

## Editorial

### Critical Emergence: Complexity Science and Social Policy

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Do we really need to look at complexity science to understand and practice social policy? 'Surely it's just a fad', I hear you say, 'there's nothing really new'. There may be some truths here. There may be a sense in which complexity science is a fad. It may well be that some of what is offered has been seen before. However, as the articles in this special edition demonstrate, there are a range of questions that complexity science invites us to ask, questions about our underlying assumptions as well as questions about how we think of future possibilities for social policy as an academic discipline and field of practice. We are not offering an uncritical translation of complexity science onto the world of social policy. The aim is to explore and develop the insights of complexity science in the specific area of social policy, to explore the specific implications of complexity science for social policy which goes hand in hand with questioning the relevance of some of those claims. What, then, is on offer? What is at stake?

Let's consider the extreme position. Douglas Kiel, in *Managing Chaos and Complexity in Government* (1997), argues we are living in times of rapid change and complexity, times which create increasing demands and pressures on public managers. He suggests the traditional assumptions of public management, based in particular on ideas of bureaucratic organisation, assume processes of incremental change and goals of stability and order. These are no longer feasible, Kiel argues, and public sector managers need to find 'a new worldview, a new intellectual framework, a new paradigm' for 'creating government organizations capable of qualitative and transformational change in performance and service delivery' (p.4). And where should this worldview come from? He argues it is to be found in the natural sciences where 'the new scientific paradigm teaches us that uncertainty, instability, and unpredictability are essential to the creative processes of nature' (p.4). This is the 'sciences of complexity', that is 'complexity science' about which there are a range of commentaries (Brockman 1995; Capra 1996; Casti 1994; Cohen and Stewart 1994; Gleick 1987; Hall 1992; Lewin 1993; Prigogine and Stengers 1984; Waldrop 1992). This is the extreme position in so far as the assumption is that research in mathematics and the natural sciences which has generated a paradigm called 'complexity science' offers a way of understanding the social world and the world of organising social policy. This position privileges particular sites for understanding complexity (namely mathematics and natural science), and down plays, as Hayles (1989) has argued, the 'cultural field' in which 'chaos' has emerged as a positive force, a shift, in Thrift's (1999: 53) words to 'a great sense of openness and possibility concerning the future'.

Nonetheless the extreme position has been powerful and it is hard to overestimate some of the claims made upon complexity science, particularly by popular science writers. Brockman, for example, suggests these insights from complexity science 'will affect the lives of everybody on the planet' (Brockman 1995: 19). In a similar vein, Capra argues the developments of complexity science offer 'a new perception of reality that has profound implications not only for science and philosophy, but also business, politics, health care, education, and everyday life' (Capra 1996: 3). But it is not just popular science writers who celebrate in this way. Within social sciences, Kiel and Elliot (1996) argue that the gap between the disciplines of science and social science can no longer be understood in terms of the differing complexity of phenomena under investigation. Khalil and Boulding (1996: xii) wish to add to what they see as the 'expanding choir calling for the relevance of natural sciences (both physical and biological) to the study of human action, cultural institutions, and social organization', though they argue equally for the relevance of the social sciences to understanding the natural world. The opening must be, they say, both ways (see also Byrne 1998). The 'expanding choir' has even been taken up in more formal initiatives, for example through the Gulbenkian Commission on Restructuring the Social Sciences (1996).

The claims of complexity science can, it seems, be totalising. We are offered a way of seeing the world that will transform our understanding of phenomena while transforming our ways of being, acting and organising. This carries a number of assumptions. Not only does it assume some sort of coherent and ordered body of knowledge which forms a 'worldview', but it also positions other

possibilities as coherent, problematic, as not up to the job. This is the extreme assumption: complexity science can explain everything and replace all that has gone before. Not only might we explain how the dynamics of, say, a neighbourhood are working, but we can also explain the dynamics of the policy organisations which interact and intervene in that neighbourhood. To explain everything is, of course, the appeal of complexity science, but it can also serve to repel. For the discourses tend to posit not a way of looking at the world to be compared with other possibilities, but *the* way of the world. We are invited not to explore possibilities for understanding the world but to see how the world really works. We are invited into, in Kiel's (1997 p.16) words 'a nonlinear paradigm for a nonlinear world'.

The assumptions of this extreme position are problematic but this need not lead to absolute, totalising, rejection for there are possibilities, possibilities beyond either form of totalising claims. Indeed, we need to pay particular attention to the arguments that non-linearity implies that knowledge is local. Hence for complexity science, there can be no universal and totalising laws in a complex world in which what is real is founded on non-linear interaction. All knowledge is local and contextual and so complexity science becomes a meta-account, a general description of how processes work. It is not a reductionist story with first principles from which everything else can be derived. This opens up possibilities. First, 'complexity science' is not given. What complexity science is, is open to question, as recent contributions to *Emergence* highlight ([www.emergence.org](http://www.emergence.org)). And so, when we look at the implications of complexity science to social policy, as in other fields, we can maintain recognition of the important specificities of that world (Hayles 1989). Second, it is not surprising then that authors from within the social sciences (a foundational discipline for social policy (see Byrne, *this edition*)) dispute what the implications are. Shared, to a degree, is the rejection of an anti-foundational relativist postmodernism and agreed is the essentially local character of knowledge, but disputed – though arguably a matter of semantics - is whether instead we have a reconstruction of science and social science (Eve et al 1997), an 'absolute and unregenerate progressive modernism' (Byrne 1998: 158), or 'the postmodern condition, characterised by a multiplicity of representation and heterogeneous discourses which represent a recognition of complexity, but a condition which is relational, which is self-organised, one far from 'anything goes' (Cilliers 1998: iix). In the translation from the natural sciences to the social sciences, then, we are not dealing with a simple move, a simple translation. Rather, when we explore the implications of the complexity sciences for the world of social policy, we cannot fix either complexity science or social policy. Both are negotiated, are relational, both are open to possibilities.

It is an exploration of possibilities that motivated the workshop at which the articles in this contribution were first presented. But why should we even enter in? Why should we be interested in complexity science at all? Well, sticking with the extreme position for a moment it may be the case that, in the context of such totalising claims, there is a need to voice resistance, to offer alternatives and, which is important, to demonstrate the limits of those claims. In the worst scenario, no critical engagement with complexity science renders the possibility of being disempowered when faced with claims by advocates of complexity science about how social policy should be understood, organised and evaluated. A critical engagement also offers other possibilities. To dismiss the value of any engagement means to dismiss the opportunity afforded by, on the one hand, an interrogation of the deeply embedded assumptions of social policy and its methods, and on the other, to examine what useful insights might be on offer. And yes, it may be that in exploring these possibilities we go over old ground, where nothing new appears, and we have heard it all before. However, it seems more than ever before that we need to explore the old ground, to find it again, to explore and challenge the assumptions of foundations which may be deeply buried and out of sight.

In this editorial, then, I neither want to lay down the assumptions of social policy (in practice and as an academic discipline) nor the insights of complexity science. To do either of these would be to deny what motivates this engagement: complexity. It would be to deny the complexity of social policy and the complexity of complexity science. It would be to deny the many ways in which both social policy and complexity science are performed and the many relations they form. It would be to deny that the world is open. Instead then, let's keep social policy and complexity science and the assumptions they carry with them, open. They remain open in the sense they can both be shaped. What I want to do then is overview the contributions of this volume in order to highlight the ways in which the

relationship between complexity science and social policy can meet, to explore what they tell us about complexity science, about social policy, and about the relationship between them.

### *Complex Contributions*

Dave Byrne calls for social policy to move beyond its use of 'a ragbag of methods', not adopting 'solipsist relativism', which he attributes to postmodernism, but instead taking a second option, namely, complexity science. He outlines key ontological (how the world is) and epistemological (how we understand it) features of complexity science, emphasising that complex systems are characterised by non-reducible properties, recursive interactions, emergence, nonlinearity and evolutionary dynamics. Byrne identifies three key implications of complexity science for social policy. First, systems are nested and intersect and interact with each other, not hierarchically but with 'flows in all possible directions'. Second, understanding complex systems means recognising agency matters and that agency is recursive, humans change 'social' and 'natural' systems and they do this with an understanding of them. Third, complex modelling can contribute to such understanding by exploring 'the range of future possibilities understood as discrete, different and multiple but not limitless'. Note though, modelling here is not taken in the sense of mathematics or simple agent (game theoretical) simulations, nor are the models being seen as the 'real' thing, but rather, as a way of representing the world, one in which 'textual description and interpretation should form a part'. Developing appropriate methodologies has been important to Dave's work generally (e.g. Byrne 1998) and this article is no exception where he argues that complexity requires multi-dimensional approaches, for example 'cluster analysis'. His argument is situated in examples of welfare regimes, mental health care and measurements of poverty. He concludes stating that complexity is 'a frame of reference – a way of understanding what things are like, how they work, and how they might be made to work'.

Malcolm Williams suggests that recognition of complexity challenges traditional approaches to explanation and prediction. Drawing on the example of homelessness, he suggests we need to explore how 'homelessness' is not one thing, for there are 'a range of heterogeneous characteristics that give rise to a wide range of symptoms that we term "homelessness"'. Further, those symptoms are 'a manifestation of social complexity and that the emergent properties of that complexity are real'. For the individual, the outcome of homelessness is an emergent and real property of a set of 'nested probabilities of outcomes'. Rejecting multivariate methodology which assumes variables occupy fixed co-ordinates in time and space, Williams argues there is a need to 'make sense of a plethora of antecedent conditions giving rise to a complex range of outcomes'. Drawing upon Poppers' idea of single case probabilities, Williams argues that the 'notion of nested probabilities has enormous implications for the way we think about reality and complexity'. Highlighting the role of the individual and the emergent system, Malcolm then explores the possibilities of understanding 'homelessness'. He suggests three: homelessness is simply a taxonomy (in which individual cases have interactions quite independent from each other); homelessness has the properties of a complex system (where individual cases interact producing emergent properties, for example a set of housing policies); each of the first two possibilities may operate under different conditions, and their difference may depend on the antecedent conditions (there may be a mixture of both). Williams concludes stating how 'a propensity to interpretation of probability is not only conducive to a complex approach, but also suggests a quite different methodological approach', an approach in the early stages.

Phil Haynes paper focuses on the possibilities of using quantitative data and argues there is a need to reassess 'the relationship between quantitative methods and the management of complex policy environments'. Complexity science, he argues, calls for a multidisciplinary approach, it challenges traditional approaches to causality and association, encourages holistic thinking, and permits policy analysts to honestly face the limits of their discipline. Haynes then makes the case for methodological pluralism which requires 'judgement' to '*describe* social complexity using a range of mathematical tools'. As a starting point in our search for appropriate methods, Phil notes that complexity already implies 'two *dimensions of quantitative security*', namely 'time and space'. Critiquing linear cross-sectional models (e.g. regression analysis and factor analysis), he suggests that models should be re-run in different circumstances, 'to test their robustness with different techniques, over time and with different data'. Such 'explanatory models' can be used inductively, as 'an extension of data

exploration, to *explore* the possible interconnections'. The answers will always be partial, he writes, because 'micro and localised study needs to be reconnected with the wider macro picture'. Rather than analysis, the researcher's task is synthesis, in order to take account of the holistic nature of complex systems. Haynes explores the implications of his argument for the management of policy with a discussion of the Standard Spending Assessment and Performance Management in the United Kingdom. He argues that, because numbers are always ideological and subjective, the selection of measures ought to involve 'those at the bottom of the policy process, front line workers and service users'.

In my own paper, I am concerned to examine the role of 'complexity' in the policy process itself. My argument is that a sensitivity to complexity also leads to a sensitivity to the role of 'ignorance' as something which is part of the constitution of policy. The article briefly examines what the policy process would be like if we described it in terms of complexity science, as a complex adaptive system. However, drawing upon three 'episodes' from an ethnographic study of collaboration in social welfare, the article examines the assumptions that are made if we are to use the language of complexity as a language to describe the policy process. The problem is what connections between events do we make if we want to assume those events are part of a policy process? This is important for 'how we make those connections has implications for what we count in – and out – of policy, what we ignore, and, for example, who or what is responsible for different outcomes. Illustrating the problem with a consideration of what assumptions we would carry if we wanted to model the policy process, I argue that there are reductionist and deterministic assumptions in the models from complexity science. Instead, I argue we need to look more closely at 'complexity' itself, and the way complexity means we 'are forced to ignore both what we cannot accommodate and what we do not know about'. This refers to both a problem for analysis of policy but also a problem *in policy itself*. To understand the policy process, I argue, we need to look at the observations in the policy processes, observations constituted in systems of communications. Thus what becomes a part of the policy process – what connections are made – is determined by the communications of the policy process, an important part of which will be ignorance.

Tim Blackman's paper examines the possibilities of complexity theory for offering new tools for social policy. He does this by reflecting on the parallels between complexity theory and performance management, particularly in relation to the role of information and steering through feedback, but then examining the way in which the emphasis of local self-organisation in complexity theory potentially offers alternatives to performance management. Blackman explores his argument through a number of case studies arguing that policy can 'seek to define attractors by constraining system behaviour' through a combination of historical 'lock-in', policy selectivity and the actions of other agents in the landscape. Using the example of his own University, Teeside, Blackman uses the language of complexity theory to describe dynamics of the University student intakes in a complex environment of 'determined unpredictability'. One response for managers is to try and impose order and stability, for example by dampening down through internal negative feedback the possibilities of 'exogenous shocks'. However, to develop a systems more adaptable to new landscapes, he argues, there is a need to pay close attention to the relationships between memory, representation and communication. Blackman concludes with a discussion of the implications of complexity theory for democracy, arguing that complexity points to the anti-democratic tendency of new public management thinking. While they both share the need for regular monitoring, the new public management tends to 'see the results fed back within a coercive and hierarchical audit culture' while 'feedback in complex systems goes directly to the elements running relevant parts of the system and problems are explored openly rather than in an atmosphere of blame and sanction'.

John Darwin's concern is with exploring complexity science in relation to the activities of people working in organisations. He contrasts three different metaphors of organisation - 'clockwork', 'snakepit' and 'rainforests' - examining the assumptions they make about landscape (what we see), mindset (how we think), language (what we say) and toolkit (how we act). Darwin contrasts the language associated to these metaphors, for example, the clockwork with 'order' and 'control', the snakepit with 'disorder' and 'chaos', and the rainforest 'complex' with 'order within chaos'. Darwin argues that there is a tendency to think in terms of 'either/or' logics when thinking about the appropriateness of different models. Drawing on Janssens's 'Four Roomed Apartment' and 'Richmond's Energy wheel' to describe states in organisational life, Darwin uses fuzzy logic to argue that the clockwork, snakepit and rainforest metaphors all offer potential strengths for individuals at

different times in organisations and all are limited in certain circumstances. With this framework, Darwin then identifies a number of methodologies for working with organisation, each useful for different situations in which organisations find themselves. He focuses his discussion on 'Immersive Drama', as a methodology to work with organisations in transition to the 'rainforest' from the 'snakepit'. Immersive drama is a 'role-playing simulation technique' which enables an 'affective and cognitive appreciation of the potentiality of the 'mess' by simulating a rainforest' (complex system). He ends his article with an example of using Immersive Drama to 'review perceptions of clinical governance by stakeholders across the NHS'. He concludes emphasising his argument that the rainforest (complex system) is not always the solution and that different methods are appropriate in different times and contexts.

The final contribution to the volume is by David L. Harvey who has been at the forefront of thinking through the implications of complexity science for social policy (see e.g. Reed and Harvey 1992, 1995). The piece is a response to the journal and offers a contribution which addresses the ways in which we need to develop our understanding of complexity science, and questions that remain unresolved in the application of complexity science to social policy. First he argues, different aspects of complexity science need to be understood in terms of understanding different aspects of complex systems and, in applying complexity science to social policy, we need to think carefully about this relationship. Second, Harvey highlights the nonlinear foundations of social policy and offers caution about the extent to which social policy can deal with the problems of populations, managing institutions and needs of individuals, and thus the role of social policy research in relation to policy formation. So, while it is clear that complexity science can be important to policy studies, we need to consider a range of issues, and Harvey leaves us with some discussion questions to that end.

The contributions to this special edition offer, then, a critical introduction to some of the emerging possibilities of social policy analysis engaging with complexity science. Does so inevitably raises a series of questions and, to emphasise the ongoing research process, we have include a page of 'questions' which have been raised by those engaged in the first workshop and to which future research needs to address. These are not exhaustive but do highlight the critical engagement we need to adopt in seeking to better understand the complexities of social policy and its possibilities.

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