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An ecology of bad ideas: approaching human relations with wider nature from an ecological-complexity perspective

In this article, human relations with wider nature are approached from an ecological-complexity perspective. From this viewpoint, environmental issues such as ongoing biodiversity loss and mass extinction are co-implicated with economic and social problems and regarded as symptomatic of a deeper 'crisis of thinking'. Borrowing from Félix Guattari's (1989) *The Three Ecologies*, which foregrounds the overlapping interrelationality of different mental, social, and environmental 'registers', ecological economics and ecopsychology are brought into interdisciplinary dialogue. Here critical attention is drawn to the "ecologics of growthmanship" (bigger, faster, more is better), as explored through the concept of "economism", which illustrates the interplay between the individual (psyche) and its surrounding social milieu. Revealed by this networking is an "ecology of bad ideas" that materially, symbolically, and psychologically detaches humans from wider nature. An ecological-complexity lens provides fresh theoretical insight into urgent collective problems and opens the dialogue for different theoretical, ethical, and practical responses.

Keywords: ecological-complexity; ecologics; growthmanship; economism; negative capability.

Introduction

> If the environmental crisis signifies a crippled state of consciousness as much as it does damaged habitat, then that is perhaps where we should begin.
>
> Paul Shepard, *The Tender Carnivore and the Sacred Game* (1972: xvi).

Speaking to the most recent IPBES Global Assessment Report on Biodiversity and Ecosystem Services, Acting Head of UN Environment Joyce Msuya declares, "[O]ur relentless demand for the earth's resources is accelerating extinction rates and devastating the world's ecosystems" (UN 2019: 1). In response to destructive human-ecosystem relationships, this article attempts to demonstrate the theoretical value that an ecological-complexity perspective – meaning one that prioritises an understanding of relationships and their organisation – holds as a framework for contextualising and negotiating contemporary problems.

An ecological complexity framework foregrounds the interdependencies between different ecological domains, or registers, which include human cultures and collective society; individual human bio-psycho-social interactivity; and the all-encapsulating surrounding 'ecosphere'. This last register involves all life forms as entities, including the inanimate, as well as their ongoing interactivity. Each register, which has been artificially demarcated purely for analytical purposes, is inherently inseparable and is interrelated in a 'non-linear' way. From this point of view, the environmental, economic, social, interpersonal, psychological, and spiritual dimensions of life, although different, are intimately interconnected and are therefore also inseparable.

In order to explore the theoretical avenues offered by an ecological-complexity approach, the article borrows from post-structural psychoanalyst Félix Guattari's (1989) *The Three Ecologies*. Following on from Gregory Bateson's (1972) *Steps to an Ecology of Mind*, Guattari (1989: 28) articulated the unique but overlapping and interactive registers that exist at the scales of mind (human subjectivity), society (or social relations), and the environment. These 'three ecologies', which Guattari (1989) termed the environmental, or natural ecology, the social ecology, and the mental ecology, are considered co-implicated, meaning that each continuously produces effects upon the other in processes of co-evolutionary exchange. When applied to human-wider nature relations, Guattari's "ecologics" (my term) provides an alternative, non-reductive framework that makes more visible the connections between environmental issues and other major problems such as the economic (debt) crisis, the energy crisis, worsening wealth and social inequalities, and so on – all of which are regarded as symptomatic of a deeper

'crisis of thinking'. Bateson (1972: 484), who incidentally shaped Guattari's conceptualisation of 'the three ecologies', remarks, "[T]here is an ecology of bad ideas, just as there is an ecology of weeds, and it is characteristic of the system that the basic error propagates itself."

The first section of the article outlines what an ecological-complexity approach broadly entails. While an environmental approach would ordinarily separate ecosystems from human (social and mental) systems, ecological-complexity differs in that this perspective recognises the ceaseless interconnectivity between different ecological domains, or registers, and establishes their co-implication. Therefore, the use of the term 'ecological' in this context extends beyond the lay meaning, which usually denotes biological ecosystems, because it emphasises the complex interrelationships and interdependencies that exist between wider nature (life-sustaining processes), the human biological body, and the psyche, as nestled within collective social and economic systems of organisation.

In the second section, destructive human-ecosystem relationships are approached by bringing ecological economics and ecopsychology into interdisciplinary dialogue. Both sub-disciplines are ecological in the sense that they foreground the relational nature of reality and prioritise an understanding of relationships (between entities), which are ontologically primary, as opposed to the entities themselves. Fisher (2012: 167) for instance makes the distinction between "ecological approaches that place humans inside the biosphere and, on the other hand, environmental approaches that regard 'the environment' dualistically as a reality external to the human world that we must instrumentally manage". In response to worsening collective problems, which are of concern here, both ecological economics and ecopsychology attempt to "ecologise" their respective fields by re-envisioning them within a relational context. Each offers a critical appraisal of how collective relations with wider nature unfold and, when read together, is alert to an "ecology of bad ideas", which in this instance refers to the collective habits of mind that are inculcated in ecological demise. Given that modern life is increasingly conditioned by the globalised economic order, the work of linking begins with ecological economics, which provides a critical examination of the nature-economy interface.

Ecological economists draw critical attention to the form, function, and processes of economic organisation and, in doing so, reveal a uni-dimensional attachment to gross domestic product (GDP). The obsession with GDP growth as the driver of economic activity, is what ecological economist Herman Daly (2013) terms "growthmanship", which, it is argued, functions as a mental abstraction (idea, or 'map') that disconnects the human economic system from the encompassing biophysical reality (the 'territory') of the 'ecosphere'

(the planet, its inhabitants, and the interactions between them). Explaining how this unfolds, ecological economics uncovers the philosophical premises and normative assumptions that are embedded within the economic order. Specifically illuminated is the philosophical architecture of the economic system, which is problematised due to Cartesian-Newtonian (dualist-linear mechanistic) reductionism and the surmised culture of (unecological) hierarchical separation that this 'ecology of ideas' (re)produces. The uses of brackets as prefix throughout this article is used as a means to emphasise dynamism and interrelationality, since from an ecological-complexity perspective, all events are processual, they unfold and co-evolve.

Thereafter, attention turns to the 'psychocultural' aspects of growthmanship and to the possible implications held for subjectivity (or inner psyche). This article draws primarily from the 'radical' school of ecopsychology, which, in response to declining planetary and mental health, offers a psycho-cultural analysis of ecological crises. As an ecologically-oriented sub-discipline of psychology, radical ecopsychology is highly attuned to the interconnectivity between the seemingly external, 'outer world' of wider nature and the internal, 'inner world' of the human psyche. For instance, Fisher (2013) refers to 'wider' nature as a means to recall that rather than being a part of nature, humans are nature.

Applied to the 'ecologics of growthmanship' (as I have termed it), the inseparability of the inner ecology (psyche) from outer ecology is explored through ecological economist Richard Norgaard's (2016: 47) concept of "economism", which denotes "an evolving, eclectic interweaving of diverse theoretical economic arguments, values, and popular assumptions, indeed deeply held beliefs that have emerged as the dominant secular religion". In this case, economism helps to illustrate how the underlying philosophical predicates of the economic order shape or pattern human relations with wider nature, with significant interrelated material and psychosocial impacts.

In the third section, the central theoretical and practical implications arising from ecological-complexity as an alternative ontology are briefly discussed. Much like an optical illusion that, once seen, cannot be unseen, an ecological lens fosters lateral thinking. In response to the ongoing dysfunctionality of an "ecology of bad ideas", it is suggested that an ecological-complexity lens offers philosophical comprehension of principles that stand in contrast to the dominant ontology of separation. Given that complexity addresses the paradox (both difference and inseparability) of open systems as an ontology (rather than a theory of causation), it provides alternative ways of thinking that meet the epistemological turn. In a similar manner, the tendency towards pluralism and transdisciplinarity found within an ecological re-envisioning, overlaps with an

ethics of alterity (otherness). It is concluded that ecological-complexity offers an alternative, non-linear ontology, and this holds potential in terms of generating different avenues through which to negotiate and respond to shared issues on both the academic-theoretical and personal-practical levels.

Defining ecological-complexity: "a unity in multiplicity"[1]

Recent advances in virology and microbiology suggest that the human body is home to trillions of microbes, without which we simply could not exist. For instance, according to Dr. Zach Bush, humanity is "an amalgamation of life rather than a single species", such is the case that human beings are increasingly referred to within the emerging literature as "supraorganisms" (Bush, cited in Burdick 2022: 1). Herein we find a central ecological premise: that we are both unique individuals and simultaneously inseparable from other beings and the wider environment. This 'co-implicatedness', as characterised by interactive processes of interrelational interdependence, is simultaneously met by an astonishing variety of difference, or alterity (otherness). This type of relational knowledge meets the ongoing complexity paradigm shift. This, in short, refers to a broad system of ideas that comprehends an understanding of non-linear dynamics (interrelational interdependent processes) and accommodates the properties of paradox and emergence.

The history of how scientific complexity has evolved is vast and complicated, but relevant for our purposes is the "post-Odumian" revolution in the 1980s, in which ecology shifted from the study of ecosystem hierarchies (vertical producer/consumer relationships) towards the recognition of interactive networks (Devictor 2017). Out of this shift emerged the idea that open systems (like ecosystems) are dynamic, non-linear, dissipative structures (subject to disturbances), and are affected by processes of constant change (Devictor 2017). Woermann (2016) explains further that complex systems are also paradoxical in that, as open systems, they are interactive but also bounded, or 'operationally closed'. Yet, the systemic 'opening' that defines open systems can only be conceived of in relation to a corresponding 'closing'. In other words, central to an observation of how complex systems function is the quality of difference (alterity), wherein one state presupposes another, which is not a static, hierarchical happening but is rather a relational unfolding with emergent effects.

Knowledge of non-linear dynamics has been taken up and applied to an understanding of various types of (complex) open systems. In ecological economics, for instance, non-linear complexity is applied to an understanding

1 Weinbaum 2014: 293.

of "heterogeneous agents, networks, emergence, and evolution" (Foxon et al 2013: 191). One example is co-evolution, a term originating from evolutionary biology and applied by economist Richard Norgaard (2016) in order to describe the "global to local" feedback that arises between micro and macro levels of organisation (Rickles et al 2007: 933). For instance, Costanza et al (2016: 76) use knowledge of co-evolutionary dynamics to detail how human economic activity has transformed from co-evolving with ecosystems, to co-evolving with fossil fuel combustion.

Regarding philosophical complexity, which includes categories like 'general' complexity (Morin 2008) or 'critical' complexity (Cilliers 2016), Woermann (2016) cites first-order cybernetics and information theory, second-order cybernetics and autopoiesis, third-order cybernetics and artificial life, and General Systems Theory as important precursors to the philosophical engagement with complexity as an ontology. Of particular relevance to the remit of this article, complexivists assert that reductionist analytic methods are not sufficient to understand complex phenomena. Regarding human relations with wider nature, the attempt to reduce environmental issues to technical problems that can be solved by specialist disciplines inevitably requires that complexity be broken down into manageable 'parts', which are first separated and then added back together in order to grasp the 'whole' situation or event (Davis and Sumara (2007: 463-4). While this may be a necessary first analytical step, it also restricts understanding to a simplified, uni-dimensional, or linear approach to highly complex events. This creates the problem of micro-reductionism.

Conversely, in contrast to both Newtonian-Cartesian reductionism (linear and atomistic thinking) and holism (i.e. early systems thinking), a complexity perspective recognises that the unit of analysis (be it the individual person, the family, society, and so on) cannot be adequately explained solely in terms of these parts, nor the whole, with the latter resulting in macro reductionism. Complexity thinking differs in that it comprehends "whole-part mutual interaction" (Woermann 2016: 37). The primary focus is on the interactive processes that arise between the (known) different but co-implicated units, or 'parts'. Therefore, the 'parts' and the evolving 'whole' are taken into consideration at the same time. As a result, analytical attention focuses on how entities or events interrelate, interact, and co-affect in processes of continuous emergence.

Applied to an understanding of human relations with wider nature, an ecological-complexity lens places the analytical focus on identifying what the collective relationship looks like, what mechanisms underlie this relationship, and what (known) effects arise. Such an approach instigates a view towards identifying patterns and understanding connections in order to discern how relationships

unfold – and in this case, deleterious ones. Guattari's tripartite ecologics (the aforementioned overlapping social, mental, and natural ecologies) act as a useful heuristic in this regard by providing a framework able to accommodate the complexity of the human-wider nature interface. Given that modern life is contextualised by a globalised economic system that is increasingly impactful, attention is first paid to the economic order and to the underlying philosophical paradigm that supports it. For this task, ecological economics is invaluable.

Ecological economics and ecopsychology in dialogue

Ecological economics aligns with the aforementioned ecological-complexity paradigm shift under way, which is to say that a linear, closed systems approach is giving way to a complexity-based view that deals with dynamic, open systems. Employing a relational ontological framework, the critical analysis emerging from this vantage point identifies the effects produced by the imbalance of reductionism inherent to the economic order. This centres on the overarching priority of growth, which continues to dominate national and international policy in ways that have "fundamentally and irreversibly" reshaped societies and the ecosphere, which is why Schmelzer (2015: 263) refers to the "quasi-religious" adoration of growth as an "incontestable dictum".

In response to what is considered an outdated and unscientific economic paradigm, ecological economists draw critical attention to economic growth as a mental abstraction that is disconnected from biophysical reality (Daly 2010, Czech 2009). A central issue is that in the dominant economic model, the human is seen as a 'part' of the 'whole' economy – a rational consumer making informed choices and satisfying unlimited wants – while the rest of nature (woodlands, prairies, wetlands, grasslands, etcetera) are 'parts' available for human use. In this fallacious vision, the economy (portrayed as the circular flow of wealth) is viewed as a large, isolated, whole system. This enables mainstream economists to "imagine that the macroeconomy grows into the void, not into the constraining biophysical envelope of the ecosystem" (Daly 2010: 1).

Of particular concern for ecological economists is the scale of the 'throughput' produced by the growth imperative, which is evidenced to be in direct conflict with life-sustaining processes. Accordingly, ecological economists declare the continued faith in growthmanship discourse (measured by GDP) as outdated, confused and ideological, disturbed only by "the invasion of reality into the economists' closed world" (Spash 2017: 5). This speaks to data from the 'Proceedings of the National Academy of Sciences' (PNAS) study, which finds over 500 species threatened with extinction due to human-created habitat loss,

air and water pollution, the use of toxic substances, wildlife trade, and so on (Ceballos, Ehrlich, and Raven 2020). Similarly, the 2020 WWF (2020: 1) Living Planet Index (LPI) shows a 68% decline across 4392 wildlife species.

The divide between ecological reality, which is composed of complex, interrelated, and interdependent open systems, and the mainstream economic system, which is erroneously regarded as a closed system, is explained (in part) by the architecture of neoclassical growth economics. This is derived from 18th century classical physics and employs 'mathematical formalism', in which quantitative modelling drives economic policy. In the traditional science of economics, money circulates "in a closed loop between families (consumers) and firms (producers)", and this system (of ideas) is based on the premise that the human economy is an isolated, 'closed' system. The outcome is that environmental health is merely "an appendix of economic activity" (Calavanti 2010: 53). Crucially, this reductionism leads to a lack of recognition of appropriate scale (the size of human economic activity in relation to ecosystems) and neglects the inability of the economy to grow indefinitely into the larger ecosphere of the Earth. For this reason, the conventional economic model does not account for biocapacity limits and is incapable of incorporating non-quantifiable impacts. On a related note, the International Monetary Fund (IMF 2023) reports an increase in global debt to the sum of $235 trillion for 2022, which is a debt burden that amounted to over 238 percent of GDP at the time. It is important to recognise that government GDP debt is really ecological debt (due to the requirement for future throughput to maintain GDP growth), but is also an entirely unsustainable debt, to be repaid by current and future human generations.

The reductionism at play unfolds through what economists call the 'externalisation' of the (actual, or concrete) costs of endless growth, which arise due to the distorted manner in which GDP accounting functions. Highlighting the faulty logic, Daly (2013: 1) explains that because the empirical measure of growth is GDP, which is based solely on the buying and selling of "goods" and services, this guarantees that negative effects, or "bads", are not detracted from accounting, but are instead added to GDP. For example, the environmental and social costs of pollution are omitted from the calculation, but the clean-up is added to GDP as a "good" (service provided). This, Daly (2013: 22) contends, is asymmetric accounting – such is the case that GDP should be relabelled "gross domestic cost".

'Economism': the spread of market logic

Ecological economics draws attention to the inability of the economic system to account for or "internalise" the unquantifiable (qualitative) aspects of life such as community, love, respect, equality, democracy, health, beauty, joy, and so on. Similarly, the costs incurred by the myriad living ecosystems are too complex (dynamic, co-implicated, interrelated, and interdependent) and subjective to be reduced to objective, quantifiable categories. Expanding the dialogue, social economists like Clive Spash (2017) are concerned with how the patterning and effects produced by the economic order (in terms of the systemic prerequisite for continuous growth) extend to other arenas of life, infiltrating interpersonal relations and individual subjectivity.

Referring to the "social metabolism" of economic activity, Spash (2017: 1) highlights for instance the power dynamics at play and the social effects produced by the interplay between the economy as a system of ideas, its surrounding social milieu (collective psyche), and subjectivity (the inner psyche). For instance, materialist wealth, when socialised as a meritocratic form of personal accomplishment, may create a habitual pattern of thought that falsely legitimises and celebrates gross wealth accumulation as personal success while deeming extreme poverty as personal failure, thereby concealing the complexity of structural constraints as well as privileges. This is a process that has been dubbed "economism" by Richard Norgaard (2016: 47) and denotes the manner in which market logic is co-evolving with cultural values.

In theoretically conceiving of the economy as a closed and limitless system, a logic prevails that only efficient allocation is of concern to economists, which is indeed the case. Efficiency and optimisation of throughput are considered critical to economic activity in mainstream policy. This is problematic however, in that the architecture of economics prevents any recognition of limitation. Take, for instance, the Oxfam (2022) report which shows that during the 2020-2022 period, while global debt escalated and the impacts were felt among the world's poorest, the world's 10 richest individuals saw their wealth increase by over $540 billion. According to the report, should these 10 men lose 99.999 percent of their wealth tomorrow, they would nonetheless still control more wealth "than 99 percent of all the people on this planet" (Oxfam 2022: 1). Spash (2016) comments, however, that if the scale of the economy were to be recognised as limited (due to biocapacity constraints), then issues of (fair and just) allocation and (equitable or inequitable) distribution, are immediately brought to the fore, which would inevitably overlap with a need for philosophy (in terms of the question of values, ontology, and ethics) and would require an engagement with politics. For Norgaard (2016: 51), that mainstream economics has excluded moral reasoning and politics in practice (for the aforementioned reasons) in order to meet the need for objectivity and neutrality is at the very heart of economism.

As a social and mental ecology, economism may be seen as co-evolving with another dispensation – that of 'scientism'. This refers to the dogmatic belief in the epistemic superiority of reductionist, objective data as the source of knowledge, and faith in its value neutrality in its deployment across a wide range of political decision-making arenas. Ecological economists are alert to and problematise scientism on the grounds that the economic system remains entirely dependent upon linear causality and brute data, which reduces collective human-nature interactivity to the solitary issue of GDP growth at the expense of our planetary health. Moreover, these forms of reductionism pattern a myopic (short-sighted), and oversimplified view of potentially catastrophic problems like the economic crisis, the unemployment crisis, the energy crisis, the geopolitical crisis, and so on, by dividing them and thereby obscuring their connections.

One such illustration is the uni-dimensional focus on climate change in response to environmental decline. In reducing ecological degradation to the single issue of carbon and its subsequent incorporation into the stock market as a "good", critical attention is deflected away from equally pressing issues such as biodiversity loss, pollution, ocean acidification, deforestation, land degradation, loss of habitat, and so on, which remain dangerously absent in policy responses. From this point of view, mechanisms like the carbon market, which incidentally is set to "unlock trillions" through mechanisms such as the 115 initiatives that the UN identifies in order to grow the "sustainable finance market" (Van Acker and Mancini 2020: 13), reflect an extension of market rhetoric that allows for the continuation of business-as-usual (unecological economic activity) under the guise of sustainability. In response to this type of market logic, Czech (2009) argues that the primary objective of policy-makers regarding environmental laws and particularly those responding to climate change is not to recognise and fully internalise the deleterious impacts of economic growth, but rather to protect the atmosphere and prevent potentially catastrophic levels of global warming in order to allow business as usual to continue.

Connecting 'inner' and 'outer' ecologies

Ecopsychologists are similarly attuned to the role that systemic factors play in regenerating unecological collective patterning of habitual ideas, organisation, and actions. Referring to the principles that pervade economic policy-making and which govern extractivist industrial action, Theodore Roszak (1992: 72) argues that the "narrow-gauged logicality" of efficient allocation may seem sensible within the confines of economics, but the pattern as a whole is deeply pathological. Habitual patterns of reductionist separation (i.e. infinite growth as detached from biophysical reality) and the blind-sighted exploitation that results,

are what Lewis Mumford calls "mad rationality". For Roszak (1992: 72), it reveals itself "nowhere more fully than in our relations with the non-human world from which our human world rose into being".

From an ecopsychological perspective, dominant cultural values are moulded by the pressures of economic prerequisites (growth at any cost), and these detach humans from nature both symbolically and in concrete ways, thereby impoverishing the human psyche as connections and relationships fundamental to human well-being are lost or degraded – the ongoing mass extinction is a case in point. Through this lens, the (inter)relationship is reciprocal; it works in both directions, such that environmental problems are seen as belonging to a broader "ecopathology". Unecological, separatist modes of thinking (re)generate pathology in the ecological realm (biodiversity loss, habitat destruction, toxicity, etc.), or 'outer ecology', that in turn (re)generate "sociocultural pathology" (Adams 2006: 117), thereby forming deleterious feedback loops. This type of interconnectivity is referred to as co-implication, and its unfolding as a lived process is called 'co-evolution'.

Applied to the potential ramifications of economism under growthmanship, the effects produced by this 'ecology of ideas' are theorised to extend beyond material concerns and are broadened to include the potential effects upon one's subjectivity and spiritual health. Song, Ikei, and Myazaki (2016: 1) remind us that if we define the rise of the industrial revolution as the beginning of urbanisation, then "less than 0.01% of our species' history has been spent in modern surroundings". The remaining 99.99% of our history has been spent living in the natural environment. In part due to the requirements of endless growth, life is becoming increasingly industrialised, digitalised, and dominated by human-built artefacts and scapes. For radical ecopsychologists like Roszak, this ongoing situation presents a fragmentary derailment from the Earth-bound history of our species. Psychosocial ramifications are theorised in that, as Fisher (2013) claims, hyper-consumerism now fashions an extreme sense of hyper-individualism. This, it is surmised, violates the human need for a sense of belonging to the community, including to wider, non-human nature, for which hyper-individualism is a hollow substitution.

The Dutch psychoanalyst Paul Verhaeghe provides a resonating perspective in this regard. In his book, *What About Me?*, Verhaeghe (2017: 4) traces the impacts of the market-based economy on the psychological struggle for identity. He chronicles how economic organisation is affecting all manner of relationships, whereby meritocratic ideals – wedded to a societal view to maximise material consumption – impose on the individual the values of individual success and responsibility for that success, too. In his view, this combination is toxic for mental

health. One example of this is the excessive value placed upon competition at the expense of cooperation, which is a form of economism in the sense that a competitive mindset, escaping the confines of market logic, socialises a deeply comparative society. Here, the individual is insidiously and continuously forced to compete for survival against peers, whether it be at school or in the job market, which propagates an undercurrent of constant comparison – of 'me against you', or 'us against them', meaning that excessive competition inherently socialises a sense of separation as opposed to a relational self.

From an ecopsychology perspective, this is an insult to our evolved relationality in that interpersonal and social relationships are contracted into hierarchical categories, reducing one's place in society to a benchmark of 'better' or 'lesser'. Where there are supposedly constant 'winners', there are 'losers' too. This constant comparison may damage self-worth and esteem and relentlessly demands constant change in order to keep up with an eye always on the future, depriving the present moment of conscious awareness. Some warn that the effects produced by the psychocultural aspects of growthmanship are a recipe for anxiety and depression and this may help to explain why such disorders are now the leading cause of disability worldwide (Global Burden of Disease 2022).

There is resonance between the notion of economism and Guattari's (2000: 33) conceptualisation of what has become known as "semio-capitalism", which denotes how the economic system shapes the collective 'social ecology', whereby the experience of human desire is invaded (colonised) through the internalisation of capitalist values that enter the mental ecology, or inner psyche. Referring back to ecological economics, this ties with what Spash (2017: xiv) calls the "social metabolism" of growthmanship, which he claims is saturated with the malevolent arts of advertising. Due to the systemic requirement for growth and consumerism, which for Scharmer and Kaufer (2013: 1) propagates a value system in which "bigger, more, faster is better", a crisis of identity is perpetually reinforced in which the standard for a 'good life' continually increases in subjective perception, but also objectively, to the detriment of those unable to keep up with the pace.

Theoretical and practical implications for knowledge practices

According to Woermann (2016: 5), complexity as a view of ontology holds fundamental theoretical and practical implications for knowledge practices, ethics, and our understanding of ourselves (in terms of subjectivity). In this instance, ecological-complexity offers a different dimension to interdisciplinary learning by facilitating networking processes. When read together, different

ecological disciplines are able to shed light on the reductionism operating within mainstream economics, which is shown to (re)produce significant effects across the three natural (or environmental), social, and mental ecologies. This type of relational understanding, it is suggested, assists in comprehending the disconnect between the single story of advanced "civilised progress", growth, and prosperity, all while we simultaneously bear witness to mass extinction, air, land, and water pollution, climate change, the economic crisis, the energy crisis, escalating anxiety, and so on. An ecological-complexity understanding as applied to the ecologics of growthmanship reveals entrenched dualist dichotomies that arise from the dominance of a mechanistic-linear ontology, such as the human/nature split and the separation of 'outer' ecology (the encompassing milieu) from the 'inner', internal ecology of the psyche.

In this regard, overlaps are found with aspects of Murray Bookchin's social ecology and various ecological feminisms. In *The Ecology of Freedom: The Emergence and Dissolution of Hierarchy,* Bookchin (1982: 4) identifies and critiques dominant foundational beliefs about the world and our place as humane beings, with a critical focus on the emergence of hierarchy, and problematises a conventional, "instrumental" rationality at the expense of an "ecological rationality". Likewise, the notion that environmental problems are symptomatic of broader social issues connects with a variety of ecofeminisms. In short, foregrounded by various thinkers are the connections that exist between androcentric value-hierarchies (Plumwood 1993), which, it is claimed, have resulted in a widespread logic of domination (Warren 1990), leading to an imbalance in an atomised, "separate self" (England 1993: 38). Although well beyond the scope of this article, it is suggested that the connections between ecological social sciences like ecological economics and ecopsychology, and environmental philosophies, offer a fruitful avenue for future networking.

The challenge to dualism and hierarchy on ecological grounds, as explored in this article in terms of the connections between economism (the hegemony and spread of growthmanship logic beyond economics) and scientism, overlap with critical diversity studies, which (in part) alert to the damages caused by epistemological hierarchies that do not serve humanity but instead homogenise and colonise the cultural milieu, destroying difference and ultimately imposing self-defeating mechanisms of structural violence. For instance, epistemological injustices such as the subjugation of different ways of knowing may be viewed through a complexity lens as patterned (habituated) systems of (hierarchical) thought that first separate, then rank, leading to the imposition of a logic of domination and mindset of control. Ecologics applied to growthmanship suggests that both 'isms' co-evolve with an imbalance towards assertiveness, the valuing of certainty and control, all of which lend to an ethos of absolutism. Arguably,

absolutism is one of the most concentrated and dangerous expressions of dualism, for it is full of conceit (righteousness, certainty), which contracts into an intolerance of difference.

An important theoretical implication arising from a recognition of the interconnections and interdependencies between phenomena as observable on multiple levels simultaneously, is that epistemological hierarchies become illogical. Instead, an ecological-complexity ontology recognises both unity and difference and, as a result, values heterogeneity, not hierarchy. Applied to an understanding of environmental problems on the epistemological level, ecological-complexity results in an alternative 'both/and' philosophical position, and this catalyses the need for an ecological rationality that would foster collaboration between epistemic bodies.

Relatedly, although scientific information provides a valuable model for analysing fundamental issues that underlie the ecological crisis in terms of interconnected relationships, as Desjardins (2013) explains, in the context of the global environmental crisis, we cannot escape the question of value, which raises fundamental philosophical and ethical questions that go hand-in-hand with scientific ones. In reply to the modern scientific attitude in which "questions of meaning and morals are left un- or under-addressed" (Davis and Sumara 2007: 465), and in demonstrating the irreducibility that defines open, complex systems, an acknowledgement of ecological-complexity raises distinct yet inseparable fundamental philosophical and ethical questions that go along with scientific ones. It is therefore suggested that, as an ontology, ecological-complexity not only provides the basis from which to make more visible the dangers of scientism as a logical outgrowth of a reductionist ontology, but by bridging the logical (reductionist) gap that has separated science from philosophy, it also offers a means to engage with an alternative ethics of alterity (or difference) that would meet with scientific developments in non-linear dynamics (or complexity).

An engagement with the non-linear and dynamic character of complexity is not necessarily new, but meets with the ontological characteristics of many different Indigenous and traditional cultures – that while we may appear to be distinct, separate, and isolatable individual entities, we are also producing-products of the world – becomings that are, at some level, indivisible from the dynamic processes of co-evolution out of which we emerge. It is notable that here are innumerable spiritual traditions that embody an understanding of non-dualism, such as the Vedanta schools of Hinduism, the African emancipatory philosophy relationality of Umsamo, which emphasises dynamic and ethical interconnectedness, and the non-duality of samsara and nirvana in some Mahayana traditions.

In regard to the possible implications for inner ecology, complexity thinking requires a departure from "the deeply rooted being-based ontology (essence-object) towards an ontology of becoming (difference-process)" (Weinbaum 2014: 283). Therefore, an ecological-complexity understanding of the human subject brings a sensitivity to the ethical-political dimensions of identity formation and, in this way, speaks to the micro-politics of subjectivity.

On the level of inner subjectivity (or the mental ecology), an acceptance of both interrelational interdependence and difference (both/and thinking) inherently works towards addressing the habitual imbalance of an atomistic, separate sense of self which arguably restricts the flourishing of empathy, compassion, and an ethics of care as cherished, uniquely humane qualities. This is because a mental ecology that accommodates both/and (ecological) thinking is more likely to recognise the importance of a 'relational self' and in this way, is more conducive to humane ideals. As Mathews (2017: 62) remarks, "[F]or the relational self, respect for others is a corollary of recognition of one's own inextricable entanglement with them."

In a more pragmatic sense, perhaps there is some agency, or freedom, to be found in the recognition of both interdependence and individuality simultaneously. As a way to think about unfolding events, ecological-complexity provides comprehension of the contradictions that may be experienced on a daily basis, wherein for many concerned with environmental and ecological discourse and practices, the ability to have an impact (or to affect) is simultaneously experienced along with the ability to be affected – limited by the constraints imposed by the collective in terms of social structures and systems. The pressures exerted by the debt-based economic system are a case in point.

Ecological awareness and exposure to the complexities that this entails may offer some aid in learning to accept the unfolding absurdity, thereby converting negative emotions like confusion, frustration, and dissonance into a more affirmative basis from which to respond to global-level events well beyond individual control. Such is the notion of 'negative capability' which is a term used by Formenti and West (2018) and borrowed from John Keats's poetry, and denotes the transformational power that is harboured by the ability to learn to live with doubt and uncertainty. Incidentally, this idea intersects with recent post-normal science (PNS), which is an emerging research paradigm that is linked to complexity. PNS regards humility and reflexivity as essential attitudinal antidotes that can respond affirmatively to the strong reductionism that imbues the mental ecology.

Additional overlaps arise with social-ecological systems (SES) research within the social sciences, which acknowledges material constraints and forces that affect (such as the processes of economism), while also recognising the agency granted by this awareness for one's 'inner ecology'. As self-reflexive human agents within the structuralist equation, Manuel-Navarrete and Buzinde's (2010: 16) conceptualisation of 'socio-ecological agency' for instance, emphasises "the co-creation between agency and socio-cultural structures". Rather than a source of frustration, perhaps an acceptance of paradox (i.e., both agency and constraint) has the potential to imbue the social field with more uncertainty, caution, and less absolutism in a manner conducive to more gentleness and ecological sensitivity.

Conclusion

In gaining an ecological understanding of the interaction between human beings and their environment, this article has attempted to illuminate hidden connections between apparently distinct phenomena. Generated through interdisciplinary dialogue, ecologics provides a heuristic to see how the micro (individual) level and the macro (systemic) level are in fact "rhizomatically" connected, meaning that visible 'above ground' social structures and systems are connected to an underground system (of ideas). As a result of bridging ecological economics with ecopsychology, the ideological belief in GDP growth as a force for good is revealed through economism, whereby deep-seated human(e) values are distorted by growth economics and manifest through the psychosocial dissemination of growth-based logic. This provides comprehension of some of the dynamics at work in the (paradoxically) homogenising effects of limitless growth and hyper-individualism, which, it is argued, amount to ecological impoverishment of both planet and people.

An awareness of ecological-complexity does more than tie things together conceptually. In the search for a framework that embeds a scientifically informed ethics of care, to use ecofeminist Carol Gilligan's (1982) terminology, it works as an alternative ontology that, in its comprehension of both interrelationality and appreciation of uncontrollability, unpredictability, and uncertainty, overlaps with the (re)valuing of difference, and this connects with an ethics of alterity (otherness). For those engaged in ecological theorising and practice, this perspective may hold the potential to catalyse an attitude of humility, gentleness, and precautionary experimentation, which offers some intellectual support to the call for the 'epistemological turn' towards pluralism and transdisciplinarity. In this way, complexity can function as an ethico-political ontology.

In a spiritual or cosmological sense, an ecological view implicates one in the universal order. As Warren (1993: 35) remarks, "[R]elationships are not something extrinsic to who we are; they play an essential role in shaping what it is to be

human." When translated into the destruction of habitat and mass extinction, this initiates empathy for the ongoing loss and suffering. At the same time, and despite one's self-importance and agency in terms of the ability to affect, the world and its habitual patterns are tugging and pushing in ways that are beyond individual control, which constitutes a 'both/and' paradox. In responding to ecological destruction from a perspective of both agency and inseparability from the milieu, this perspective may offer 'negative capabilities' that on the stratum of one's own personal "ecosophy", could stimulate personal reflection upon one's inner ecology and therein offer opportunity for an attitudinal shift away from binaries, absolutes, and assertiveness. Speaking to critical theory practitioners, in reply to highly complex issues like human-nature relations, an ecological approach enables different vantage points from multiple levels of abstraction to be traversed, and this allows for closer attention to be paid to the interactions between politics and economics and underlying collective ways of thinking. If in the current epoch there is indeed a need to manifest new subjectivities, social relations, and environments, an ecological-complexity ontology may have much to offer.

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