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Paper Title: **Restoring The Possible To The Probable: Digital Psychedelic Studies and the Algorithmic Cancellation of the Future**

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Part I: The Future Is Dead; Long Live The Future?

In his 2009 book *Capitalist Realism: Is There No Alternative?*, cultural theorist Mark Fisher argues that, at the dawn of the new millennium, it has become easier to imagine the end of the world than the end of capitalism.[1] Turning to popular culture, he observes that mainstream films and television shows depict apocalyptic scenarios more frequently than long-term improvements in human life. He also argues that the phenomenon of retro and remix art stems from the widespread intuition that the end of the world is more likely than a meaningful shift away from capitalism. Artists, he suggests, no longer see the point in creating original work for a future in which imagination is only valuable insofar as it makes profit. Thus they merely amalgamate the past, mining popular works from various historical epochs to be recombined as collage.[2] They speak to and confirm a pervasive sense that little is left except competition and inequality spurred by unregulated capitalism.

In his 2014 book *Ghosts of My Life: Writings On Depression, Hauntology And Lost Futures*, Fisher describes this scenario as "the slow cancellation of the future," borrowing an expression from Marxist sociologist Franco 'Bifo' Berardi.[3] In a 2013 essay, Fisher writes that Berardi did not intend the phrase to mean extinction in any literal sense. Rather, he coined it to refer to a diffuse psychological effect rooted in the collective realization that the future is no longer promised. As Berardi explains, society used to have deep faith in a more abundant future. The likelihood of this ideal future, Berardi writes, positively influenced the present. However, economic policies that took root in the United States and Western Europe beginning in the 1970s gradually erased these optimistic visions. Deregulation had a wasting effect on the psyche, imposing a false sense of material scarcity and the impression that life depended on fierce competition [4] This "death of the future" manifests as cynicism and depression which are normalized by social and cultural representation. Fisher scrutinizes the cultural effects of Berardi's "slow cancellation of the future" in his examinations of apocalyptic, cynical, endlessly reiterative art.

Both thinkers agree that this fatalism imposes a generational schism. As they claim, younger people accept the indignities of capitalism as both inevitable and eminently normal because they've never known anything else. Berardi cannot follow suit. He writes that "it is very difficult, maybe impossible, to ... look at reality without this kind of temporal lens." [5] Fisher adds

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[1] Fisher, Mark. (2009). *Capitalist Realism: Is There No Alternative?* Hants, UK: Zero Books.

[2] Fisher, Mark. (2009). *Capitalist Realism: Is There No Alternative?*, pp. 2

[3] Fisher, Mark. (2014). *Ghosts of My Life: Depression, Hauntology and Lost Futures*. (2014). Hants, UK: Zero Books, pp 2.

[4]. *After The Future*. Oakland, CA: AK Press, pp 18-19

[5] Berardi, Franco. (2011)

that while Berardi is a generation older than him, the two are on the same side of this divide. Neither believe themselves capable of making sense of reality if the illusion of a better future completely breaks down. Fisher implies that those younger than himself may be comfortable with the new futility. But if such concessions are made, the "slow cancellation of the future" will become more than simply psychological. To accept the apocalypse, Fisher writes, encourages a very dangerous pessimism. If capitalism permits no structural challenge to itself, activist motions towards a better future are pointless. Then cynicism and depression would give way to apathy, and apathy allows for destruction. Pessimism becomes a self-fulfilling prophecy

Amidst the future's alleged cancellation, we are presented with datafied visions of the future accompanied by assurances of their objectivity and likelihood. Predictive analytics appear to challenge the myth of the future's end. How are we developing so many new tools for augury while simultaneously conceding the world? Actually, these developments share an ontological ground. Predictive analytics are merely a scientized correlate to the sense of defeatism which pervades popular culture. This is because "the future," as a concept, rests on a certain *a priori* unknowability. When it's repackaged as computational probability, its conceptual function changes entirely. Mystery has a social function. It inoculates a sense of possibility and changefulness into the social sphere. In his essay "Data's Intimacy: Machinic Sensibility and The Quantified Self," Sun-ha Hong defines the future as a space where "truths too uncertain, fears too politically incorrect, ideas too unprovable, receive unofficial license to roam... the future is a liminal zone, a margin of tolerated unorthodoxy that provides essential compensation for the rigidity of modern epistemic systems." The rise of predictive analytics / machine learning tightens bureaucratic (fascist?) epistemologies. Popular visions of the apocalypse, nostalgic art, and computational prediction work together to replace imagination with determination. In this environment, speculative activities appear as naïve, and hopefulness reflects a disconnect from reality.

In what follows, I will focus on machine learning and algorithmic prediction as contributors to the alleged "cancellation" of the future. After describing how these tools work to preempt the future, I offer a case study from the burgeoning field of psychedelic psychiatry as an example of a domain in which epistemic indeterminacy is not only viable, but necessary. The case I offer defies predictive computational logic. Its principles may be extrapolated to a general hypothesis of epistemic unassailability, indicating new sites for speculation and imagination which resist economic subsumption.

Part II: How Do Machines Learn?

Machine learning comprises computational algorithms which are designed to automatically update themselves as they assimilate new data inputs. Contemporary artificial intelligence invariably includes machine learning features; in fact, the concepts of artificial intelligence (or A.I.) and machine learning (or M.L.) are so closely related that the terms are often used interchangeably. "Predictive analytics" refers to computational tools which use M.L./A.I. to prognosticate future events. Predictive analytics forecasts, among other progressions, crime, future food and drink preferences, and the development of illness in biological organisms. As these programs appear to become more accurate, they are said to possess greater "intelligence."

In his primer article "A Few Useful Things To Know About Machine Learning," Pedro Domingos writes that machine learning programs "learn" by means of generalization. M.L. "knows" how to carry out its functions based on generic principles. Their "fundamental goal is to generalize beyond the examples in the training set," he observes, where the term "training set" refers to the data that human programmers use in the creation of machine learning algorithms. Training-set data provide the materials on which M.L. "learns" to learn: if, for example, a machine learning system is intended to distinguish human faces from other forms of data, a training set might include thousands of photos which feature human faces alongside multiple unrelated images. Technologists observe how well an M.L. algorithm performs the bespoke task of identifying human faces amid visual cacophony. They then alter the program's algorithms to accede toward a more refined array of general principles. These principles allow the program to successfully carry out this function on any data set, including those that it may encounter once it is no longer under human oversight. Unsupervised M.L. systems auto-update: they refine their own algorithms to optimize themselves as they encounter new datasets in the wild.

Some have questioned whether this process can be likened to "learning" in any meaningful sense. In "Machines That Morph Logic: Neural Networks and the Distorted Automation of Intelligence As Statistical Inference," Matteo Pasquinelli considers whether machine learning is conceptually analogous to non-digital learning. In the following passage, he indicates that generalization, whether in the context of digital or non-digital intelligent systems, is always a process of logical induction:

> By induction, we conclude that facts, similar to observed facts, are true in cases not examined. By hypothesis [a function of abduction], we conclude the existence of a fact quite different from anything observed, from which, according to known laws, something observed would necessarily result. The former is reasoning from particulars to the general law; the latter, from effect to cause. The former classifies, the latter explains.[6]

Pasquinelli then writes that technologist Frank Rosenblatt, considered the father of modern-day artificial intelligence, intended his programs to automate complex forms of induction, not abduction. While the machinations of M.L. systems may occasionally resemble abduction, they do not surpass the basic restrictions of this original design. Pasquinelli:

> The complex statistical induction that is performed by [M.L.] gets close to a form of weak abduction, where new categories and ideas loom on the horizon, but it appears invention and creativity are far from being fully automated [...] if pattern recognition via statistical induction is the most accurate descriptor of what is popularly termed Artificial Intelligence, the distorting effects of statistical induction on collective perception, intelligence and governance (over-fitting, apophenia, algorithmic bias, "deep dreaming", etc.) are yet to be fully understood.[7]

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[6] Pasquinelli, Matteo. (2017). "Machines That Morph Logic: Neural Networks and the Distorted Automation of Intelligence As Statistical Inference." *Glass Bead*. Available at http://www.glass-bead.org/article/machines-that-morph-logic/?lang=enview. [Accessed July 5 2018].

[7] Pasquinelli, Matteo. (2017).

The above is why he argues that machine "learning" is something quite different from "learning" conceived as a function of non-digital mentality (as in human and animal intelligence). For him, deductive and abductive reasoning are preconditions for "learning" and "intelligence." He denies that "learning" is purely inductive. Although their functions may resemble a weak form of abduction, Pasquinelli maintains that M.L. never entirely supersedes induction to achieve the capacity to, for example, explain unprecedented phenomena, generate new hypotheses, and create idiosyncratic metaphors, as poets might. He offers these examples as embodiments of "genuine intelligence." But the misconception which claims that entities incapable of these functions are "intelligent" is authorized and naturalized in the field of machine learning.

Adrian Mackenzie is similarly concerned with the assumptions reified as scientific "fact" by predictive tools. In his book *Machine Learners: Archaeology of a Data Practice*, he takes a historiographic and arguably more radical theoretical approach than Pasquinelli. Drawing equally from the disciplines of computer science, continental philosophy, and the history of statistical mathematics, he argued that the assumptions codified in machine learning systems lead to ontological transformations in their subjects. Naming philosophers Michel Foucault and Ian Hacking as his influences, Mackenzie describes the impact of statistical probability and metrical comparison on the subjects of automated inference, referencing the history of naïve Bayes classification and linear regression[8] to argue that computational output occupies "a reality that had already introjected statistical realities at least a century earlier." For this reason, digital "knowledge" always bears the ontological signature of its ancestors. Knowledge produced by machine learning cannot be scientifically objective, he claims, even in the ostensibly neutral domains of mathematics and computer science.

Regardless of whether they are the products of ontological alteration or not, it is at least true that the data output of M.L. programs are restricted by their imperative to generalize from the initial data sets on which they were trained. Herein lies the main concern of Matteo Pasquinelli: the restrictions at the heart of computational predictive analytics place this functionality within an epistemic and ontological order very much separate from that of non-digital intelligence. Although their functions may appear to weakly resemble abduction and induction, they can neither execute the "reverse generalization" of deductive reasoning nor the hybrid technique defined as abduction.

Unlike Pasquinelli, Mackenzie isn't interested the changing definitions of "intelligence" and "learning." His project is to reveal future-prediction as a form of future-control. Here, he writes that prediction forecloses certain futures, and in so doing, increases the likelihood others:

> The programs that machine learners "write" are formulated as probabilistic models, as learned rules or association, and they generate predictive and classificatory statements ("this is a cat") . They render calculable some things that hitherto appeared intractable to calculation (e.g., the argument of a legal case). Predictive and classificatory calculation, with all the investment it attracts (in the form of professional lives, in the form of infrastructures, in reorganization of institutions, corporations, and governments, etc.) does rule out some and reinforce other futures…. although it is not always possible to disentangle machine learners from the databases, infrastructures, platforms, or interfaces

[8] These mathematical procedures are foundational to machine learning systems.

> they work through, I will argue that data practices associated with machine learning delimit a positivity of knowing.[9]

Mackenzie then clarifies that he uses the term "positivity" in the sense meant by Michel Foucault in his 1969 book *The Archaeology of Knowledge*. For Mackenzie, following Foucault, a "positivity" designates "specific forms of accumulation of statements grouped in a discursive practice and an operational formation." Positivities are not by definition finite, but the knowledge generated by M.L. introduces finitude — hard boundaries — to the bodies of knowledge they process. In other words, the realities they reinforce arrive with a priori limitations and bounds. The futures immanent to predictive analytics are foretold, containing the inscription of technological contingencies internalized over decades (and sometimes centuries) of development. Multiple iterations of development, including the addition of new content, device embodiment and applied usage, sediment to such an extent that probability is recast as absolute inevitability. Alternative possibilities are gradually written out of intellectual awareness: futures that do not fit within these computational and mathematical models are slowly cancelled.

Part III: A Case From Psychedelic Science

The rationale given for the use of qualitative and non-digital methods in psychedelic drug research — and in particular, interpretative phenomenological analysis — can be leveraged toward an intervention in this case of epistemic overdetermination. Within the scope of qualitative psychedelic psychiatry research, interpretative phenomenological analysis has become quite popular. The unusual character of psychedelic therapy, experience as a subjective alteration in consciousness, calls for a methodological commitment to a broad, holistic understanding of individual research factors — a perspective that affirms their profound context-sensitivity. Psychedelic research also benefits from a self-reflexive acknowledgement of scholarly bias. Both of these principles are enshrined within interpretative phenomenological analysis.

In her book *Introducing Qualitative Research In Psychology*, psychologist Carla Willig explains as much, writing that in interpretative phenomenological analysis,

> understanding cannot take place without us making some preliminary assumptions about the meaning of what we are trying to understand. There is a circularity built into the process of meaning-making that is referred to as the 'hermeneutic circle'. This means that "parts can only be understood from an understanding of the whole, [and] that the whole can only be understood from an understanding of the parts. [10]

The need for such a deep entwinement between researchers, subjects and data is also suggested by journalist Michael Pollan. His recent publication *How To Change Your Mind: What The New*

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[9] Mackenzie, Adrian. (2017). *Machine Learners: The Archaeology of A Data Practice*, London, Cambridge, MA, The MIT Press, pp. 6.

[10] Willig, Carla. *Introducing Qualitative Research In Psychology*. New York, NY, Open University Press, 2013, pp. 259.

Science of Psychedelics Teaches About Consciousness, Dying, Depression, Addiction and Transcendence reports on the rise of psychedelic drug research in the twenty-first century — and what has been discovered in attempts to use modern digital techniques to explore this fascinating, stigmatized, and under-researched class of chemicals. Pollan notes that the various causes and effects of psychedelics fundamentally resist isolation "whether from the context in which [the treatment] is administered, the presence of the therapists involved, or the volunteer's expectations".[11] The psychiatric advantage of psychedelics relies on a *Gestalt* characteristic wherein the therapeutic experience supersedes the sum of its parts. Thus the medically effective properties of psychedelics may not resemble predictable data factors, and psychedelic researchers must consider the possibility that the outcome of their trials will bear little resemblance to their expectations. This dynamic makes Willig's "circular movements" between presupposition and interpretation useful towards an accurate understanding of psychedelic medicine.

Phrased differently, the *Gestalt* nature of psychedelic experience implies its resistance to predictive practices based on the rote extraction and examination of parts taken as separate from the whole. Meanwhile, phenomenological analysis was developed to address the irreducibility of experience and context to isolated and datafiable variables. For this reason, leading psychedelic researchers Stuart Turton, Robin Carhart-Harris, and David Nutt note the constraints inherent to quantitative and measurement-based methods, and offer that interpretative phenomenological analysis is instead "the most appropriate to use to explore human experience" in their work.[12]

It matters that they portray their research as an exploration of human experience not necessarily restricted to illness or suffering is significant. Nutt, Carhart-Harris and Turton count among a number of scientists who view these substances not only as palliatives,[13] but also as powerful tools for exploring the human psyche. Stanislav Grof, one of the founders of transpersonal psychology, wrote that "the potential significance of LSD and other psychedelics for psychiatry and psychology was comparable to the value the microscope has for biology or the telescope has for astronomy".[14] This is reflected etymologically: translated from Ancient Greek, "psychedelic" may mean either or "mind-manifesting" or "mind-revealing." Psychedelic substances are in this sense defined by their capacity to provide new insights on the mind. Research performed on them stands not only informs medical interventions, but offers new perspectives on consciousness in general.

Interpretative phenomenological analysis along with similar methods which affirm integration, subjectivity, and self-reflexivity may be necessary to bring these perspectives to light. Here, information and interpretation take multiple directions as they flow between patients, scientists, and other interested parties. Notably, the methods which may be most essential to psychedelic science are grounded in philosophies which challenge the inductive, i.e.

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[11] Michael Pollan, *How To Change Your Mind: What The New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence*, p. 333

[12] Turton, Stewart, D.J. Nutt and R.L. Carhart-Harris. "A Qualitative Report on the Subjective Experience of Intravenous Psilocybin Administered in an fMRI Environment". Current Drug Abuse Reviews, Vol. 7, 2014, pp. 2

[13] These include Ben Sessa, Robin Carhart-Harris, David Nutt, Thomas B. Roberts, Neşe Devenot, and many more.

[14] Author unknown, "Grof, Dr Stanislav". Available at https://allaboutheaven.org/sources/669/147/grof-dr-stanislav [Accessed August 17 2018]

unidirectional, functions of machine learning algorithms. Among these assumptions is a certain logical positivism reflected in the precept that all knowledge can be determined by computation.

Pasquinelli remarked on the production of metaphor as a sign of genuine intelligence. Psychedelic researcher Nese Devenot identifies the production of metaphor by those under the influence of psychedelics as a justification for the use of non-computational interpretative techniques:

> Linguist R. S. Sharma writes that the fundamental function of poetic language is "to convert denotation into connotation, the language of [objective] reference into that of feeling and mood." Poetry employs creative metaphors to communicate subtle nuances of subjective experience, and the poetic transfer of meaning inherent to metaphor-making constitutes a universal linguistic device for communicating novel and unprecedented experiences. In the process of verbalizing the interiorized effects of moderate- to high-dose psychedelics, poetic language and creative metaphors are often evoked spontaneously. Since scholars of poetry are trained to discern meaning in non-ordinary language, literary scholars are well positioned to make meaningful contributions in the context of qualitative research that seeks to determine the significance of psychedelic trip reports.[15]

The use of qualitative methods allows psychedelic scientists to observe a breakthrough of machinic epistemic finitude. The use of hypothesis-generating methodology leads to insights which indicate a genuine connection between psychedelic psychotherapy and abduction, a power which surpasses the limits precoded in predictive analytics.

Conclusion: Against Algorithmic Realism

Capitalism reduces cultural history to the ontological plane of realism. "The power of capitalist realism," Fisher writes, "derives in part from the way that capitalism subsumes and consumes all of previous history: one effect of its 'system of equivalence' which can assign all cultural objects, whether they are religious iconography, pornography, or Das Kapital, a monetary value."[16] Much like capitalism, computation also homogenizes its objects. Digitality reduces various entities to the same ontological stratum (that of discrete, datafied bits and bytes) and sp forecloses that which might otherwise exist as ontologically or epistemically incommensurable or truly "other."

But the future relies on epistemic otherness. If there is no space for it to acknowledge the possibility of unknowable terrain, technoscience will have succumbed to the defeatism described by Fisher in *Capitalist Realism*. Algorithmic realism suppresses that could not be portended by calculation and statistical inference. As an intervention, I present interpretive sensemaking strategies in psychedelic psychiatry as an empirical study in the continued relevance of non-computational intelligence. Cases such as these, which emphasize epistemic uncertainty and multivalent, irreducible contextual factors, should be recognized as social and political outliers.

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[15] Devenot, Nese. (2017). "The Role of Poetic Language In Psychedelic Science Research." Poster presentation at MAPS Psychedelic Science Conference.

[16] Fisher, Mark. (2009). *Capitalist Realism: Is There No Alternative?* Hants, UK: Zero Books, pp. 12

Irreducible to parts that may enter into an economy of equivalences — especially financial currency and digital data — they are sites where true otherness remains.

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