonal, in other words, is "the judgment of God" – it is the stratification of the body, the single phase of being that occludes the pre-individual field and entrenches the dogmatic image of thought – the view from the given. When it becomes hegemonic, the *tonal* is what results in the passive death Simondon warns us of. This becomes especially clear when Don

Juan observes that “the tonal in all of us has been made into a petty and despotic guard when it should be a broadminded guardian” (123).

On the other hand, the *nagual* is the virtual – the metastable field: “[t]he *nagual* is the part of us for which there is no description – no words, no names, no feelings, no knowledge” (126). The reality of the situation, Don Juan declares, is that “we are fluid, luminous beings made out of fibers. The agreement that we are solid objects is the *tonal*’s doing” (159). However, “[b]eyond the gate of the *tonal*’s eyes the wind rages. I mean a real wind. No metaphor. A wind that can blow one’s life away. In fact, that is the wind that blows all living things on this earth” (176). Throughout Castaneda’s book, he describes a complex, delicate interplay of the *tonal* and the *nagual*, presenting the achievement of provisional balance between the two in near-Nietzschean terms – the will to power of the sorcerer, who does not wish to wholly abolish the *tonal* but instead to properly situate it vis-à-vis the creative dynamism of the *nagual.* As Don Juan says, “one of the balancing arts of the warrior is to make the *nagual* emerge in order to prop up the *tonal*. I say it is an art, because sorcerers know that only by boosting the *tonal* can the *nagual* emerge” (161). The dance of the *tonal* and the *nagual* is profoundly resonant with the creation of the BwO and in fact Castaneda goes quite far in developing his own critique of the tracing of the transcendental from the empirical:

> I sincerely contended that in European thought we had accounted for what he called the “nagual.” I brought in the concept of the Transcendental Ego, or the unobserved observer present in all our thoughts, perceptions and feelings. I explained to D?on Juan that the individual could perceive or intuit himself, as a self, through the Transcendental Ego, because this was the only thing capable of judgment, capable of disclosing reality within the realm of its consciousness. Don Juan was unruffled. He laughed. “Disclosing reality,” he said, mimicking me. “That’s the tonal.” I argued that the “tonal”’ may be called the Empirical Ego found in one’s passing stream of consciousness or experience, while the Transcendental Ego was found behind that stream. “Watching, I suppose,” he said mockingly. “That’s right. Watching itself,” I said. “I hear you talking,” he said. “But you're saying nothing. The nagual is not experience or intuition or consciousness. Those terms and everything else you may care to say are only items on the island of the tonal. The nagual, on the other hand, is only effect. The tonal begins at birth and ends at death, but the nagual never ends. The nagual has no limit.” (Castaneda 1974: 140-1)

Below, I will examine how Deleuze and Guattari approach the task of making oneself a BwO. It is clear that this is a creative and experimental task, not an intellectual one. As they note, referring to a lesson Castaneda receives from Don Juan, the injunction is: “[e]xperiment, don't signify and interpret!” (1987: 138). This experimental task, in other words, entails opening oneself up to intensive, pre-individual forces, which is why they describe it as a form of *becoming*. Deleuze and Guattari also, importantly, discuss the creation of the BwO as a

dismantling of the self (151)[313]. If the way we find ourselves in the world is a result of a specific individuation, a single phase of being, then to contract a new individuation entails a dephasing of being, "singularities that can no longer be said to be personal, and intensities that can no longer be said to be extensive" (156). The proximity to the notion of ego death, drug-induced or otherwise, to creation of the BwO cannot be ignored. But what *is* the BwO? Deleuze and Guattari explain that it is not the individuated, i.e., it lacks extension. Instead, it is *populated* by intensities which it both produces and distributes; it is an intensive *spatium*, but also "matter that occupies space to a given degree – to the degree corresponding to the intensities produced … [p]roduction of the real as an intensive magnitude starting at zero." (153).

Perhaps anticipating that their description is too vague, they helpfully return to an example we've come across before: the egg. As they explain, the BwO can be understood as "the full egg before the extension of the organism and the organization of the organs, before the formation of the strata; as the intense egg defined by axes and vectors, gradients and thresholds, by dynamic tendencies involving energy transformation and kinematic movements involving group displacement, by migrations: all independent of accessory forms because the organs appear and function here only as pure intensities" (153).

Recall the discussion of the egg in *Difference and Repetition*; as I noted, Deleuze employs the embryological idea of a fertilised egg progressively individuating into a fully-formed being to exemplify his notion of indi-drama-different/ciation. There is something particularly interesting in the model of the egg, which seems to draw together notions of birth or becoming stretching from biology to cosmology to spirituality. Deleuze and Guattari observes that "[t]here is a fundamental convergence between science and myth, embryology and mythology, the biological egg and the psychic or cosmic egg: the egg always designates this intensive reality" (1987: 164). In other words, the BwO is this intensive reality – a pre-individual field or metastability qua metastability. To make the BwO is to unleash a renewed process of individuation, beginning with a vice-dictive specification of adjunct fields – determining the distribution of singular and ordinary points or abstract machine of which a given actual situation is the individuated shadow – and then condensing these singularities via the inception of a transductive process or becoming. Deleuze and Guattari underscore these two phases, the latter of which can also be grasped as an active genesis or counter-actualisation, as the fabrication of the BwO and subsequently of "making something circulate on it" (152), i.e., intensive processes.

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[313] Here, as in *Anti-Oedipus*, they contrast their method with that of psychoanalysis, with its endless interpretosis. As they say in *A Thousand Plateaus*, this is why psychoanalysis "botches the real" (1987: 151).

The full situation of counter-actualisation thus entails a complex different/cial-reciprocal relation between "the Body without Organs or the destratified Plane of Consistency; the Matter of the Plane, that which occurs on the body or plane (singular, nonsegmented multiplicities composed of intensive continuums, emissions of particles-signs, conjunctions of flows); and the abstract Machine, or abstract Machines, insofar as they construct that body or draw that plane or 'diagram' what occurs (lines of flight, or absolute deterritorializations)" (72). While I have not, for reasons of scope, elaborated on each of these Deleuzoguattarian neologisms, the core conceptual architecture should be evident, as should its deep resonances with the processes of individuation described by Simondon. In this regard, Deleuze and Guattari are particularly clear that the egg does not signify some form of regression; instead it can be considered "your own milieu of experimentation, your associated milieu" (164).

5.5.3 Becoming a psychedelic egg

Sometimes we have individuated badly. We are over-stratified: bound to rigid arrangements of the organism, signification and subjectification. Increasingly unable to contract our pre-individual funds, we suffer the passive death of stability, equilibrium, monophasic being – come to be trapped on the island of the *tonal*[314]. When this happens, a little more metaplasticity may help us disarticulate, unleash the bottom-up molecular flows that have been constrained by the molar hegemony of the DMN, enact a nomadic, experimental, non-signifying becoming that is also a transcendental empiricism: "motionless voyage, desubjectification" (159)[315]. Here, the fact that the creation of the BwO is repeatedly described as a radical *unselfing* or *desubjectification* should serve to underscore that it is not that each of us "has" a BwO that we can merely access – through peyote or otherwise – but that the BwO is instead the milieu as multiplicity, differentiated without being differenciated, within which selves emerge. Thus, the BwO assembles "elements, things, plants, animals, tools, people, powers, and fragments of all of these; for it is not 'my' body without organs, instead the 'me' (moi) is on it, or what

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[314] "The tonal seems to cover many disparate things: It is the organism, and also all that is organized and organizing; but it is also signifiance, and all that is signifying or signified, all that is susceptible to interpretation, explanation, all that is memorizable in the form of something recalling something else; finally, it is the Self (Moi), the subject, the historical, social, or individual person, and the corresponding feelings. In short, the tonal is everything, including God, the judgment of God … Yet the tonal is only an island." (Deleuze and Guattari 1987: 162)

[315] In the chapter on faciality that follows the BwO chapter, Deleuze and Guattari further explore the normative entanglements of processes of signification and subjectification as components of a "faciality machine" and argue that what is needed is the dismantling of the face and the creation of "probe heads" in a manner that is similarly evocative of the psychedelic experience (1987: 167-191). Later still, they reiterate the core ethos in a discussion of nomadic war machines, observing that "[t]o place thought in an immediate relation with the outside, with the forces of the outside, in short to make thought a war machine, is a strange undertaking." (376-7). I note this simply to underscore that my focus on the BwO chapter is to a certain extent arbitrary and that I could have drawn similar conclusions from various other chapters or, indeed, by tracing the subterranean rhizomatic flows across each of the plateaus.

remains of me, unalterable and changing in form, crossing thresholds)" (161). "'The nagual is there,' he said. 'There, surrounding the island. The nagual is there, where power hovers'" (Castaneda 1974: 127). This power, however, is not without its risks.

To create a BwO, psychedelically or otherwise, is to practice great care in the curation of flows; it matters immensely *how* we destratify, which specific relations of movement and rest we contract, which adjunct fields we specify, which singularities we condense[316]. While Deleuze and Guattari are sometimes erroneously criticised for the method of schizoanalysis they develop in *Anti-Oedipus*, which is an earlier gloss on the practice of creating the BwO[317], and which is commonly misconstrued as the inchoate liberation of desire for desire's sake, they are in fact frequently at pains to implore us to exercise caution. As they make clear throughout both *Anti-Oedipus* and *A Thousand Plateaus*, the "important thing is not to dismantle the *tonal* by destroying it all of a sudden. You have to diminish it, shrink it, clean it, and that only at certain moments. You have to keep it in order to survive, to ward off the assault of the *nagual*. For a *nagual* that erupts, that destroys the *tonal*, a body without organs that shatters all the strata, turns immediately into a body of nothingness, pure self-destruction whose only outcome is death" (162). Indeed, in their tone it is not hard to detect a critique of the excesses of the psychedelic counterculture of the 1960s, which both Deleuze and Guattari would have lived through[318]. As almost every psychedelic therapist, researcher or advocate I have discussed in the preceding chapters has pointed out, "in dismantling the organism there are times one

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[316] DeLanda interprets the condensation of singularities solely as the expansion of singularities into series (e.g., 2002: 75), but Deleuze sometimes appears to use the term to describe the inception of a process of transduction (e.g., 1994: 190), even though in other places he talks about the "condensation of singularities one into another" (201), i.e., as the differentiation of the virtual. In this regard, it is notable that Simondon's work is not cited in DeLanda (2002), even when clearly Simondonian terms are employed; it is interesting to consider how this would have affected his account.

[317] I provide a full account of schizoanalysis from the perspective of psychedelic therapy in Eloff (2023). Deleuze and Guattari explicitly recapitulate the schizoanalytic project of *Anti-Oedipus* in the later book in a manner that makes it clear that schizoanalysis and the creation of the BwO are essentially the same set of tasks: "What is your body without organs? What are your lines? What map are you in the process of making or rearranging? What abstract line will you draw, and at what price, for yourself and for others? What is your line of flight? What is your BwO, merged with that line? Are you cracking up? Are you going to crack up? Are you deterritorializing? Which lines are you severing, and which are you extending or resuming? Schizoanalysis does not pertain to elements or aggregates, nor to subjects, relations, or structures. It pertains only to lineaments running through groups as well as individuals." (1987: 203)

[318] It also seems as though this, along with readings of pessimistic, cynical characters like Burroughs and Michaux, not to mention tragic figures like Artaud, influences their overly generalised comments about "drugs", the kind of category error or "badly analysed composite" they are usually careful to warn us about. Regardless, it is hard to reconcile their largely favourable discussion of Castaneda with the statement that "[d]rug users have not chosen the right molecule or the right horse. Drugs are too unwieldy to grasp the imperceptible and becomings-imperceptible; drug users believed that drugs would grant them the plane, when in fact the plane must distill its own drugs, remaining master of speeds and proximities" (1987: 286). Clearly, given everything I have outlined thus far, Deleuze and Guattari's own evident lack of direct experience with psychedelics should not deter us from applying their notion of the BwO – and its careful creation – to the psychedelic experience.

courts death, in slipping away from signifiance and subjection one courts falsehood, illusion and hallucination and psychic death … [instead] [y]ou have to keep enough of the organism for it to reform each dawn" (160)[319]. With this cautionary note in mind, and having specified myriad adjunct fields and condensed innumerable singularities across the course of our long trip, I will make one final stop before providing a final individuation of our account of the psychedelic experience.

5.6 Constrained and enabled: dynamic systems as living systems

5.6.1 Attractor topologies of the virtual

At the end of his book on Deleuze, *La guêpe et l'orchidée* (The wasp and the orchid), Arnaud Villani poses a series of questions to the aging philosopher. At one point, he asks whether the "topological model" of *A Thousand Plateaus* can be transposed into mathematical or biological terms. It seems like an odd question given Deleuze's acknowledgement in his earlier work that his notion of different/ciation was precisely a bringing together of concepts from mathematics and biology. Deleuze's answer, however, is surprising: he observes that the conclusion of the later book is in fact like a table of categories – not in the manner of Kant, but *Whiteheadean*, i.e., processual, meaning that "[c]ategory therefore takes on a new, very special meaning" (Villani 1999: 130; my translation). He then observes that the transposition perhaps goes the other way, declaring, in a statement that is usually presented in decontextualised isolation in its translated form, that "I feel Bergsonian, when Bergson says that modern science has not found its metaphysics, the metaphysics it needs. It is this metaphysics that interests me" (ibid.)[320]. What seems clear in this statement, and what is borne out across his oeuvre, is that Deleuze was keenly interested in developments within science and that he regarded science and philosophy as equal partners that could and should inform each other[321].

From differential calculus to Riemannian manifolds to Dalcq's embryology to René Thom's catastrophe theory, there is a rich vein of scientific engagement in Deleuze's work that has been picked up on by a number of scholars. In some instances, this has extended as far as situating his ontology and epistemology within an entirely mathematico-scientific framework. While we should bear in mind that Deleuze is, as he confirms to Villani, a *metaphysician*, not a physicist, viewing his work – and by extension Simondon's – through a scientific lens, in

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[319] "What happened? Were you cautious enough? Not wisdom, caution. In doses. As a rule immanent to experimentation: injections of caution. Many have been defeated in this battle." (Deleuze and Guattari 1987: 150)

[320] Amusingly, Deleuze says something near-identical at the beginning of the first *Cinema* book.

[321] The complex relationship between science and philosophy (and art) is the subject of his final work with Guattari, *What is Philosophy.*

particular that of dynamic systems theory (DST), will afford us a useful heuristic for drawing together the singular points of the various disparate series I have been following. Here, the primary guide is Manuel DeLanda and his brilliant albeit controversial Deleuze-DST synthesis. I will first briefly summarise how DeLanda recasts the core conceptual apparatus of Deleuzian philosophy[322], after which I will turn to Alicia Juarrero's work on emergent constraint regimes and then to diagramming of the psychedelic experience in a way that weaves together a heterogeneous meshwork of neuroscience, enactivism, process biology, individuation and psychedelic therapy.

DeLanda grounds his redeployment in the concept of multiplicities, i.e., manifolds, and reminds us that "multiplicities specify the structure of spaces of possibilities, spaces which, in turn, explain the regularities exhibited by morphogenetic processes" (2002: 3). It is important to remember that a multiplicity comprises an arrangement of disparate series of singular and ordinary points and is imbricated with various other multiplicities. For DeLanda, the phase spaces used in DST provide a perfect way to think about this situation: any specific state of something we encounter in the actual – an object, a thought – is one of these points and thus expresses a particular state of the manifold or phase space. Over time, these constituents of the actual follow various paths that are echoed by the trajectories that define the abstract topological terrain of the phase space. Some paths will end up at the same place regardless of where they begin and this behaviour is described as a trajectory entering a basin of attraction, attractors being the tendencies exhibited by systems over time. These attractors, which are also called singularities, "have a large influence in the behaviour of the trajectories, and since the latter represent actual series of states of a physical system, a large influence in the behaviour of the physical system itself" (7).

Importantly, while some of these singularities are topological points, i.e., single, static termination points of a trajectory, others are, as we saw when I discussed the Lorenz attractor several chapters back, cyclical or chaotically patterned – these are the kinds of attractors that typify the behaviour of living systems, from circadian rhythms to habits of thought. The distribution of attractors (and repellors) in a phase space does not, however, define the full metastability of such systems; instead, living beings, being non-ergodic, far from equilibrium and teleodynamic complex systems, undergo various *phase transitions* at certain critical thresholds of instability (recall that complex systems operate close to criticality, limning this transformative zone in order to perpetuate their living dynamisms).

[322] With the explicit goal of making this philosophy accessible to scientists and analytic philosophers.

These transitions, also known as bifurcations, constitute a redistribution of the attractor topology: "[a] state space structured by one point attractor, for example, may bifurcate into another with two such attractors, or a point attractor may bifurcate into a periodic one … Much as attractors come in recurrent forms, so bifurcations may define recurrent sequences of such forms" (11-12). This is demonstrated by examples like a caterpillar becoming a butterfly, or an egg individuating. Technically, we can thus reimagine the process of indi-drama-different/ciation as a series of bifurcations or symmetry-breaking cascades[323] that progressively give rise to structured being, i.e., the actual. However, while it may seem that this means that phase space just *is* the virtual, strictly speaking this is not the case. Indeed, while the former is entirely immanent to the latter, there is a crucial distinction to be made. Bonta and Protevi explain that "singularities are established by differentiation in the vector field prior to integration, which establishes trajectories" (2004: 143)[324]. This is equivalent to the distinction between the virtual and the intensive-actual; while the virtual is entirely differentiated without being differenciated, i.e., pre-phased, the intensive is the actual in the process of phasing or becoming. In DST terms, the virtual is a collection of vector fields (vectors indicating velocity and direction) describing the continuous differential dynamisms I discussed earlier via differential calculus and dy/dx. The trajectories that unfold within phase spaces are *integrations*[325] of this differential field – the distribution of intensities populating the BwO.

Given that phase spaces describing living, teleodynamic systems are themselves best understood processually, i.e., not just as static transcendent spaces within which processes unfold but instead as continuous bifurcative transformations of attractor-repellor topologies, spaces in flux, they have, as Longo and Montévil point out (2014), variable numbers of dimensions as they unfold in reciprocal determination with the spatiotemporal dynamisms they express and which give rise to them. Here, we can recall Tsuda and Kaneko's seminal conceptualisation of attractor ruins and ghost attractors – the former describing anachronistic dynamics that may continue to resonate within the behaviour of living systems after dissipating and the latter, closely related, referring to liminally effective attractors from previous or

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[323] Symmetry-breaking is a term from physics describing a change in the set of transformations under which an object or dynamism is invariant – a circle is invariant under more rotations of angle than a square, to give a simple example, just as some physicists argue that the high energy conditions at the birth of the universe constituted a kind of supersymmetry that cascaded into what we now commonly regard as separate forces of physics: strong and weak interaction, gravity and electromagnetism.

[324] They note that this is a crucial ontological difference for Deleuze – one he takes from the mathematician Albert Lautman, whose work in part focused on the definition of a transcendental field of mathematical problematics much like the Deleuzian virtual.

[325] Integration being the inverse operation within calculus, i.e., finding the area beneath a segment of a curve as opposed to the instantaneous rate of curvature.

upcoming topological transformations of fluctuating, dimensionally varying phase spaces (2001).

Finally, given that in following Deleuze's theorization of indi-drama-different/ciation we are, as Sarti and Citti argue, developing an account of differential heterogenesis, we cannot rely on straightforward Riemannian notions of locally homogeneous non-Euclidean space when defining phase spaces qua manifolds; here, they propose the mathematically novel concept of sub-Riemannian manifolds as a way to conceive of a space that differs in dimension and quality from point to point – a truly differential space all the way down (2022). While these modifications of the intuitively simplified phase space model that is usually employed in elucidating Deleuze qua DST open up a vast array of new questions, we can, however, domesticate the situation somewhat by considering that entirely heterogeneous topological manifolds qua self-transforming differential processes can themselves be modelled as traversals of higher-order vector fields and phase spaces. This nesting of phase spaces, while highly speculative, is probably well-suited to the kinds of messy assemblages that make up the living world; here, it is precisely ghost attractors and attractor ruins that may stand in for transformational invariances in the child phase spaces traversing these emergent dynamic regimes. While I cannot develop this point further here, it does seem that the usual notion of phase spaces we employ in conceiving of living systems, Deleuzian philosophy and so forth is an egregious simplification and that more work in this direction is necessary – work that the aforementioned theorists are at the forefront of[326].

5.6.2 From efficient cause to emergent constraint regimes

Speculation aside, there is something philosophically remarkable in the notion that I am describing: there is a differential field of virtual tensions implicit in actual living systems; these tensions mark out the tendencies of such systems and yet the aforementioned tensions only become evident in the behaviour of the systems themselves, i.e., the phase space becomes defined through multiple trajectories. There is thus an interesting relation of reciprocal-recursive causality taking place whereby the actual behaviour of systems in the present iteratively entails the accumulation of a repertoire of unactualised tendencies and potentials that then act to constrain and enable these systems in various ways.[327] This presents a

[326] In the strange essay "The Virtual and the Actual", which has the possibly apocryphal status of being Deleuze's final piece of writing, there is a possible allusion to the situation I'm describing in his discussion of a kind of infinite regress of virtuals, which hews to some extent to the notion of time crystals in Cinema II but seems also to point beyond this.

[327] Elsewhere, Deleuze will describe this, via Bergson, as the accumulation of the past and in fact Bergson discusses the past as both memory and virtuality. Deleuze repurposes what for Bergson is a

challenge to our usual conceptions of causality itself, something that, as Alicia Juarrero has pointed out (2023), we usually conceive of solely in terms of efficient causality in the post-Enlightenment era of scientific rationality (and materialist reductionism)[328]. However, "in a Deleuzian ontology one must emphasize that the regularities displayed by the different possible trajectories are a consequence of the singularities that shape the vector field …. As Deleuze puts it, 'the singularities preside over the genesis' of the trajectories" (27; citing Deleuze 1990: 103).

However, singularities, attractors and so forth are not material things – they are not billiard balls that can be bumped into other billiard balls as efficient causes of change. At the same time, without these material things there would be no attractors. Deleuze sometimes uses the term *quasi-causality* to describe this non-efficient flow of influence both within the virtual and between the actual and virtual, but Juarrero's notion of emergent constraint regimes covers much of the same ground and is perhaps easier to grasp. In a manner similar to Deleuze and to enactivism, the latter of which she extensively engages with, Juarrero understands "identity as contextually embedded coherence and interdependence" (2023: 4), with the implication that "interactions and relations play a role in a thing's nature" (5) and that these interactions and relations are thus not secondary or epiphenomenal but have primary ontological valence, even when such interactions and relations are the expression of emergent properties that constrain and enable their constitutive elements in a manner that cannot be reduced to efficient causality. Juarrero argues that there is an aversion to thinking in this way, "an ontological bias that favors concrete things over processes and relations, substances over properties" and that ignoring emergent wholes "begs the question by assuming that all cause must be billiard ball-like to be causally efficacious at all" (1999: 129).

Juarrero's work straddles a number of fields, including mereology, Kantianism (specifically a critical engagement with Kant's discussion of self-causing causes[329]) and dynamic systems theory, in the latter instance including the seminal work of Prigogine and Stengers (1984) on dissipative systems as well as the biologist Lila Gatlin's underappreciated discussion of

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kind of psychological memory as ontological memory – the pure past or virtual and describes it as a second synthesis of time (the living synthesis of the present, or habit, is the first synthesis, while counter-actualisation, understood in its full transformative scope, i.e., as active genesis, is the third synthesis – the sequence Hume, Bergson, Nietzsche is a common heuristic for defining the three syntheses in this regard).

[328] Recall that for Aristotle there are four causes: formal, material, efficient and final.

[329] In Juarrero's earlier work her focus is specifically on "the parallels between Kant's understanding of intrinsic teleology as self-organization and the recursive causality at work in Prigogine's dissipative structures" (2023: 207). In this regard her work pushes back against Kant's circumscription of self-causing cause and, by extension, biological self-organisation, arguing that by making a concession instead of rigorously rethinking efficient causality, "Kant thus upheld Aristotle: causes are external to their effects; self-cause, and therefore, self-organization, are phenomenally impossible." (1999: 47)

emergent constraints (1972). A brief summary of Gatlin's work will clarify Juarrero's project and by extension the ontological status of the various components of the phase space formalism. Operating at the intersection of biophysics and information theory, Gatlin argues that we can understand the emergence of anti-entropic principles in the broader context of the inevitability of entropy in terms of two sets of constraints on how life is expressed. Using DNA and language as two prominent examples, she shows how initial frequency asymmetries express an initial set of *independent* constraints: if some letters appear more than others in the alphabet, for instance, then this gives rise to certain structural dynamics, just as the frequency of codons that express particular amino acids constrain the structure of DNA.

The initial structural dynamics that arise from these independent constraints become increasingly contextualised, i.e., they intersect with other structural dynamics, which entails the emergence of *dependent* constraint regimes – the position of a particular codon relative to other codons and biological factors, for instance, will constrain how that codon is expressed, just as the position of a cluster of letters within a broader linguistic object – a word within a sentence, for instance – will constrain its meaning. From initial frequency asymmetries or divergences from equiprobability, Gatlin argues, we achieve complex contextual dynamics – divergences from independence – that iteratively give rise to the rich diversity of life (1972: 35-45). She asserts that "[t]he second law of thermodynamics is indeed an order-degrading principle in itself and without constraint; but when we place it under the control of the higher laws of information theory, it becomes directly responsible for the production of order of a very important type. This is why life has arisen" (190).

While the information-theoretic underpinnings of Gatlin's argument are debatable, her understanding of how emergent constraints come to be, which has also influenced Oyama's DEST, is the philosophical basis for Juarrero's position, and in the latter's work we can see her argue that "[e]verything interesting, including identity and individuation, starts with inhomogeneity" (2023: 51) and that this takes conditions away from equilibrium, something that is exemplified by the uneven energy landscape at the cosmological level, where "gravitational and electromagnetic fields are examples of primordial context-independent constraints at work" (49). For Juarrero, such initial constraints can be considered "preset configuration settings of the dimensions, possibilities, and limits of multivariate and multidimensional landscapes" (55); it is within these constraint landscapes that relations of reciprocal dependency are fomented that in turn give rise to dependent constraints, which "weave together streams of matter and energy into the coherent and covarying pattern of a coordination dynamic" (57). In turn it is these latter constraints that produce order in the world ("order out of chaos", as Prigogine and Stengers would describe it), something Juarrero

explicitly describes as metastability, i.e., the chaotic but not random behaviour of far from equilibrium, close to criticality, complex living systems. To reiterate, this entails a kind of "mereological looping" (67) that violates reductionist models of efficient cause but is expressed in various non-physical forms of emergent correlation or ordering that are commonly modelled in terms of "[p]hase locking, resonance, synchronization, and entrainment" (71)[330]. In the language of DST, constraints function "by modifying either a system's phase space or the probability distribution of events and movements within that space" (Juarrero 1999: 7).

Indeed, Juarrero employs DST across her work to describe context dependent constraints as attractor distributions in phase spaces whose broader topological dynamics can, as we saw, be understood as "configuration settings". Living systems can thus be viewed as non-ergodic traversals and transformations of these spaces via phase transitions or bifurcations. While Juarrero spends a great deal of time working out the mereological consequences of emergence, she does not spend as much energy on the metaphysical implications. Here, it seems evident that DST can act as a dark precursor to bring her work together with that of Deleuze. By extension, DST is, as was indicated, a way to conceive of everything from emergent neural dynamics to living systems to the ongoing practices of adaptive sense-making by which these operationally closed yet structurally open systems endure. From the DMN to enactivism's organic, sensorimotor and linguistic bodies to spatiotemporal morphogenetic dynamisms, we are dealing with emergent quasi-causal regimes that constrain and enable the expression of that which recursively gives rise to them.

Furthermore, considering all this in terms of phase spaces, attractor distributions and the vector fields that define these in turn allows us to consider everything we have discussed, from receptor site potentiation to resonant cell assemblies to set and setting and entangled system-environment assemblages in terms of individuation via the Deleuzian notions of the virtual and the BwO. In all of this, equilibrium and linearity – features typical of simple, homeodynamic systems, in which predictive coding and other Bayesian approaches find their onto-epistemological ground – are the exception and we are dealing instead with the morpho- and teleo-dynamic[331] nonlinearities of complex and chaotic living emergences far from equilibrium.

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[330] Juarrero discusses several examples where emergent order demonstrates this kind of emergent constraint regime that couples previously independent dynamisms in this way, including Bénard cells (the emergently-patterned convection dynamics in fluids heated in specific ways), the Belousov–Zhabotinsky chemical reaction, vaccine epidemiology and traffic. "Laser beams cauterize wounds, which individual photons cannot. Molecules subtend the world of chemistry, which atoms on their own do not. A vaccinated population acquires protective powers, and entrained pendulums generate waveforms that regulate individual swings. Liquids with zero viscosity (superfluid) can flow without loss of kinetic energy; electrical resistance vanishes in superconductors." (2023: 79)

[331] "In virtue of its own internal dynamics, self-organization thus spawns even higher levels of self-organization and the system as a whole evolves. That is, dissipative processes self-organize into stable

Such systems are metastable, with attractors, energy landscapes or intensive gradients – and by extension perplicated[332] virtual multiplicities of singular and ordinary points – constraining and enabling their spaces of possibility in various quasi-causally entangled ways across their individuations and they emerge from a pre-individual field that is rich in differential potential even if it lacks differenciation.

Returning to the seemingly inexhaustible example of the egg, Juarrero notes, for instance, that it “does not have an unlimited state space; each generation begins with a characteristic pool of potentialities that, no matter how large, is not unlimited” (1999: 176). To reify any of this is a fundamental philosophical mistake because we are dealing not with things but with "meta-stable networks of transformations, nested, hierarchical arrangements of organizational patterns: ‘structures of process’" (Juarrero 2023: 124). As crucial as context dependence is for the emergence of the aforementioned complex dynamisms in which life consists, however, it is also the case, as Juarrero and others observe, that excessively locking into a particular attractor landscape or distribution of singular and ordinary points, is in fact highly risky and threatens to undermine teleodynamics itself, again leading to what Simondon described as passive death.

Juarrero warns that “[t]aken to extremes, context dependence has the potential to overfit, which renders systems brittle; they become extraordinarily fit, but in only in one context, for one unit … [this] tends to render systems unresponsive to changes in context” (149). This is a simple point, but in a way the crux of the entire argument for psychedelic therapy and for the creation of BwOs. Indeed, Juarrero intuits this well when she notes that “[c]omplex dynamical systems theory suggests that many psychological and emotional problems may be due to dynamical malfunction … that schizophrenia and manic-depression might have a dynamical origin” and that if we could “reset mental dynamics we could also fix these illnesses” (1999: 252). Here she offers the tantalising suggestion, echoing the aspirations of psychedelic-assisted therapy and the schizoanalytic project in DST terms, that “if taken far from equilibrium, a person's existing mental attractor regime embodying meaning, desire, and similar mental

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structures that, after again reaching a critical threshold of nonequilibrium, can bifurcate once more and reorganize into an even more complexly differentiated, metastable system. And the process repeats. Dissipative structures thus evolve through a sequence of such irreversible phase changes or bifurcations. Each reorganization, it will be recalled, dissipates the nonequilibrium that had built up. The reorganized system is therefore better adapted to current conditions than the earlier one. So dissipative structures are also adaptive systems that show how, over time, complex order emerges from disorder. Because random, contingent fluctuations serve as the nucleus around which the reorganization occurs, the progression of this evolutionary process also marks the trajectory of an increasingly individuated system.” (Juarrero 2023: 122)

[332] “[I]n multidimensional dynamic space an indefinite number of attractors can coexist, inextricably intertwined with and entrained into each other. Like wave interference patterns, some will reinforce and some will cancel each other” (Juarrero 1999: 185).

properties might reorganize and thereby recontour the landscape" (180)[333]. We may attempt just such a journey of counter-actualisation, away from equilibrium and across the Body without Organs. As I have spent the last several chapters exhaustively defining the set and setting for this journey, I will let it unfold without interpretation. If I have been thus far successful in the task I have set for myself, then it will be clear why I have presented this final account in the manner I have. Deleuze's remark about learning to swim is relevant here: "[t]o learn to swim is to conjugate the distinctive points of our bodies with the singular points of the objective Idea in order to form a problematic field" (1994: 165). I therefore individuate this last rendering with "the totality of the system being incarnated in the real movement of the waves" (ibid.).

5.7 I DIED: A final unified account of psychedelic counter-actualisation and ontogenesis

> "One can say that the *nagual* accounts for creativity," he finally said and looked at me piercingly. "The *nagual* is the only part of us that can create." (Castaneda 1974: 141)
>
> [T]he self is only a threshold, a door, a becoming between two multiplicities. (Deleuze and Guattari 1987: 249)

5.7.1 Interlude: a trip

You are somewhere in the Amazon basin, in a small wooden structure below the tropical canopy. Or perhaps you are in a psychedelic neuroscience research laboratory, lying on a bed with an fMRI device measuring your neural activity. A substance is passed to you to ingest: a foul brown liquid or a nondescript white pill – either way, a dark precursor of the event that is about to unfold. As you gulp the substance down you are reminded of Deleuze and Guattari's warning against destratifying too wildly, but reminded too of the stratified habits – the dogmatic image – that have brought you here seeking transformation. After a short while, the effects begin. You are first struck by the phenomenological novelty of the experience: the bright colours, the eidetic patterns, the breathing, pulsing nature of everything around you. You can taste the sounds. It's the result of attenuation of cerebral gating mechanisms you tell yourself, a simple gradient shift in neurochemical distributions, an increase in bottom-up entropic flow, but this does not account for the profoundly subjective, emergent properties of this redistribution. It's an enjoyable experience, but after a short while – you're not sure exactly how long, because time and space seem strangely different, more imbricated with your enactive participation in the world and in worlding – the situation begins to feel slightly claustrophobic. The people and objects around you seem like cardboard cutouts of their usual

[333] We should read *equilibrium* here as closer in tone to Kaneko and Tsuda's homeochaos than thermodynamic equilibrium I have argued is ill-equipped to describe living beings.

selves, bare repetitions without difference; similarly, your own thoughts seem absurd to you; caricatured reiterations of useless social norms, over-generalised cognitive patterns, automatic responses. It is almost as though there is a growing rift between your ego and your self, the latter watching the former perform its stereotyped dance of entrained movement across an attractor landscape populated by steep hills and valleys. You are not judging, but you are perceiving the judgments of God, the ways in which you have been organised, the obstructions blocking your pathways of access to the pre-individual funds that constitute your own metastability. You feel constricted. There is a hauntingly familiar metallic taste in your mouth as your default mode network begins to dissolve.

Then the singing begins – the icaros of a ayahuasquero or a curated Spotify playlist of music for psychedelic therapy – and a cascade of oscillatory dynamics washes over you: the crude refrains that sustain the sense-making holding patterns of your everyday life are replaced by a music rich subtler connectome harmonics and endless choirs of resonant cell assemblies emerge from and return to the void. You are not sure who you are anymore; you are afraid that you may die, but you no longer know who the you is that this death is summoning, because you are as much the flowers as you are this body, this moment. Simultaneously, everything seems hypersalient, reviviscent, as though you have entered a domain of archetypal meaning where everything is a metaphor for everything else and life is played out on a cosmic terrain of mythic battles. These archetypes are just your attractors, you remind yourself; you are a metaprogrammer – a transcendental empiricist specifying adjunct fields, vice-dicting the genetic, pre-individual conditions of your real experience. Becoming metastable, you enter the pure past and see before you an infinite array of compossible worlds in all their perplication. Condensing singularities, moving even closer towards criticality, you counter-actualise, effectuate a bifurcation, summoning a play of intensities across the Body without Organs that is itself folding and unfolding as attractors come and go and dimensions pop in and out of being.

You are in slippery, treacherous territory: some of these attractors seem ghostly, and the conditions of the problem transform from point to point, and you struggle to take a single step forward on the ever-smoothing, ungrounding ground. You know you must traverse this Baroque, self-transforming terrain though, and transform it along with you, becoming the quasi-cause of the event. It is a redistribution of this now largely flattened energy landscape you seek; a new vector field. The force of this third basic perinatal matrix seems to unravel all your bodies – organic, sensorimotor and linguistic – you are nothing more than intensities, an anonymous molecular becoming, pure immanence, a life, Huxley's mind-at-large. You have made yourself an egg again, or rather unleashed the associated milieu within you, as you

reach the fons et origo, the pre-individual, the threshold of your death and rebirth and transformation. Throwing the dice, you throw as if all of chance is redistributed in every throw and trigger a psychedelic ontogenesis; a caesura, a third psychedelic synthesis of time, beyond both the actual present and the virtual past, in which all that repeats is difference. The guide is close by, cognisant of the torsions and transductions you are experiencing.

Later, as the energy landscape settles and new attractor formations begin to stratify you will begin the long work of integration; of weaning this receding hyperplasticity, this bout of chaotic itinerancy, into a renewed metastability and weaving new intersubjective braidings of utterances, because every psychic individuation is a transindividuation – a collective becoming. For now though, the effects are still strong and your guide is paying close attention to the set-setting entanglements of body, world and mind in their collective organismic becomings: how a birdsong causes a cascade of aesthetic wonder; a hand on the back summons the archetypal depths of hidden traumas; proprioceptive cycles explode into conscious awareness and your thoughts continue their traversal of solitude. The fMRI captures this processual haecceity, its singular and ordinary points, and the spatiotemporal unfoldings implicit in it. Everything is vibration, resonance, disparation become morphodynamic: your consciousness is this song being sung by all the virtual multiplicities – the entangled web of life in its transductive splendour – that comprise the plane of immanence: a shared, multiphased, intensive song of teleochaotic connecome harmonic improvisation. As the song progresses, new meshworks of selfless selves or larval subjects begin to coalesce; independent asymmetries merge into entangled, dependent constraints that iteratively structure the being that you are becoming: a differenciation that is the shadow of the differentiation you have been dramatising … Later, much later, you take a walk outside. You are struck by the beauty of the sky. You never noticed it in quite this way before. You feel reborn.

5.7.2 Five dried grams, or “what happened?”

Several chapters ago, I drafted a provisional list of the core salient features of the psychedelic experience. I noted that these included neurobiological alterations at various scales of emergent complexity from cellular to whole-brain, diverse sensory, affective and phenomenological encounters with the self and world, perturbations of the ego up to and including drug-induced ego death, changes in processes of meaning-making and the traversal of an archetypal or mythic domain, heightened metaprogrammatic insight, and the fundamental influence of set and setting on all of this. Now that the effects of the trip are subsiding, what can we conclude, reflecting upon all these disparate elements? First, it appears to be the case that the formalisms of dynamic systems theory offer us a useful and

unified set of heuristics for conceiving of the full scope of the psychedelic experience, from the initial neurochemical alterations that give rise to it to the complex, nonlinear whole brain spatiotemporal dynamics that emerge during this experience and which constrain and enable its directions of unfolding in various ways. We saw that these emergent constraint regimes could be construed as attractor landscapes that are not transcendent forms but entirely immanent to the material systems whose living teleodynamics they demarcate. This immanence renders them subject to transformation, and it was made clear in several overlapping contexts how this transformative dynamic – drug-induced ego death, the flattening of energy landscapes in the REBUS mode, the contracting of new patterns of enactive sense-making, the redistribution of attractor topologies, individuation or the counter-actualisation of the virtual – was the core salient aspect of the potential therapeutic use of psychedelics.

Psychedelics appear to effectuate a loosening of entrenched structures on both an organic and a psychic level, and so a philosophical framework that is grounded in process – in the primacy of metastability, becoming, differentiation and so forth – seems especially apposite for describing their effects vis-à-vis subjectivity. Similarly, living psychic systems are, as I have described via both contemporary enactivism and recent trends in system biology, ongoing, patterned imbrications of systems and environments in mutual presupposition and we thus require what Žukauskaitė, drawing together many of the same heterogeneous domains I have been exploring, terms an *organism-oriented ontology* (2023). A renewed relation to space and time has also been alluded to throughout the current work: while I have not been able to develop this into a full account, it should be underscored that all of the fields I have discussed, fields which share, at the end of the day, an interest in describing living systems in the full scope of their thriving and error, level their own arguments against strictly Newtonian-Euclidean conceptions of the spatiotemporal and that instead of viewing spacetime as a container within which the dramas of ontology take place, each of them instead proposes a view of immanent unfolding as the simultaneous expression and experience of lived and ontological duration and spatiality. In terms of time specifically, there is a profound affront to our everyday intuitions in what is being proposed here.

In his discussion of Deleuze, DeLanda for instance proposes that time “needs to be approached in exactly the same terms as that of space: we need to conceive of a nonmetric time, a temporal continuum which through a symmetry-breaking process yields the familiar, divisible and measurable time of everyday experience” (2002: 99). As counterintuitive as notions like this may be, just as concepts like connectome harmonics – the brain-mind as music – or the Deleuzian virtual – an entirely new modal status – are provocative in their unfamiliarity, everything I have discussed is grounded in rigorous scientific inquiry. This is not

to obviate the need for metaphysics, but rather to reiterate the Deleuzian ethos of bringing science and philosophy together in such a way that each is worthy of the other.

If what I have been describing has merit as the starting point for a new framework for understanding and facilitating the psychedelic experience, a very first step in the construction of a philosophy and practice of psychedelic ontogenesis, then it is the case that several key concepts within the psychedelic milieu need to be revised, including how we conceptualise set and setting within the context of organism-oriented ontology and life as different/ciation, as well as what psychedelic therapy sessions look like given everything we know about the embodied, enactive, environmentally entangled nature of cognitive agents as messy assemblages of intersubjective meaning-making and psychic individuation that is always also transindividuation. It may be that the dominant medico-scientific framework for psychedelic research: hospital rooms, lab equipment, blindfolds and headphones, is ill-suited for fostering optimally beneficial transformative experiences and that group therapeutic experiences in natural contexts – which, after all, are the contexts in which psychedelics have been explored for most of human history – offer far more promise, even if they do not conform to the strictures of what Deleuze and Guattari call Royal science.

Perhaps there will always be an aspect of psychedelic therapy that remains, in this regard, a nomadic science – a fugitive, subterranean experimentation with all the ways in which we can make ourselves Bodies without Organs, summoning the *nagual* from the depths to the surface while holding onto just enough *tonal* to find ourselves again at dawn. Finally, and most ambitiously, each of the disparate threads I have meshed together holds serious implications for how we conceive of consciousness and, by extension, its potential transformations. Here, the path is still largely untrammelled; whatever provisional post-hoc stories we have told ourselves about homeostasis, cognitive computation, free energy minimisation, unified subjectivity or the transcendental conditions of possible experience, it remains the case that, whatever small footways these may have cleared, it is a clearing within a broader confusion, the tropical foliage ahead remaining dense despite the occasional glimpses we may catch of the distinct-obscure rhizomatic network that sustains it. In the midst of this humble clearing, to think, and to think about thinking, is “[t]o place thought in an immediate relation with the outside, with the forces of the outside” (Deleuze and Guattari 1987: 376-7) and to allow the thought of individuation to become the individuation of thought.

Chapter 6

Conclusion: having fathomed hell and soared angelic …

> Arnaud Villani: Can we say that a love of life, in its frightening complexity, leads you throughout your work?
>
> Gilles Deleuze: Yes.
>
> Arnaud Villani: …Are you pessimistic?
>
> Gilles Deleuze: No. I am not at all pessimistic because I do not believe in the irreversibility of situations.
>
> (Villani 1999: 130-1; my translation)

I have covered a huge range of disparate topics in this dissertation and at times it may have been difficult to see how they all hang together. My core thesis is simple, however: psychedelics, as the entire history of their use across myriad diverse contexts unequivocally demonstrates, are best understood as fomenting the loosening (and occasionally complete dissolution) of stable forms of identity – a loosening that is followed by the emergence of a transformed identity. Within this process, frequently described as one of death, rebirth and transformation, it appears that identity is secondary to individuation – of the complex foldings, unfoldings and refoldings that give rise to identity as a single phase of being: the ontogenesis that is provisionally expressed in any given ontology. If this is the case, then to think in a philosophically adequate manner about the psychedelic experience qua individuation entails thinking about the individuated as secondary to individuation; of being as the result of a more fundamental and always-ongoing process of becoming.

6.1 Findings

In short, experiences of individuation require a philosophy able to adequately grasp individuation. To philosophise in this manner, via difference as primary to identity, is not to relegate fixity to the void on behalf of an inchoate fetishism of the flux; indeed, it is precisely real, material dynamisms that recursively give rise to the emergent constraint regimes – the abstract machines or attractor topologies – that in turn give rise to the given. That by which the given is given as diverse, is reciprocally given by the given, or effects an ongoing quasi-causation we could say. This is the complex interplay between the virtual and the actual, the former neither a transcendent or transcendentally ideal domain of fixed eternal forms or categories or schemata, but instead a wholly immanent domain – a differential field of singular and ordinary points drawn together into perplicated multiplicities that, in their disparation,

iteratively and transductively give rise to the actual via the complex process of indi-drama-different/ciation.

This process, which can be described as becoming or ontogenesis, is in fact a two-way street. Through vice-diction and counter-actualisation we can determine the virtual conditions that give rise to the actual in order, one hopes, to actualise differently, via bifurcative phase transitions rearranging our attractor layouts, flattening some of the hills and valleys, setting up new patterns of non-ergodicity that better enrich the pluripotent associated milieus of pre-individual charge we all carry within us; the metastability we all too frequently forget we can access when the world comes to stratify us too much through all the forms of human suffering – from the existential to the political – that afflict us.

Just as the human experience straddles a wide range of entangled domains across various scales of organisational complexity, from molecular biology to subjectivity to the social and ecological milieus we are so deeply imbricated with and in which our identities form, so too does a coherent account of psychedelics and the transformative experiences of individuation they afford us necessitate examining the broader contexts in which these experiences take place. For this reason, I have sought to situate psychedelics historically, showing how their effects were thought about in different times and places, moving from subtle traces buried in the archaeological and anthropological records to the great hall at the Temple of Demeter and onwards towards the 20th century, when Western culture began in earnest to explore and think about mind-altering substances. I have shown how such thinking was very much informed by cultural, theological and scientific approaches of the time, but also how these approaches were perhaps inflected by the existentially profound consequences of the psychedelic experience itself.

What has hopefully been clear throughout is that psychedelics have *always* been thought of as agents of individuation, in whatever ways this thought could be articulated within the conceptual and linguistic exigencies of place and time. Whether viewed as gateways to the *fons et origo*, attenuations of the reducing valve of everyday waking consciousness in order to enter into Mind-at-Large, or metaprogrammatic technologies of cybernetic unselfing, an oftentimes inchoate but remarkably perennial consideration of processes of differentiation – of ontogenesis – as metaphysically primary seems common to nearly all thinking about psychedelics, something borne out in the convictions of psychedelic experimentalists as far afield as Henri Michaux and the brothers McKenna.

Situating psychedelics historically is only half the task, however. It is also the case that human experience itself needs to be situated. In this regard, I have sought to examine the psychedelic experience at all its levels of emergent complexity, primarily through an examination of the

myriad scientific fields that intersect with contemporary research into psychedelics, life and mind. I have demonstrated how the destratifying effects of psychedelics begin at a molecular level, where they appear to increase turbulent neurobiological behaviour. This in turn does not give rise to chaos, in the lay sense of disorder, but instead a new kind of increasingly complex emergent order, i.e., chaos *proper*, or heightened *metastability*, even as this entails the dissolution of stabilising whole-brain dynamics like the default mode network. I have explored this emergent metastable order by looking at recent findings in psychedelic neuroscience.

I have also paid specific attention to Bayesian brain models and notions like homeostatis and entropy. While a variation on these quasi-cybernetic themes – REBUS – is the dominant conceptual model within psychedelic neuroscience, I have pushed back against its hegemony by arguing that it is unable to account for the non-ergodic, teleodynamic nature of living systems. Just as a philosophy in which identity is primary and difference is secondary, is insufficient for thinking individuation qua individuation, so too is a conceptual framework that regards living beings as in the habit of minimising their free energy in order to maintain conditions of homeostasis a poor way of thinking about anything much more complex than a thermostat, least of all a human being capable of high-level abstract thought and whose life can be understood as a cascade of irreversible transformations across a heterogeneous landscape of potential and *even less* a human being capable of drug-induced ego death.

While REBUS and predictive coding may be relatively novel forms of thinking about cognition and its psychedelic perturbation, they are grounded in much broader sets of specious theoretical convictions that stretch back over half a century and which also informed some early work within the first wave of psychedelics, including that of John Lilly. Here, I have encapsulated the overall framework that is the object of my critique as FCR – functionalism, computationalism, representationalism – and have sought to demonstrate some of the arbitrary assumptions packaged within this still highly-influential school of thought. As a replacement for FCR, which oftentimes perpetuates a tenuous Cartesianism, albeit disingenuously tempered with some modest nods to bodies and “the environment”, I have presented enactivism, the offspring of the autopoietic school of cognition that sees living beings as organisationally closed but structurally open asymmetries between systems and environments, asymmetries that are stabilised, in a manner that gives rise to emergent order, through ongoing processes of adaptive sense-making in precarious conditions.

I have argued that enactivism affords us a much richer way of thinking about both cognition and life more generally – indeed, it is grounded in the realistic assumption that mind and life form a continuum without any sharp breaks – and one more in line with what the contemporary life sciences demonstrate. This way of thinking has serious implications for psychedelics, and in particular the notions of set and setting that form a crucial part of psychedelic therapy. While

there is much work to be done here, I have offered an opening salvo in what I hope is the right direction, arguing that we need to think about set and setting enactively, i.e., as the ongoing nonlinear coupling between myriad flows and processes, both within and traversing the boundaries of the body. We also need to think about set and setting transindividuatively, something have I gestured towards in my discussion of Simondon.

Several leading scholars in enactivism have begun to explicitly engage with the work of Gilbert Simondon and his philosophy of individuation. In fact, it has been understood by these researchers as a crucial missing piece of the enactive puzzle: if human beings participate in life through their organic, sensorimotor and linguistic bodies, then we need to conceive of the individuations that give rise to all these bodies, each of which then retain an associated milieu of individuative charge as part of their ongoing autopoiesis. In short, we need an ontogenetic body, or a Body without Organs to complement the already messy assemblage that is the enactive body. I have offered a comprehensive account of Simondon's philosophy of individuation in this regard, with particular attention paid to the notion of psychic individuation, which as we saw is always an individuation that disparatively entails living individuation and transindividuation.

It is clear that Simondon's notion of the pre-individual funds or metastable, pre-phased being powerfully recapitulates the idea of the *fons et origo* that in turn is seen as a site of originary cosmological dynamism within which psychedelic ego death, followed by rebirth and transformation, takes place. In Simondon I have shown that this is not some kind of mystical return to the source, but simply the contracting of the real, life-giving dynamisms inherent to all of us, even if they can sometimes be exhausted in the passive deaths that are a feature of each of our lives. Here, Simondon anticipates, and is broadly in line with, recent theoretical advances in process biology and developmental systems theory, some of which I have briefly introduced.

In seeking to extend the philosophy of individuation as far as it can go, I have traced a final short path from Simondon to Deleuze and Guattari, showing how what was merely implicit in the former – the crucial ideas of vice-diction and counter-actualisation, which can be understood precisely as counter-individuation; as changing the conditions by which individuation takes place – form key parts of the philosophy of ontogenesis developed first by Deleuze as part of his philosophy of difference, and made manifest in his notion of indi-drama-different/ciation, and then in collaboration with Guattari, where the idea of the Body without Organs (BwO) becomes their most strikingly *psychedelic* concept. In fact, as I have shown, Deleuze and Guattari's theorisation of the BwO, as well as related concepts like becoming, is imbued with a rich vein of psychedelia, from references to Artaud – with whom the term *BwO* originates – and Michaux, to the more substantial engagement with the unlikely figures of

Carlos Castaneda and the most likely mythical Don Juan, the latter of whom imparts an important lesson to Castaneda about the relationship between the *tonal* – or actual – and the *nagual* – virtual, pre-individual or *fons et origo*. Beyond the playful introduction of figures from the sixties counterculture, I hope to have made clear via the field of dynamic systems theory that a rigorously scientific reading of Deleuze, Guattari and Simondon is both possible and useful, and that this reading can serve as a dark precursor that brings them into communication with the various neuroscientific, enactive and biological fields I have outlined, all of which employ DST as a conceptual heuristic.

Beyond this utility, DST, as it becomes increasingly nuanced by cutting-edge advances in niche fields like homeochaos or sub-Riemannian manifolds, is highly suggestive of a new way of thinking, and one that is profoundly Deleuzian. To think via attractors, dynamisms, tendencies, distributions of intensity, vector fields, phase transitions, bifurcations and so on – not as the objects of thought but as a *style of thought* – is perhaps to begin to think outside of the ambit of what Deleuze calls the dogmatic image of thought. Here, what matters is not identity, error, good or common sense or any of the other ways in which we think *representationally* about ourselves and the world, but precisely individuation, becoming, emergence, transformation; an *anexact* yet rigorous thought that eschews ontological fixity for ontogenetic flow without lapsing into a tepid *all is flux*.

This kind of thinking, where the thought of individuation is the individuation of thought – the concatenation of singular and ordinary points as an ongoing production not of knowledge but of learning – is a thought both apposite and much needed in the times in which we find ourselves. Psychedelics, after all, are not just transformative tools that can one day be deployed for healing in medico-scientific contexts, although I sincerely hope that they soon can be; they are also caught up in a world riven by intersecting crises that stretch from the microplastics accumulating in all of our brains to ongoing wars to the appropriation of indigenous knowledge to the ecocidal ravages of the capitalist death machine.

The rich tapestry of psychedelic history is marked also by colonial plunder and genocide, by wars on drugs, by the carceral system and organised crime, not to mention that our dominant psychiatric models are ill-equipped to deal with difficult psychedelic experiences or any other kind of spiritual or individuative emergency. Here too, Deleuze and Guattari can help us to think otherwise: about the collective assemblages of enunciation we form part of, both within communities of psychedelic practice and as part of the broader world; about the preservation of indigenous knowledge systems, including those within which entheogens play a central role, and also of contemporary forms of collective meaning-making, countercultural and otherwise, as nomadic war machines against the state apparatus, hallucinating the people to come; about the clandestine practices of nomadic science that in fact constitute most of the history of

psychedelics research in the 20th century, and which in the 21st, Royal science is now attempting to incorporate into its functioning. Thinking across what Guattari once called the "three ecologies", which have now become four with the advent of digital realities, hopefully we can begin to think in better ways about ourselves, the world and how these can come to be transformed in the direct of life, be it psychedelically or otherwise.

6.2 Limitations of the study / Suggestions for further research

There is a great deal I have not covered here. Most notably, I have paid scant attention to phenomenology, which is a primary influence on enactivism and also for some contemporary work on psychedelics, including that of Beny Shanon, whose monumental *Antipodes of the Mind* is the most substantial engagement with ayahuasca from a phenomenological perspective. The relationship between phenomenology and Deleuze and Guattari is a fraught and complicated one. While some scholars like Judith Wambacq have sought to draw out parallels between, for instance, Merleau-Ponty's incomplete notion of wild being and the Deleuzian virtual, this is a project unto itself. So would be tracing the more direct connections between Simondon and his one-time instructor Merleau-Ponty, whose *Visible and the Invisible* appears subtly influenced by Simondon's work on individuation. Perhaps Varela's theorisation of neurophenomenology can serve as a mediator here – I leave this tantalising possibility open.

I have also not discussed Whitehead, the quintessential process philosopher. Again, this is a sprawling and daunting task given the difficulty and novelty of Whitehead's thought. That said, it is encouraging that some scholars within the field of psychedelic studies, including Peter Sjöstedt-Hughes, are beginning to take Whitehead seriously in this regard. Neither have I said much here about schizoanalysis, the practice of becoming otherwise developed in *Anti-Oedipus*, that is at least as applicable to a discussion of psychedelics as the closely related concept of the BwO. I have, however, undertaken this work elsewhere (Eloff 2023), in a chapter that can serve as an appendix to the current work.

Finally, throughout this dissertation I have been discussing cognition, consciousness, subjectivity, the ego and so forth in various registers, and sometimes in a manner that suggested that we have anywhere near a consensus on what these terms in fact refer to. Consciousness studies and philosophy of mind, those most liminal fields of inquiry, will be with us, I think for some time still, as will philosophy more generally. It could be that the matter is as Simondon puts it, and that "ontogenesis is not able to be axiomatized, which would explain the existence of philosophical thought as perpetually marginal with respect to all other studies, since philosophical thought is what is driven by the implicit or explicit research of ontogenesis in all orders of reality" (2020: 256). This notwithstanding, I suspect that enactivism, Simondon,

Deleuze and Guattari each have a great deal to offer us here. So too, undoubtedly, do psychedelics. This, however, is the subject of a future project.

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