

COMPLEXITY, POST-STRUCTURALISM, AND CONSILIENCE

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ABSTRACT

Epistemological questions about knowledge of complex systems are not addressed as often as ontological questions about what complex systems are. As with many philosophical issues, one can identify two approaches to answering the former type of question: an analytic and a post-modern approach. In this article, I engage with the latter, specifically a post-structuralist view called Critical Complexity. Critical complexityists defend a radical kind of epistemic perspectivism: Knowledge and understanding are always contextually situated; there are no meta-theories that can grant an overarching meta-perspective of some subject matter of interest (e.g. some complex system). Contra Critical Complexity, I argue that invoking William Whewell's notion of consilience can help us account for successful epistemic inquiry into things like complex systems. On such an account, perspectives can be merged into meta-perspectives, which can be merged into meta-meta-perspectives, and so on. This represents a progressive and hierarchical epistemic schema, one that seems to match what we witness in actual successful scientific inquiry.

KEY WORDS

consilience, perspectivism, complex systems, unity of science, William Whewell, Edgar Morin

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INTRODUCTION

There are numerous ways that complexity theorists understand complex systems. According to Seth Lloyd [1], all complex systems can be understood in terms of *quantum computation*. For Stuart Kauffman [2, 3], we can have knowledge of complex systems by thinking of them as *autocatalytic sets*. According to a group of post-structuralist complexity theorists who call their view Critical Complexity (CC) (notably [4, 5]), there is no grand theory of complexity. There is no meta-theory for coming to know or understand complex systems. For CCists, theories of complexity developed in different domains of inquiry can enjoy equal epistemic legitimacy (or what I will call equal ‘epistemic weight’). As CCists Rika Preiser and colleagues put it, “there is no standpoint for a description, no central perspective for a convincing form of critique” [6; p.266] (see also [5; ch.1, 7-9]). On such a view, no perspective grants objective knowledge of complex systems. There are also no meta-perspectives from where to judge between different perspectives on complex systems [6; p.266, 10; p.269, 11; pp.458-450]. This represents a form of radical epistemic perspectivism.

CCists contrast their approach to what they call the Analytic Approach (AA). AAists assume that complex systems are closed – that we can isolate and study complex systems from a detached point of view (or meta-perspective). This putatively renders AA hierarchical, exclusionary, and oppressive [5; p.193]. For CCists, such an outdated, pre-post-structuralist approach ignores the subjectivity, interpretations, and value judgements we make when seeking knowledge and understanding. As CCist Paul Cilliers puts it, “we have to cope with a multiplicity of discourses, many different language games – all of which are determined locally, not legitimated externally” [4; p.114]. There is, then, just a multiplicity of situated narratives, and none are reducible to any other. There are no unifying meta-narratives.

This kind of epistemic contextualism (often called “epistemic pluralism” or “epistemic perspectivism”) should be very familiar to readers of contemporary philosophy journals. Even if it is not always framed in post-structuralist terms, the idea that meaning, knowledge, understanding, truth, and even reality are indubitably situated seems to represent the presiding paradigm in 21st century philosophy (whether in the analytic or continental tradition) [12-14]. If so, then my argument should have import beyond the scope of post-structuralist interpretations of complexity.

In countering CC’s style of radical perspectivism, I will invoke William Whewell’s notion of *consilience*. In the context of this article’s topic, consilience implies that epistemic perspectives can be merged or unified over time, and that this progressive process engenders increased knowledge and understanding of things like complex systems.

Consilience is, in turn, reminiscent of Edgar Morin’s notion of *meta-points of view*. Morin specifically talks of merging and evolving systems (epistemic or otherwise). This echoes the kind of epistemic convergence I will identify in (at least some of) our epistemic pursuits, specifically scientific pursuits related to the study of complex systems. I contend that such a consilient process more properly reflects successful epistemic inquiry than radical perspectivism does. I will also discuss some examples of consilience in practice, specifically in climate science (which can be thought of as the study of a complex system). Lastly, I engage with three possible objections that CCists might make in response to my overarching thesis.

This article centres around two key notions: ‘perspectives’ and ‘complex system’. For the purposes of this article, we can understand these as follows:

- Perspectives are roughly what some call “stances”, “points of view”, “frameworks”, “paradigms”, or “conceptual schemes”¹. A perspective is an epistemic attitude directed towards some subject matter (e.g. a complex system). Epistemic analyses, comparisons, and judgements are made from a perspective. Perspectives also engender – they inform or generate – knowledge and understanding of the relevant subject matter.
- ‘Complex system’ is notoriously difficult to define. Ladyman and Wiesner [16] have identified up to ten different features that complex systems can have. Following Richardson and Cilliers, I will, nonetheless, take a complex system to be “a system that is comprised of a large number of entities that display a high level of nonlinear interactivity” [17; p.8] (emphasis removed). Interactivity is nonlinear when cause-and-effect relationships between the interacting entities are, strictly speaking, unpredictable. There are other definitions, but this succinct one sufficiently captures the features that are important to my thesis. Examples of complex systems include the economy and ecosystems, but also more abstract systems (e.g. knowledge systems and even ethical systems).

POST-STRUCTURALIST COMPLEXITY

For CCists, Derridean semantics implies that no two models represent synonymously. Models (scientific or otherwise) are always relative to some context of inquiry. They are indubitably indexed to variable locations in space and time, and this affects their fidelity (sometimes in subtle ways). There is always variability (or overdeterminacy of meaning) involved in modelling complex systems² [5; p.101]. On CC’s account, we cannot glean a single meaningful interpretation of the semantic output of any given complex system. We can never reach a final consensus – a ‘master narrative’ – when it comes to gaining knowledge of some complex system (or ‘complex systems’ as a unified concept). Understanding is, likewise, never complete. Complex systems are always open to interpretation and new avenues of understanding [4; p.72]. CCists Minka Woermann and colleagues maintain that “[o]bjective knowledge of complex systems is therefore impossible” [18; p.2]. Presumably, if objective knowledge is impossible, then genuine understanding is as well.

CCists also emphasise how complex systems cannot be absolutely controlled and that their future states or trajectory is unavoidably unpredictable. As Cilliers puts it, “having limits means something is excluded, and we cannot predict the effects of that exclusion” [19; p.264] (see also [8; pp.27-28, 9, 20; pp.28-29]). This means that no representation and no interpretation is privileged over any other. In post-structuralist terms, complex systems are in a perpetual state of non-equilibrium (i.e. always changing) due to the play of *différance*³. We can only ever provisionally and approximately model complex systems. Thus, CC “seeks to explain the world as inherently complex” [5; p.2]; “there is no over-arching theory of complexity that allows us to ignore the contingent aspects of complex systems” [4; p.ix].

CCists contrast their approach with what they call the “analytic approach” to complexity (AA). AA, they say, is exemplified in the work of Descartes, Newton, Chomsky, Fodor, Searle and Habermas [4]. These scholars attempt to secure a fixed reference or rigid grounding for complex systems; they seek “a master key from which everything else could be derived” [4; p.112]. For CC, AA is doomed to fail. One can never faithfully model the subtle relational structures of truly complex systems, such as language, society, or the brain. Cilliers maintains that AA merely avoids, rather than engages with, complexity:

The obsession to find one essential truth blinds us to the relationary nature of complexity, and especially to the continuous shifting of those relationships. Any acknowledgement of complexity will have to incorporate these shifts and changes, not as epiphenomena, but as *constitutive* of complex systems [4; p.112] (original emphasis) (see also [22]).

On CC's account, AA mistakenly subscribes to a strict formalism; it conforms to a precise kind of epistemic logic [4; ch.1]. It reduces a complex system to its purportedly "important" parts, resulting in an inevitable loss of knowledge and understanding.

CCists stress that we must remain cognisant of the inescapable fact that our models are exclusionary approximations of a complex world. The information and meaning that is excluded can 'loop back' to affect the system and our knowledge of it in unpredictable ways. Thus, says Woermann, "disorganisation and reorganisation are as characteristic of systems as organisation itself" [5; p.35] (see also 20; pp.27-28). The take-away is that there are no meta-models or meta-perspectives; "there can be no meta-position that legitimises the framing practices that we employ in our theories" [18; p.3] (see also [19; p.259, 22; pp.8-13]).

Much of what CCists say is accepted by most complexity theorists. It seems uncontroversial that a complex system's semantic or informational content cannot be precisely (i.e. absolutely) epistemically captured. The problem is that CCists extrapolate from this relatively mild fact to a kind of laissez-faire epistemic openness (i.e. the claim that all knowledge and understanding is unvaryingly contextualised). In other words, there are no (epistemic) meta-perspectives from where to judge between different (epistemic) perspectives. This suggests that no perspective is any better than any other – no perspective has any more epistemic weight than any other – hence what I am calling "radical (rather than 'mild') perspectivism".

I aim to show that we can embrace epistemic imprecision (or vagueness) without adopting AA's style of absolutism or CC's style of relativism. As Cilliers correctly claims, the "fact that our knowledge is limited is not a disaster, it is a *condition* for knowledge. Limits *enable* knowledge" [19; p.263] (original emphasis). However, CC concludes that knowledge and understanding are always limited to perspectives that cannot be judged. I will, instead, suggest that perspectives can be evaluated against each other and even ranked in terms of the degree to which they confer knowledge and understanding (i.e. the degree to which they carry epistemic weight). Some perspectives are epistemically better than others, and we can make sense of this by invoking the notion of *consilience*. Meta-perspectives enable judgements between (micro-) perspectives, and this represents a hierarchical and progressive schema for the ongoing accrual of scientific knowledge and understanding.

On my account, even if there is no final all-encompassing *God-perspective*^A, some perspectives encompass others. As knowledge and understanding evolve over time, new perspectives can provide an overview of two or more old perspectives and thereby grant knowledge and understanding that transcends the original perspectives. This is consilience. I will argue that, in science, there is an ongoing consilience of epistemic perspectives. Before doing so, I should introduce this key notion of consilience – a notion first developed by the 19th century English polymath William Whewell. Consilience is, in turn, reminiscent of French sociologist and philosopher Edgar Morin's notion of "meta-points of view", which I will discuss in the section thereafter.

WHEWELL AND CONSILIENCE

Consilience is more specifically what Whewell called the "consilience of inductions". Ilkka Niiniluoto sums up the concept nicely:

[Consilience] takes place when 'inductive' steps from different classes of facts lead to the same results, that is, when two separate generalisations or laws are found to be consequences or special cases of the same comprehensive theory [23; pp.22-23] (see also [24, 25]).

So, a scientist (or any inquirer for that matter) comes to understand two or more previously disparate facts as actually being subsumed under a single theory. That theory can then be

merged with other similarly subsuming theories, and so on. The consilience of inductions is cumulative and progressive. Theories previously applied to separate classes of facts come to be understood as parts of the same overarching theory.

Scientific laws can undergo the same kind of unificatory process. Whewell [26; bks.II, III, XII] uses the example of Newton's unification of Kepler's laws of planetary motion. Kepler's laws "jump together" when shown to be a consequence of Newton's laws of motion and law of universal gravitation. Newton both (a) showed Kepler's laws to be a limiting case and (b) unified the celestial motion of planets with the terrestrial motion of falling bodies. Facts previously thought to be governed by different laws and explained by different theories became subsumed under Newton's unificatory framework (see [24] for detail). Before consilience,

the facts are seen as detached, separate, lawless; afterwards, they are seen as connected, simple, regular; as parts of one general fact, and thereby possessing innumerable new relations before unseen (Whewell quoted in [27; p.281]).

Whewell thinks of science as an (inverted) "genealogical tree": there are various branches of science that are "uniting their ramifications so as to form larger branches, these again uniting in a single trunk" [26; p.241] (see [28; pp.262-263] for a similar metaphor). Put otherwise,

[t]ruths once obtained by legitimate Induction are Facts [and] these Facts may be again connected, so as to produce higher truths: and thus we advance to *Successive Generalizations* [26; p.xviii] (original emphasis) (see also [29]).

Whewell did not talk about "(epistemic) perspectives" per se. He did, however, mention a "point of view":

An Induction is not the mere *sum* of the Facts [...] The Facts are not only brought together, but seen in a new *point of view*. A new mental Element is superinduced; and a peculiar constitution and discipline of mind are requisite in order to make this Induction [26; p.xxxix] (emphasis added; original emphasis removed).

As we will see in the next section, a point of view is analogous to an epistemic perspective. In any event, we can see how perspectives are similar to theories. Both perspectives and theories provide some inquirer with a sort of epistemic 'window'. They both serve as abstract functions that grant knowledge and understanding about something of interest in the world. A theory or perspective transforms some facts (or data or phenomena) into a neatly comprehensible 'package' – a package that an interested inquirer can use to gain knowledge and understanding (or, as Whewell suggests, possibly even truth). If so, then, like theories, perspectives can undergo the same kind of merging, unificatory process over time (or so I will argue).

MORIN AND POINTS OF VIEW

At times, Morin alludes to the kind of perspectival epistemic hierarchy I am suggesting. He writes of

an incitement to surpass knowledge by the construction of a meta-system, a movement, which, from meta-system to meta-system, causes knowledge to progress ... [30; p.28] (see also [13, 31]).

Morin equates systems and meta-systems with both living organisms and scientific ideas. Indeed, on my account, scientific ideas and claims are made from perspectives, and these accumulate through time via the kind of progressive evolutionary schema Morin seems to have in mind. He puts the general idea as follows:

[T]he point of view of complexity tells us precisely that it is crazy to believe we can know things from an omniscient point of view, from some supreme throne looking down upon the universe. There is no omniscient vantage point. But what

we can do to avoid total relativism or ethnocentrism is to construct a meta-point of view. It is as though we were imprisoned in camps but still capable of building look-out towers and, from this perspective, could see the camp along with what's going on in the outside world. We can establish meta-points of view, however limited and fragile [30; p.92].

Here, Morin intimates at the kind of epistemic consilience that we saw Whewell express in the previous section. Morin also seems to understand “point of view” and “perspective” to be synonyms. I will do likewise (the same goes for “meta-point of view” and “meta-perspective”). Even if we cannot adopt an ultimate God's-eye perspective – an “omniscient point of view” – we can build meta-perspectives that engender knowledge and understanding of previously diverse perspectives. As before, this process is cumulative and convergent. A meta-point of view or meta-perspective grants knowledge and understanding that supersedes what preceding perspectives had to offer.

Morin also thinks of complex systems in evolutionary terms. Because complex systems are open systems, they can merge with systems in their environment to form “meta-systems”. Similar to a meta-perspective, a meta-system is a system that “results from the mutually transformative and encompassing interrelations between two previously independent systems” [30; p.106]. These meta-systems are themselves open systems that can likewise merge into meta-meta-systems and so on. When systems merge, “a new systemic totality is created, which becomes the meta-system with respect to both ...” [30; p.108].

By analogy, Morin [32] notes that an H₂O molecule has emergent qualities or properties that the H and O atoms do not have individually. Two H atoms and one O atom have certain properties when separated. When joined to form an H₂O molecule, they (mostly) maintain their individual properties but also take on new emergent properties, such as viscosity and solubility.

Morin further notes that complex systems produce both order and disorder. Via a kind of looping process involving interactions between ‘inside’ (the system) and ‘outside’ (the system), “[o]rder and organization... are capable of gaining ground on disorder”⁵ [33; p.49]. This gives rise to a type of looping process that generates, not only further order and disorder, but also more ‘higher order’ systems [30; ch.3]. Since knowledge systems are, presumably, complex systems, it follows that knowledge is capable of progressing by way of such an evolutionary process. Although (complex) epistemic systems generate both ignorance and knowledge, knowledge can win out in appropriate conditions⁶. On my account, these conditions are exemplified in Whewellian consilience⁷.

CONSILIENCE VERSUS RADICAL PERSPECTIVISM

We have seen how post-structuralists – specifically CCists – advocate for a kind of radical perspectivism. Such a view naturally conflicts with the progressive themes I have been discussing in the last two sections.

Cilliers states, for example, that “having limits means something is excluded, and we cannot predict the effects of that exclusion. Knowledge is a fragile and, above all, *contingent* thing” [19; p.264] (original emphasis). Yet, he goes on to claim that complex systems

have mostly robust structures, which change over time and enable the system to respond to different circumstances. It is, therefore, incorrect to associate complexity with ... notions of chaos, randomness and noise [19; p.264].

The problem is that, if epistemic structures (like knowledge and understanding) represent a kind of complex system, then they can “change over time” and “respond to different circumstances”. Like other complex systems, epistemic structures should, consequently, be

“robust” rather than “fragile”. Knowledge and understanding can accumulate and advance; they are not necessarily fragmented and indubitably contextualised⁸.

Cilliers further maintains that post-structuralist thinking involves a “flight from universal principles and unifying meta-narratives” [34; p.11]. Likewise, for Woermann, CC entails a “denial of unity as an ontological or epistemological imperative” [5; p.2016, 8]. This contradicts the Whewellian motif I am defending, where there is a nesting or hierarchy of perspectives (a consilience of perspectives).

Note that a meta-perspective (a perspective unifying two other perspectives) would not simply be equal to the sum of the perspectives it unifies. It would, in a sense, be epistemically ‘superior’ to the perspectives it unifies (it would have more epistemic weight). This is because a meta-perspective grants knowledge and understanding (or even explains) the perspectives it encompasses. It might even facilitate new epistemic opportunities (new avenues for research and knowledge-accrual). This could involve identifying previously unseen connections between ostensibly disparate facts or theories (i.e. opportunities for further unifications).

Oddly enough, an example can be drawn from Cilliers [34]. In the context of a critique of the supposed opposition between ‘difference’ and ‘identity’ in business ethics, he writes the following:

In order to recognise a *difference* between A and B, they must in the first place be identifiable *as* A and *as* B (in their singularity), and secondly, they must, even if only slightly, share something that makes a comparison possible (there must be some element of identity). Moreover [it] is not really possible to talk of the difference between A and B if A and B are the only two things under consideration. The difference between apples and pears can only be understood in terms of what they share, e.g. that both are fruits [34; p.12] (original emphasis).

This (implicitly at least) hints at the notion of consilience. Indeed, on my account, someone who identifies apples and pears as both fruit assumes a meta-perspective and articulates a meta-theory, one that is absent when she only considers apples or pears (and not fruits). Someone who thinks in terms of apples, pears, *and* fruits surely has a better understanding of the relevant subject matter by (a) comprehending three things instead of one or two and (b) realising how those things interrelate (vis-à-vis ‘fruitiness’). This person (with her meta-perspective) has better knowledge and/or understanding of the pertinent topic of interest. (I will discuss a less trivial example in the next section).

Arguably, we can only begin the process of analysis and then gain knowledge and understanding when we identify commonalities in the world (when we merge facts or theories). If not, then inquirers would constantly be dealing with a haze of disordered (and therefore useless) data. If we cannot recognise any (unificatory) patterns in the world, then we cannot have knowledge or understanding (see [13, 31] for more). It follows that knowledge and understanding appear to be intimately tied to unification (I press this point in the next section). A commonality or a pattern, in this sense, is a reduction or compression of complexity, one that can facilitate knowledge and understanding. Conversely, when we lose unification, we lose knowledge and/or understanding.

Given the above, we can think of ‘understanding’ as synonymous with ‘common understanding’. A common understanding (arrived at via the consilience of perspectives) involves quantifying over, or drawing the essence from, a putative disparity of facts or theories. By its very nature, this process seems to involve compressing or reducing the information content of many epistemically relevant ‘things’ into one simpler ‘meta-thing’. This entails eliminating redundancy while capturing the epistemic essence from some plurality.

This sentiment outwardly contradicts the radical perspectivism expressed in claims like this one from CCists Tanya De Villiers-Botha and Cilliers:

[As] [e]ntities embedded within complex social environments, we have to make use of various meaning-given frameworks and assumptions. Since we cannot step out of our complex environment to view these frameworks omnisciently, we have to make choices based on the contingent, local knowledge and options available to us [35; p.37].

Statements like this seem to overlook the Whewellian (and Morinian) insight that knowledge can be unificatory without the adoption of an “omniscient” God’s-eye view. We do not need to see ‘everything’ to see that some things are connected or unified (i.e. consilient). De Villiers-Botha and Cilliers do not seem to consider that some knowledge systems are better than others (even if none introduce omniscience). We do not have to choose between an absolute God’s-eye view (epistemic absolutism) and radical contextuality (epistemic relativism). There can, instead, be a nesting of epistemic perspectives granting different degrees of knowledge and understanding.

CONSILIENCE IN APPLICATION

CCists are correct when they observe that complex systems cannot be absolutely epistemically reduced for the purpose of gaining infallible knowledge or understanding. However, they follow Derrida in concluding with radical perspectivism. If my argument in the previous section is on point, then this move is too drastic. The fact that there is some vagueness or imprecision in our modelling practices does not mean that those practices are irreconcilably contextualised. CCists exaggerate the degree to which the complexity of complex systems renders knowledge and understanding (and truth, meaning, and reality) irredeemably situated.

An important example of consilience in practice comes from climate science, specifically the work of Syukuro Manabe, Klaus Hasselmann, and Giorgio Parisi (which won them the 2021 Nobel Prize in Physics). Manabe and Hasselmann developed models of the Earth’s climate capable of predicting how increasing levels of carbon dioxide in the atmosphere raise global temperatures over time. By studying the interplay of disorder and fluctuations in complex systems, Parisi developed models that predict such systems’ long-term behaviour. These scientists’ research suggests that short-term weather models can be suitably adapted for long-term climate predictions (see [36] for detail).

For the purposes of this article, it is important to note that the theory of human-caused climate change that Manabe et al.’s work supports does not stand apart from the rest of science. It can, instead, be thought of as a consilient meta-theory, one that relies on (at least partly) merging theories in several diverse scientific fields. These include meteorology, oceanography, physics, chemistry, and complexity science (see [37] for detail). Specific theories in these disciplines would include the greenhouse gas theory of atmospheric warming (physics and chemistry), fluid dynamics and thermodynamic circulation models (meteorology and oceanography), radiative transfer theory (physics), the theory of feedback mechanisms and nonlinear dynamical systems (complexity science), and ocean-atmosphere coupling theory (oceanography and meteorology). Together, these interlocking theoretical frameworks provide the foundations on which the broader meta-theory of anthropogenic climate change rests.

Over time, theories in diverse ‘low-level’ sciences have consiliated into the theory of human-caused climate change – a theory expressed in the ‘high-level’ endeavour we call climate science. Although we cannot be certain that some future discovery will not falsify the theory of human-caused climate change, our (fallible) commitment to the theory is justified by its consilience (and, of course, the empirical evidence) (see also [38]). Arguably, the same applies to similar ‘higher-order’ scientific constructs, such as (the standard or textbook) versions of evolutionary theory and information theory.

Moreover, certain complex systems previously thought to be irreducibly complex have become better understood in terms of simple parts or laws. For example, the complex informational and cognitive activity in the brain is notoriously recalcitrant to modelling. Yet, ongoing instrumental and formal advances in cognitive science are aiding in the progression of our understanding of brain activity in simpler (i.e. unificatory) terms (see [39]). Likewise, complex bird flocking behaviour (although previously mysterious) is now relatively easily understood in terms of individual birds following local rules (see [16; pp.97-98, 40; pp.34-44] for informative explanations of the complex flocking behaviour of the famous starlings over Rome). As before, this accrual of knowledge and understanding outwardly involves the kind of consilience I have been highlighting.

To further press the point, here is a hypothetical example of consilience. As mentioned in the introduction, Seth Lloyd understands complex systems in terms of quantum computation, while Stuart Kauffman does so in terms of autocatalytic sets. We can say that Lloyd comes to his conclusion by adopting a computational perspective, while Kauffman comes to his conclusion by adopting a biological (or, more precisely, a systems biology) perspective. CCists (and scientific contextualists in general) might claim that both Lloyd's and Kauffman's perspectives enjoy equal epistemic weight, even if the epistemic content of those perspectives is incompatible. This is because of the different, yet supposedly equally warranted, suppositions, models, and methods these researchers adopt during inquiry, given their different contexts.

Now, my claim is that this is not the whole story. Suppose some agent (or 'meta-agent') comes along. Let us call her A+. Suppose further that A+ comes to understand *both* Lloyd's and Kauffman's perspectives. A+ thus adopts a meta-perspective, one that encompasses the other two. This potentially has, at least, two advantages.

First, by being able to consider things from both a computational and a biological perspective, A+ might gain new insights into – better knowledge and understanding of – the nature of complex systems. Her meta-perspective is a new perspective, one that is not contained in either of the previous two perspectives.

Second, and more importantly, in analysing and judging between Lloyd's and Kauffman's perspectives, A+ might come to understand those two perspectives in terms of some more general epistemic structure – in terms of some unificatory meta-theory⁹. This will seemingly be the case even if A+ concludes (like CCists) that the previous two perspectives are equally legitimate (i.e. carry equal epistemic weight). A+'s meta-perspective from where she expresses this (contextualist) claim is granting an insight that was not evident from either of the individual perspectives. A+'s meta-perspective (contextualist or otherwise) must grant a sufficiently high degree of knowledge and/or understanding to warrant the relevant (meta-)claim. If everything proceeds smoothly, then A+ will know and understand Kauffman's perspective, Lloyd's perspective, *and* her own meta-perspective. She will arrive at greater knowledge and understanding than either Lloyd alone, Kauffman alone, or Lloyd and Kauffman simply summed together. This is because she can adopt three perspectives instead of only one or two. This means that she is in a position to potentially gain novel insights into the relevant subject matter and uncover novel connections that were not previously evident. A+ adopts a potentially knowledge- and understanding-producing meta-perspective, one that might allow her to fit things into some overarching epistemic structure (*even if* this structure is expressed in contextualist terms).

Interestingly, despite being sympathetic to post-structuralism, Francis Heylighen and colleagues have suggested the future possibility of an epistemic hierarchy containing what they call "supersystems" and "superagents". They write:

[C]omplex adaptive systems may come to resemble the supersystems studied by systems theory. Such a supersystem can be seen as an agent at a higher level, and the interaction of several such ‘superagents’ may recursively produce systems at an ever higher hierarchical level [41; p.127].

If we accept the possibility of ‘superagents’, then they will presumably adopt what we might call ‘*superperspectives*’ (or what I am calling meta-perspectives or perhaps meta-meta-perspectives).

Indeed, a general takeaway from my overarching thesis is that we indubitably adopt some meta-perspective when we explore multiple perspectives and then gain subsequent knowledge and/or understanding. Assuming we care about knowledge and understanding, evaluating different perspectives *ipso facto* involves adopting an evaluative (or judgemental) meta-perspective – a perspective that (explicitly or implicitly) assumes epistemic superiority over other perspectives. Interestingly – as the vignette about Lloyd, Kauffman, and A+ suggests – this also applies to CC’s post-structural perspective itself. Radical perspectivism is no different from any other view in this regard. It is also a meta-perspective, one that considers a variety of perspectives, how they interrelate, and purports to grant a novel insight – the insight that radical perspectivism applies during the study of complex systems. If so, then CC’s radical perspectivism seems to represent the very kind of meta-perspective that CCists deny (see also [42, 43]).

Although the consilient theories and structures I have discussed in this section are not perfectly (i.e. completely) unificatory, they show the type of merging, progressive epistemic process Whewell and Morin have defended. Meta-perspectives are neither strictly absolutist (or God-like) nor strictly (radically) contextualised. Yet, they can grant us a superior kind of knowledge and understanding compared to what we have without them. This model is hierarchical and progressive. Such a hierarchy can, nonetheless, be collaborative rather than oppressive, and this progress can be piecemeal and exploratory rather than hard-nosed and Whiggish. Meta-perspectives can build on perspectives, and meta-meta-perspectives can build on meta-perspectives. Following Whewell, this process occurs in an evolving, accumulative, and convergent fashion.

POSSIBLE OBJECTIONS

CCists, or those sympathetic to post-structuralist-style radical perspectivism, will likely object to my overarching argument. I anticipate, at least, three primary objections. In this section, I will describe and then respond to each.

FIRST OBJECTION

Woermann has worried that the notion of meta-perspectives introduces a regress problem [5; p.98] (see also [44]). If there are meta-perspectives, meta-meta-perspectives, and so on, then there might be an unwieldy infinity of perspectives. This is a legitimate concern with hierarchical schemas in general.

However, on my account, there is, in principle, some end to consilience (i.e. to the continuous merging of perspectives). Invoking Peirce’s [45] notion of an ‘end of inquiry’ will be helpful here. If the end of inquiry is a future actuality rather than an “ideal” (as Peirce actually seemed to think), then there might be some single overarching, global perspective (a perspective that governs all other perspectives). At the end of inquiry, all perspectives would be united by meta-perspectives, which are united by meta-meta-perspectives, and so on. There would be a single ‘uber’-perspective, one that grants absolute (or presumably infinite) knowledge and understanding¹⁰.

Now, at stated, I do not think that this will happen in practice. Nonetheless, *in principle*, the process of consilience ends once all perspectives have merged with all others. This blocks the regress concern (which is a similarly theoretical or ‘in principle’ notion). On my account, perspectives, meta-perspectives, and so on do not form an infinite chain. This is due to the merging process they undergo. This is enough to deal with the above objection.

SECOND OBJECTION

CCists might respond to my thesis by stating that the kind of nesting I have described is itself a function of context. Woermann, for example, writes that

a nested system is very much the product of the description that one gives to the system. For example, the brain can be viewed as either a nested system within a larger human system, or it can be defined as a complex system in its own right, depending on one’s level of analysis [5; p.29] (see also [47]).

The idea here is that some complex system (whether concrete or abstract) will be (ontologically) isolated or part of a hierarchy, depending on one’s research parameters and suppositions.

There is a sense in which this kind of contextualism is correct (see [40, 48] for (non-post-structuralist) book-length arguments to this effect). I should, however, make it clear that my claim is not that *all* perspectives are consilient. In certain cases, it can be useful (or pragmatic) to treat some system (and the associated epistemic perspective) in isolation. As demonstrated, there are, nonetheless, cases where consilience appears to be occurring (e.g. in climate science).

More importantly, as argued, consilience is intimately tied to knowledge and understanding (not to mention scientific progress) in a way that contextualised inquiry is not. This seems to match our intuitions, especially when it comes to understanding. Intuitively, when some phenomena of interest are disjointed, we do not sense that understanding is present. Suppose that some inquiring agent A is confronted with two mysterious and seemingly disjoint phenomena X and Y. A wants to understand both X and Y. Yet, understanding seems to be absent due to X’s and Y’s disjointedness. Now, suppose some second (more enlightened) agent A’ explains to A that X and Y are, in fact, not disjointed. Properly analysed, X and Y are two manifestations (or kinds) of the same general phenomenon Z (perhaps, X and Y can be jointly incorporated into Z, or X and Y are proper parts of the whole that is Z). We sense that A has now gained in understanding; some understanding that was absent is now present. *Prima facie*, understanding obtains when an inquirer comprehends two previously disjoint phenomena in terms of one overarching phenomenon (or, there is, at least, a higher degree of understanding than before, see also [14, 49]).

In sum, I could perhaps rephrase the relevant part of my thesis in the following normative terms: If we *care* about understanding, then we should be more concerned with consilient (or unificatory), rather than diverse (or contextualised), epistemic perspectives. Arguably, the same applies to knowledge and scientific progress. We have to care about these things in order to (a) pursue them and (b) consider the occurrences that generate them to be noteworthy events.

THIRD OBJECTION

CCists might also object that the apparent instances of unification I have highlighted are incomplete and could, in fact, ultimately fail. Given that past attempts at unification (e.g. Kantian and Newtonian attempts to unify science) have failed, we can induce that future attempts will do likewise. Perhaps, my account of epistemic progress wrongly assumes a Whiggish interpretation of past and future (human inquiry as an inevitable ‘march towards truth’).

This objection is reminiscent of the so-called pessimistic meta-induction (PMI) that is often discussed in the scientific realism/anti-realism debate (first proposed by Laudan [50]; see [51] for an overview). There are thoughtful responses to PMI (e.g. [52, 53]), but the debate can get technical, making a detailed response beyond the scope of this article. For present purposes, I am prepared to accept the PMI challenge. There is no guarantee that consilience will continue. Our epistemic endeavours could turn out to be inherently fragmented rather than convergent. It is possible that the instances of consilience I have discussed are the product of random chance – a momentary glitch – rather than any temporally salient feature of scientific inquiry. That said, we do seem to witness salient cases of consilience, and (as far as I can tell) the only way to predict the future is to induct from the past. If so, then we can reasonably infer that the past consiliatory trend I have highlighted will, *ceteris paribus*, continue into the future.

CONCLUSION

Post-modern-style epistemic perspectivism, contextualism, or pluralism appears to be the presiding paradigm in contemporary philosophy¹¹. I have argued against post-structuralist radical perspectivism – an argument that should have implications for radical perspectivists in general. I then suggested that knowledge and understanding progress via the ongoing consilience of perspectives (meta-perspectives, meta-meta-perspectives, and so on).

Admittedly, my account includes a form of reductionism in that unification or simplicity (i.e. consilience) is the goal of inquiry. This is, however, not an absolutist form of reductionism. I am not claiming that we can, or will, reduce the world, and/or our knowledge and understanding thereof, to some simple law or algorithm. Nonetheless, as argued, the attainment of consilience does seem to grant knowledge and understanding. Even if there is no universal ‘theory of everything’ or actual ‘end of inquiry’, we might be justified in pursuing one anyway. The (mini) consiliences that occur while we pursue an ideal (i.e. unattainable) ultimate (meta) consilience appear to be beneficial (assuming we care about knowledge and understanding). This view suggests a middle way of sorts between radical perspectivism and epistemic dogmatism or absolutism.

By aspiring to consilience and by discovering and adopting meta-perspectives, we do not necessarily embrace dogmatic or dictatorial (or ‘colonial’) epistemic doctrines. Consilience can, instead, involve cooperation and collaboration (see also [13]). By working together – by pooling resources and know-how from different domains – inquirers can make the kind of progress we have witnessed in climate science and similar (meta-)projects.

My view is overtly hierarchical. I contend that this is, however, a good kind of hierarchy. We need not balk at the term ‘hierarchy’ simply because some hierarchies introduce oppression, discrimination, and similar undesirables. In the relevant context, a hierarchy of perspectives can promote epistemic progress and help inquirers avoid pursuing dead ends. Epistemic diversity simply for diversity’s sake seems to have the opposite effect. Inquirers are encouraged to pull in different directions instead of coming together around a common goal (e.g. tackling climate change). As with knowledge and understanding, some perspectives are better than others in helping us achieve our goals.

REMARKS

¹See the collection in [15] for more fine-grained contemporary theories of perspectives and perspectivism.

²Woermann suggests that we should think of scientific models as fictional novels rather than formal tools [5; pp.88-89].

³The notion of ‘différance’ is notoriously difficult to define. We can, nonetheless, think of it as an ontologically significant yet ethereal and nebulous kind of oscillation or “movement” (as Derrida puts it), one that both creates and destroys semantic differences. Différance should be

understood as both noun and verb, both present and absent. Derrida calls it “the systematic play of differences, of the traces of differences, of the spacing by means of which elements are related to each other. This spacing is the simultaneously active and passive ...” [21; p.27]. Différance plays or “dances” between signs (semantic units). It produces, or rather is the production of, fleeting instances of meaning – meaning that is immune to epistemic capture [21] (see also [4; ch.3, 5; ch.3]). In the context of complexity theory, Woermann thinks of différance as “the play of disorder [...] and entropy” within a complex system [5; p.64].

⁴A God-perspective would be the one and only final meta-perspective (or what we might call the “∞-perspective”). This God-perspective would potentially consider every possible perspective from every possible context. It would encompass all possible perspectives and therefore grant complete (or infinite) knowledge and understanding.

⁵For Derrida, the opposite is true; disorder is “stronger” than order even if order can transiently survive [5; p.64].

⁶According to complexity theorists Dominique Chu and colleagues, a theory of complexity “should have a control, prediction or explanatory component, and it should aspire for universality, that is, be applicable to a wide range of diverse phenomena” [20; p.28]. This statement is nicely concordant with the notion of consilience.

⁷As Whewell puts it: [b]efore [consilience], the facts are seen as detached, separate, lawless ... afterwards, they are seen as connected, simple, regular; as parts of one general fact, and thereby possessing innumerable new relations before unseen (quoted in [27; p.281]).

⁸CCists Preiser and Woermann have recently (and surprisingly) stated the following: [D]ifferent knowledge systems are internally validated, when viewed in relation to one another, they give rise to new knowledge forms. Therefore [...] different knowledge systems can contribute to enriched knowledge pictures based on participatory, collaborative research approaches that allow for the bridging of knowledge systems, actors, institutions and processes [9; p.47].

This passage seems to endorse the kind of epistemic progress Whewell, Morin, and I are pointing to. That said, it stands in stark contrast to the things these scholars have said elsewhere (e.g. in various quotes throughout this article; see also [13]). It is, therefore, possible that (at least) some CCists are moving away from Derrida’s style of radical contextualism and starting to embrace the possibility of epistemic unification and progress.

⁹I do not know what such a meta-theory might look like. Perhaps, it would involve quantum biology.

¹⁰This recalls Steven Weinberg’s [46] (often-criticised) “dream of a final theory”. Although such an idea is exciting, I am (highly) sceptical of its actualisation

¹¹On my reading, the same seems to apply in the social sciences, arts, and humanities more generally [14].

REFERENCES

- [1] Lloyd, S.: *Programming the Universe*. Knopf, Cambridge, 2006,
- [2] Kauffman, S.A.: *Reinventing the Sacred: A New View of Science, Reason, and Religion*. Basic Books, New York, 2008,
- [3] Kauffman, S.A.: *A World Beyond Physics*. Oxford University Press, New York, 2019,
- [4] Cilliers, P.: *Complexity and Postmodernism. Understanding Complex Systems*. Routledge, London, 1998,
- [5] Woermann, M.: *Bridging Complexity and Post-Structuralism: Insights and Implications*. Springer, Cham, 2016, <http://dx.doi.org/10.1007/978-3-319-39047-5>,

- [6] Preiser, R., Cilliers, P. and Human, O.: *Deconstruction and Complexity: A Critical Economy*. South African Journal of Philosophy **32**(3), 261-273, 2013, <http://dx.doi.org/10.1080/02580136.2013.837656>,
- [7] Hurst. A.: *Complexity and the Idea of Human Development*. South African Journal of Philosophy **29**(3), 233-252, 2010, <http://dx.doi.org/10.4314/sajpem.v29i3.59144>,
- [8] Human, O. and Cilliers, P.: *Towards an Economy of Complexity: Derrida, Morin and Bataille*. Theory, Culture & Society **30**(5), 24-44, 2013, <http://dx.doi.org/10.1177/0263276413484070>,
- [9] Preiser, R. and Woermann, M.: *Complexity, Philosophy and Ethics*. In: Galaz, V., ed.: *Global Challenges, Governance, and Complexity: Applications and Frontiers*. Edward Elgar Publishing, Northampton, pp.38-62, 2019, <http://dx.doi.org/10.4337/9781788115421.00012>,
- [10] Preiser, R. And Cilliers, P.: *Unpacking the Ethics of Complexity: Concluding Reflections*. In: Cilliers, P. and Preiser, R., eds.: *Issues in Business Ethics: Complexity, Difference and Identity*. Springer, Dordrecht, pp.265-287, 2010, http://dx.doi.org/10.1007/978-90-481-9187-1_13,
- [11] Woermann, M. and Cilliers, P.: *The Ethics of Complexity and the Complexity of Ethics*. South African Journal of Philosophy **31**(2), 447-463, 2012, <http://dx.doi.org/10.1080/02580136.2012.10751787>,
- [12] Tahko, T.E.: *Unity of Science*. Cambridge University Press, Cambridge, 2021,
- [13] Van der Merwe, R.: *How Pluralistic is Pluralism Really? A Case Study of Sandra Mitchell's Integrative Pluralism*. Theoria **38**(3), 319-338, 2023, <http://dx.doi.org/10.1387/theoria.23838>,
- [14] Van der Merwe, R.: *Modern Philosophers*. Worth Press Ltd, Bath, 2025,
- [15] Crețu, A.-M. and Massimi, M., eds.: *Knowledge From a Human Point of View*. Springer, Cham, 2020, <http://dx.doi.org/10.1007/978-3-030-27041-4>,
- [16] Ladyman, J. and Wiesner, K.: *What is a Complex System?* Yale University Press, New Haven, 2020, <http://dx.doi.org/10.12987/yale/9780300251104.001.0001>,
- [17] Richardson, K.A. and Cilliers, P.: *What is Complexity Science? A View From Different Directions*. Emergence **3**(1), 5-23, 2001, http://dx.doi.org/10.1207/S15327000EM0301_02,
- [18] Woermann, M., Human, O., and Preiser, R.: *General Complexity: A Philosophical and Critical Perspective*. Emergence:Complexity & Organization **20**(2), 2018,
- [19] Cilliers. P.: *Complexity, Deconstruction and Relativism*. Theory, Culture & Society **22**(5), 255-267, 2005, <http://dx.doi.org/10.1177/0263276405058052>,
- [20] Chu, D., Strand, R., and Fjelland, R.: *Theories of Complexity: Common Denominators of Complex Systems*. Complexity **8**(3), 19-30, 2003, <http://dx.doi.org/10.1002/cplx.10059>,
- [21] Derrida, J.: *Positions*. University of Chicago Press, Chicago, 1981,
- [22] Dillon, M.: *Poststructuralism, Complexity and Poetics*. Theory, Culture & Society **17**(5), 1-26, 2000, <http://dx.doi.org/10.1177/02632760022051374>,

- [23] Niiniluoto, I.: *Is Science Progressive?*
Springer, Dordrecht, 1984,
<http://dx.doi.org/10.1007/978-94-017-1978-0>,
- [24] Ruse, M.: *Falsifiability, Consilience, and Systematics.*
Systematic Zoology **28**(4), 530-536, 1979,
<http://dx.doi.org/10.2307/sysbio/28.4.530>,
- [25] Van der Merwe, R.: *Whewell's Fundamental Antithesis: A Lineage of Influence.*
South African Journal of Philosophy **44**(1), 55-73, 2025,
<http://dx.doi.org/10.1080/02580136.2025.2462434>,
- [26] Whewell, W.: *The Philosophy of the Inductive Sciences, Founded Upon Their History.* 2nd edition.
John W. Parker, London, 1840,
- [27] Fisch, M.: *Necessary and Contingent Truth in William Whewell's Antithetical Theory of Knowledge.*
Studies in History and Philosophy of Science Part A **16**(4), 275-314, 1984,
[http://dx.doi.org/10.1016/0039-3681\(85\)90014-7](http://dx.doi.org/10.1016/0039-3681(85)90014-7),
- [28] Popper, K.R.: *Objective Knowledge: An Evolutionary Approach.*
Clarendon Press, Oxford, 1972,
- [29] Whewell, W.: *On the Philosophy of Discovery: Chapters Historical and Critical.*
John W. Parker, London, 1860,
- [30] Morin, E.: *On Complexity.*
Translated by Kelly, S.M. Hampton Press, Cresskill, 2008,
- [31] Van der Merwe, R.: *Perspectives and Meta-Perspectives: Context Versus Hierarchy in the Epistemology of Complex Systems.*
European Journal for Philosophy of Science **15**(1), No. 14, 2025,
<http://dx.doi.org/10.1007/s13194-025-00641-9>,
- [32] Morin, E.: *Restricted Complexity, General complexity.*
In: Gersherson, E.; Aerts, D. and Edmonds, B., eds.: *Worldviews, Science and Us: Philosophy and Complexity.* World Scientific, London, pp.5-29, 2007,
http://dx.doi.org/10.1142/9789812707420_0002,
- [33] Morin, E.: *Method: Towards a Study of Humankind, Vol. 1, the Nature of Nature.*
Translated by Bélanger, J.L.R. Peter Lang, New York, 1992,
- [34] Cilliers, P.: *Difference, Identity and Complexity.*
In: Cilliers, P. and Preiser, K., eds.: *Complexity, Difference and Identity.* Issues in Business Ethics **26.**
Springer, Dordrecht, pp.3-18, 2010,
http://dx.doi.org/10.1007/978-90-481-9187-1_1,
- [35] De Villiers-Botha, T. and Cilliers, P.: *The Complex "I": The Formation of Identity in Complex Systems.*
In: Cilliers, P. and Preiser, R., eds.: *Complexity, Difference and Identity.* Issues in Business Ethics **26.**
Springer, Dordrecht, pp.19-38, 2010,
http://dx.doi.org/10.1007/978-90-481-9187-1_2,
- [36] Nobel Prize Outreach AB.: *Advanced Information.*
<https://www.nobelprize.org/prizes/physics/2021/advanced-information>,
- [37] Parker, W.: *Climate Science.*
In: Zalta, E.N., ed.: *The Stanford Encyclopedia of Philosophy.* 2018,
<https://plato.stanford.edu/archives/sum2018/entries/climate-science>,
- [38] Alvargonzález, D.: *Is the History of Science Essentially Whiggish?*
History of Science **51**(1), 85-99, 2013,
<http://dx.doi.org/10.1177/007327531305100104>,
- [39] Thagard, P.: *Cognitive Science.*
In: Zalta, E.N., ed.: *The Stanford Encyclopedia of Philosophy.* 2020,
<https://plato.stanford.edu/archives/win2020/entries/cognitive-science>,

- [40] Mitchell, S.D.: *Unsimple Truths: Science, Complexity, and Policy*. University of Chicago Press, 2009, <http://dx.doi.org/10.7208/chicago/9780226532653.001.0001>,
- [41] Heylighen, F.; Cilliers, P. and Gershenson, C.: *Philosophy and Complexity*. In: Bogg, J. and Geyer, R., eds.: *Complexity, Science and Society*. CRC Press, pp.117-134, 2007, <http://dx.doi.org/10.1201/9781315383132-8>,
- [42] Van der Merwe, R.: *On Paul Cilliers' Approach to Complexity: Post-Structuralism Versus Model Exclusivity*. *Interdisciplinary Description of Complex Systems* **19**(4), 457-469, 2021, <http://dx.doi.org/10.7906/indecs.19.4.1>,
- [43] Van der Merwe, R.: *Complexity, Akrasia, Cognitive Dissonance, and Buridan's Ass*. *World Complexity Science Academy Journal* **6**(1), 1-17, 2025,
- [44] Luhmann, N.: *Familiarity, Confidence, Trust: Problems and Alternatives*. In: Gambetta, D., ed.: *Trust: Making and Breaking Cooperative Relations*. Blackwell, Cambridge, pp.94-107, 2000,
- [45] Peirce, C.S.: *Collected Papers of Charles Sanders Peirce*. In: Hartshorne, C. and Weiss, P., eds. Harvard University Press, Cambridge, 1958,
- [46] Weinberg, S.: *Dreams of a Final Theory: The Search for the Fundamental Laws of Nature*. Pantheon Books, New York, 1992,
- [47] Cilliers, P.: *Boundaries, Hierarchies and Networks in Complex Systems*. In: Preiser, R., ed.: *Paul Cilliers, Critical Complexity: Collected Essays*. De Gruyter, Berlin, pp.85-96, 2016, <http://dx.doi.org/10.1515/9781501502590-009>,
- [48] Massimi, M.: *Perspectival Realism*. Oxford Academic, New York, 2022, <http://dx.doi.org/10.1093/oso/9780197555620.001.0001>,
- [49] Gijsbers, V.: *Understanding, Explanation, and Unification*. *Studies in History and Philosophy of Science Part A* **44**(3), 516-522, 2013, <http://dx.doi.org/10.1016/j.shpsa.2012.12.003>,
- [50] Laudan, L.: *A Confutation of Convergent Realism*. *Philosophy of Science* **48**(1), 19-49, 1981, <http://dx.doi.org/10.1086/288975>,
- [51] Chakravartty, A.: *Scientific Realism*. In: Zalta, E.N., ed.: *The Stanford Encyclopedia of Philosophy*. 2017, <https://plato.stanford.edu/archives/sum2017/entries/scientific-realism>,
- [52] Magnus, P.D. and Callender, C.: *Realist Ennui and the Base Rate Fallacy*. *Philosophy of Science* **71**(3), 320-338, 2004, <http://dx.doi.org/10.1086/421536>,
- [53] Fahrback, L.: *How the Growth of Science Ends Theory Change*. *Synthese* **180**(2), 139-155, 2011, <http://dx.doi.org/10.1007/s11229-009-9602-0>.