

A Postmodern Critique of Complexity Sciences

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There is no "out there," out there.
- John Wheeler

*It moves. It moves not.
It is far and it is near.
It is within all this
And it is outside all this.*
- Lao Tzu

One does not need to believe in reality to live.
- Jean Baudrillard

Abstract

Postmodernism is presented as a response to traditions of "modern" thought, one that emphasizes the importance of perspective for knowledge production. These notions are then used to critique complexity science and model building. The authors push for more explicit descriptions of models so as to avoid implicit notions of universal applicability in the discoveries of the sciences of complexity. The paper also concludes there is great room for additional work in the philosophy of complexity and calls for further study in future summer schools and throughout academia.

Prelude

The man's study reminds us of his thoughts. The study walls, like the structural beams holding his brain in stasis, are lined with high-level books on the nature of reality as seen from the vantage of the various sciences of his liking. Between the walls, lying in stacks upon all the area of his workspace are collections of domain-specific research documents. These are the flow of his thoughts, moving in and out of his office in concert with the fascinations of his day. A

confusion of perspectives trying to grab hold of a reality believed to exist outside the confines of his study; his mind.

“So,” the professor thinks to himself, “if each agent simply gives away one dollar at every time step to some other random agent, what will happen?”

On the computer screen the automated agents within their cells boastfully flash their wallets in the form of various colors. As the agents go through time step after time step the distribution of money within the society begins to take form. A bar graph to the right of the agent visualization has an x-axis displaying different bins of wealth. The y-axis has the amount of agents within that economic category. Over time, the distribution of wealth stagnates to a form in which there exist many poor, and few rich. For the values in between, a power law distribution interpolates accordingly.

“Exactly. Market economics can be thought of simply as the exchange of money between two random individuals. From that we can begin to realize that inherent in any market system, there lies a distribution of wealth where there are only a few rich, and many poor.”

Invigorated by his discovery, the scientist is quick to share his enthusiasm with his wife. He calls upon her and she enters his chambers. She leans down to kiss the top of his head and looks at the computer screen as she places her hands comfortably upon his shoulders. She notices the blinking lights and the bar graph.

“So random blinking lights make a power law curve,” jokes the professor’s wife.

“One would think, but these lights actually mean something. Something that tells us about the nature of market economies.”

The professor goes on to explain his model in terms of agents randomly exchanging money and how over time, these agents begin to represent the imbalance of wealth found in society.

“Oh love,” bursts his wife, “you have found the secret to Jesus’ preaching. If one is to give away their wealth they can begin to celebrate with the majority instead of lying lonely with rich. If man wishes to be akin to his world, then man should abandon his money.”

“What on God’s green earth are you saying?” asserts the professor. “This is economics, not moral theology!”

“What’s the difference?”

“The difference is that I’m explaining market economy, not making claims on the necessary ethic of man.”

“Well it seems to me that your model is saying that giving away one’s money makes one more in tune with society. More in harmony with his brethren.”

“That’s ridiculous.”

“Thanks for the research; it gives proof to the teaching of Jesus. What a blessing.”

The professor’s wife leaves the den. He stares baffled at the screen. Baffled that his wife found strength in a conviction he wasn’t selling. To her the blinking lights meant a further validation of her belief in the teachings of Christ. To him, inherent economic effects. What does that mean for the objectivity of his model?

Methodology

The philosophical context of this paper was explored at first through literature, then through extensive conversation, some of which was recorded, transcribed, reviewed and discussed. All of the project members contributed in their own ways and as they saw fit, the result being this construction of what we hope has become a meta-essay, an essay in which the style is in the form of its theme. We have infused the rhetoric of this essay with quotes from conversation, story, and illustration to better reveal the varied texture of this postmodern critique.

Postmodern Epistemology

Epistemology concerns itself with this question: how do we know what we know? The word stands for both ways of identifying and interpreting data and information, and also the study of these ways of identifying and interpreting data and information. In short, what has meaning for us as individuals is studied and formalized by philosophers and social theorists according to various epistemologies (Johnston et al, 2000). Postmodernism, in a broad sense, can be thought of as one of these epistemologies.

Postmodernism emerged out of a general frustration with the self-contradictions and non-actualization of the ideals of modern thought. Modernism posited a general progress to humankind where the creation and application of knowledge would emancipate humanity from the shackles of struggle. To confront the reality that knowledge has had a dubious history of

empowerment and not emancipation, postmodernism has brought into question the notion of universality of knowledge, the concept of progress, and the ways in which we pattern and express thought (Lyotard, 1993).

Postmodernism is a response to a very unified and progressive approach to reality. In a world where there's diversity, political ideology and academia and art were all moving toward uniformity. And at a certain point, we reached a critical threshold where philosophers and artists and architects and social thinkers of all kinds, they basically (almost simultaneously) decided – hey, we're not going to put up with this uniformity anymore. We have to bring the world back into a kind of diversified mode of thinking. And we have to embrace tradition and a whole lot of things that we've just been basically ignoring out of a sense of progress.¹

The deconstruction of objective reality and the focus on multiple realities expressed through multiple perspectives have been hallmarks of postmodern thought and application, and yet its application has been as varied as the fields in which it has had great impact. Postmodernism seems to have grown first out of artistic and architectural traditions, but in recent decades has found its way into the social sciences and humanities, especially anthropology and human geography, but also philosophy and literature. And in each of these disciplines, postmodernism has come to represent a different set of ideals and critiques, making it very difficult to discuss postmodernism as a consistent set of themes or as a movement. Instead, it seems to be represented by the variety of ways that different disciplines respond to and critique the projects of modernism. This is the meaning of “post” in postmodernism – that it is a response to the traditions of “modern” thought, and thus occurs after and moves beyond modernism, even as it deconstructs it.

Although postmodernism has had its greatest impact in the social sciences, art and humanities, the physical sciences are not immune to its critique. Complexity sciences have emerged largely out of the physical sciences, and in many ways they share the admonitions of postmodernism against universals, the notion of progress, and decontextualized and overly general knowledge. Many of the works of complexity scientists tend to focus on these very ideals, and so a postmodern critique is quite pertinent. Yet, sensitive dependence on initial conditions and chaos push complexity studies toward context-specific theories and principles rather than universal laws, and so embedded in complexity are the roots of a key postmodern theme, situated knowledge. All knowledge is situated within a particular context and

perspective, for without the context and perspective, the knowledge has no meaning. This is the same for Andy Warhol as it is for Stuart Kauffman.

We want to avoid privileging one way of knowing. But that's one of the problems with science, being one way (or various ways) of knowing but not all ways of knowing. In art, rather than saying these are the standards for what is beautiful, it says there can be multiple perspectives on what is beauty. It's not to say that beauty itself is invalid, just that it's highly subjective. And it's multi-interpretable. So here's the big challenge - how can you have your perspective AND your science? How can you have the subjective and still allow for methods of validity?²

Given such a non-universal and necessarily partial and local perspective of knowledge, there is much that can simply be described as unknowable, leading one prominent postmodern author to introduce a 'theory of the unrepresentable' (Chow, 1993). From this perspective, presentation serves as a way of implying that even greater body of existence that is unrepresentable and unknowable. Does such a perspective have any implication for or resonance with the sciences of complexity?

Complexity is losing the profundity of its focus on there NOT being a sort of Newtonian endpoint to the application of either mathematical or physical ideas and processes to this variety of phenomena that exist. Is it trying to become, by its codification, a field that's studied like a discipline in itself? As we're studying it here, and as it's put into university systems, is it losing actually what is so profound about the way that it approaches things?³

Into the Chasm of Postmodernism: An Individual Perspective

I sit here confused by my inability to express my thoughts in an acceptable form of what it means to know. In the elucidatory form I take now, I feel content in knowing that I am explaining myself. But this isn't science. Yet I feel I know. I'm tired of the objective form. I don't care for the solutions of your domain. Much less do I care for your problems. Your problems are trivial and your solutions are meaningless. They serve no purpose outside the shelter of your world. Care to declare otherwise, science is nothing more but an egotistical drivel of a man wishing to explain to himself, himself within the concepts of himself? Where is your universality? It's not here. It is not anywhere. To the end of my days may I wallow in knowing that what I know will never be known - to neither you nor myself. This is the branch where science refuses to venture. Today and foremost towards the future, science has imposed

constraints on what it means to know. Understanding has been washed through the filter of the central theme. Knowledge left to be validated by a consensus of confusion. And from this moment, I proclaim an undying disgust for your militaristic fashion. Your tyrannical structure. Your blasphemous disgust for the self-indulgent ingenuity lying beyond the framework designed through your own accord. I lie here nauseated by your inability to express the inexpressible and your insistent desire to leave that which is self, to the strangle hold of the collective. Science is the death of the individual. It is a perspective of the objective. An objective that does not exist. Science is the death of the individual. It's the perspective of the objective. An objective that has long created a bland monotonous bridge unifying the concepts of our own internal selves. Bored and weary, I scrape my fingernails along the universal blackboard you call reality in order to cringe your spine for the purposes of my desire to further propel my insanity. Insanity deriving its meaning in the form I choose to elucidate. "In" my "sanity." I leave you to your "world." You have destroyed my hope for the whole and have caused me to sink further into the domain of my mind, where the world presents itself in its truest form. In its only form. What do you seek in making others seek the unseekable? There is nothing "out there." Give it up. There is only "in here." Stir it up.



Figure 1. Artistic Interpretation of Perspective from Within the Chasm.⁴

Climbing Out of the Chasm: Toolboxes and Complexity Science

There is nothing "out there." There is only "in here."

The prelude and the above passage are intended to evoke different thoughts and emotions. The first is a story of frustration in the communication of knowledge. The scientist is

baffled by his wife's inability to come to his conclusions when she comes to her own very different ones based on her personal perspective and convictions. This is an example of the dangers of the western scientific model, and we have seen the effects of these risks becoming reality whenever any discovery of popular and political interest is communicated through the political arena and an obviously biased press.

The second is an inner dialogue of someone who recognizes these risks, the limitations of his perspective and that of science. He uses this recognition and the disgust it creates in him to cast off the motivations and conclusions of science in a fit of deconstruction. He sees the hypocrisy of the project of science and wants nothing to do with it. Not only does he cast off science, but also the entire world that it creates and enacts in order to carry out its pursuit.

The latter passage is quite radical, and taken to its logical conclusion would deconstruct and devalue the majority of what we know as consciousness. Yet, the central tenets of discontent that the author holds are valid. In turn, the prelude describes a very naïve scientist, but much of the work and communication of the complexity sciences contains unspoken and implicit assumptions to which only a fraction of its audience might agree.

If we can't be sure that there is anything 'out there,' and if our entire experience can only be reliably described as an internal construction of reality, social or otherwise, then what attitude can we have toward knowledge? How do we treat our ideas, the meaning we associate with experience, or scientific principles if every individual's own perspective subtly or radically differentiates these ideas, meanings, and principles as they are communicated and pondered? But, if our individual "in here's" are similar, have similar patterns of ideas and thought, or otherwise would agree on the same set of assumptions, can this be the basis of scientific work and the building of models? Is there no use for scientific tools, models, and principles if they can't ultimately be reliably relayed and utilized?

Is there an underlying common mechanism in each of our heads? In each of our experienced bodies, that we can point to in terms of experience or phenomena and engagement with the other world and – is that a basis for determining some sort of universality? Some sort of consistency, standards? Postmodernism says “no” - there are a multitude of perspectives.⁵

We argue for a middle ground between the hubris of “modern” western science and the absolute deconstruction of the “postmodern” critique. There is room for knowledge production

between people, while there are checks to this knowledge production. A responsible science would recognize the limits of the knowledge it creates so as to reduce the confusion and muddling that plagues humanity through claims to absolute knowledge and applicability.

Finding this middle ground would be a monumental task, one more appropriate for a doctoral thesis than a short summer school report. There seems to be great opportunity for further work on the philosophy of complexity, and the authors of this report advocate continued work in this area by future summer school participants. We also recommend that the philosophy of complexity play a greater role in the focus of future summer schools.

Lacking a comprehensive vision for how to treat the dubious relationship between complexity science and “reality,” we offer a couple of small suggestions in hopes that they will inspire more careful science and conclusions in the study of complexity:

- 1) Any scientist or model builder studying complexity should answer the following question: What shared experience is my principle/theory/model based upon? This is a question that should evoke an answer that goes beyond the mere peer review process, as the peer review system consists of only a relatively small number of similarly specialized thinkers. An overwhelming confidence in this process to the exclusion of critique amounts to hubris.
- 2) Model and principle development should include explicitly identified assumptions behind their development to the extent that the author can identify them. This should significantly aid in accomplishing the above first point, and also should help to make the peer review process a bit more critical.

Ultimately all we have is each other. We have to give each other feedback. A lot of times the institutions and mechanisms by which we set up processes for peer review are archaic. But I don't mean peer review necessarily in the journal sense. In general, getting critical feedback. Having dialogue about, what do you think? What would make sense? And talking it through. Ultimately what you're left with is that real dialogue is what you have to have.⁶

It is hoped that this short paper will leave the reader with a sense that absolutes or universal organizing principles are not an appropriate objective for his or her scientific endeavors. However, we also hope that the reader recognizes that engaging with the possibly confusing middle ground above holds the potential to justify and save the study of common

patterns of organization insofar as they represent common interpersonal experience as well as commonality among objects of study.

Epilogue⁷

BC: Maybe there are lessons from the path that postmodernism has taken that complexity could learn from.

JB: Or can see itself not as an end, but as an extension. Postmodernism has very much gone – we're postmodernists. And it's so hypocritical and inherently binary to create a foundation and a definitional space for itself. In fact, it's gone to the absurd. But that might be an interesting point with complexity, to say we're interested in addressing this issue before it happens. Before you reach a period of absurdity.

BC: So we'll probably reach levels of absurdity. But it doesn't have to reach a point of alienation.

¹ Quote from author Champion during a conversation on June 22, 2004. The entire transcript of this conversation may be made available to interested readers who email the authors with their request.

² Quote from author Metcalf during the June 22, 2004 conversation.

³ Quote from author Blakeslee during the June 22, 2004 conversation.

⁴ Illustration and perspective provided by author Rodriguez.

⁵ Quote from author Champion during the June 22, 2004 conversation.

⁶ Quote from author Metcalf during the June 22, 2004 conversation.

⁷ Excerpt of dialogue between authors Champion and Blakeslee during the June 22, 2004 conversation.

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