Luhmann and emergentism: Competing paradigms for social systems theory?

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Abstract

Social systems theory has been dominated in recent years by the work of Niklas Luhmann, but there is another strand of systems thinking, which is receiving increasing attention in sociology: emergentism. For emergentism, the core problems of systems thinking are concerned with causation and reductionism; for Luhmann, they are questions of meaning and self-reference. Arguing from an emergentist perspective, the paper finds that emergentism addresses its own core problem successfully, while Luhmann's approach is incapable of resolving questions of causation and reductionism. On the other hand, neither paradigm yet has a convincing response to the challenges of meaning and self-reference.

Introduction[1]

Social systems theory has been dominated by the tradition initiated by Talcott Parsons and developed more recently by Niklas Luhmann.[2] But there is more than one way to build a theory of social systems. As Luhmann himself has written, "Even when a theoretical edifice is offered under the brand name 'systems theory', this does not mean that it is developed exclusively from the concept of 'system'. Many further conceptual determinations, which could have turned out differently, enter in" (Luhmann 1995, p. xxxvii).

In particular, this paper will argue that there is an alternative approach to social systems theory founded on the theory of emergence, with its roots in Durkheim (Durkheim 1901 [1964]) and Buckley (Buckley 1967) and its most substantial recent realization in the work of the critical realists Roy Bhaskar (e.g 1998) and Margaret Archer (e.g. 1995).[3] The paper will investigate whether these two approaches are potentially complementary and open to synthesis, or whether they represent

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[1] An earlier version of this paper was presented to the RC51 sociocybernetics stream at the ISA's World Congress of Sociology in Durban in July 2006. I am grateful to Andreas Pickel and to the audience at that seminar for their useful comments.

[2] For want of a better term this paper will refer to this tradition as functionalism, though Luhmann himself would perhaps have rejected this label. Note that *functionalism* as used here does not refer to a well-defined theory but rather a school of thought. More analytical critiques of functionalism as a theory are available in Hempel (1994) and Mahner and Bunge (2001).

[3] Durkheim and Buckley are also of course significant for the functionalist tradition. A different approach to emergentism in sociology is offered by Keith Sawyer, but this has little in common with systems theory and hence is not considered further in this paper. Confusingly, perhaps, Saywer's emergentism is also derived from a tradition called *functionalism*, but this is the very different functionalism of the philosophy of mind (Sawyer 2005).

incommensurable and inherently conflicting paradigms for social systems theory. Little attention has been paid in the literature to this question and the little that has been said seems to suggest a complementarity between the two. Both Parsons and Luhmann mention emergence in positive terms, though paying relatively little attention to it in the main body of their work (Parsons 1937, pp. 734-49, 765-9; Luhmann 1995, p. 221). On the emergentist side, Archer cites the functionalist Lockwood as a significant influence (Archer 1996b; 1995, pp. 67-9). And as Mingers has pointed out, Bhaskar has employed the concept of autopoiesis, central to Luhmann's work, though again somewhat marginally (Bhaskar 1986, p. 54; 1993, pp. 49, 156; Mingers 2004, p. 407).

In this paper, by contrast, I will argue that the two approaches are deeply in conflict with each other at the ontological level. The paper will begin by introducing the idea of conflicting paradigms in the social sciences, and then apply this construct to the clash between emergentism and functionalism. It will identify the core problems that each of these two approaches seek to address. The emergentist paradigm, it argues, is centrally concerned with questions of causality and reductionism, whereas Luhmann's core problem is the role of meaning and self reference in social systems. The main body of the paper will consider in turn the responses that each of the two traditions makes to each of these two core problems.

This argument is of profound importance for the future of social systems theory. The future success of social systems theory depends upon being able to move beyond Luhmann. Already, the functionalist tradition in social theory is being outflanked by the direct importation of arguments from the latest iteration of general systems theory: complexity theory – as exemplified, for example, by the recent special issue of *Theory, Culture, and Society* (e.g. Urry 2005). By contrast with

Luhmann's work emergentism is already well integrated into complexity thinking and thus provides a route for social systems theory that is both stronger ontologically and more in tune with wider developments in systems thinking.[4]

Paradigms and problems

Kuhn and paradigms

Let me begin by clarifying what it might mean to suggest that emergentism and functionalism are conflicting paradigms for social systems theory. It is perhaps controversial to apply Kuhn's concept of a *paradigm* to the social sciences (Kuhn 1970). In doing so, this paper implicitly selects out some aspects of the concept that may be applicable and neglects others that are not. In particular, it neglects the dynamic of scientific change that Kuhn associates with the concept: the idea that normal science entails the domination of a discipline by a single paradigm, and scientific revolutions occur when a new paradigm replaces it. In the social sciences, paradigms (in the more restricted sense adopted here) are often able to coexist for long periods, with the result that there is rarely a truly dominant paradigm in any given discipline (the most significant exception being the marginalist neo-classical tradition in contemporary economics). Hence *normal social science* includes an element of paradigm conflict and paradigm uncertainty that is excluded from Kuhn's vision of normal science.

The aspects of the concept of paradigm that will be retained here are: (1) A paradigm consists of an interlinked set of beliefs about the appropriate subjects for

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[4] Byrne, for example, has argued for the compatibility of critical realism with complexity theory (Byrne 1998). Smith and Jenks write that "'Emergence' is completely central and necessary to complexity theory" (Smith and Jenks 2006, p. 61).

investigation, the appropriate methods for investigating them, the criteria of a good

theory, the concepts to be used (and their meanings), and the primary theories

explaining them (Kuhn 1970, p. 10). (2) The concepts used within any one paradigm,

and hence the discourses constructed from them, may be difficult to translate into the

concepts and discourses of another paradigm, because they draw their meanings from

their relations with other concepts as they are understood within the paradigm, and

these relations may differ in the other paradigm (Kuhn 1970, pp. 128-9, 149, 198). (3)

There may be no straightforward grounds for selecting between paradigms, because

each is coherent in its own terms and meets its own criteria for good theory (Kuhn

1970, pp. 94, 109-10). Points (2) and (3) are labelled the *incommensurability* of

paradigms by Kuhn (Kuhn 1970, pp. 148-50).

We must, however, qualify the second and third of these points. In particular,

Kuhn rejected excessively relativist readings of *incommensurability* in his later work,

such as the 1969 *Postscript* to his book (Kuhn 1970, p. 205-7; Demir 2004). He did

not intend to deny that those who think in terms of one paradigm can ever understand

another; only that there are obstacles in the way of such understanding, which arise

primarily from the different meanings attached to the same terms within the two

paradigms. The interdependence of concepts within a paradigm means that individual

concepts are interwoven in ways that may make comparisons of individual concepts

difficult. But it is always still possible to translate between these different senses,

provided that we are sensitive to these interweavings (Kuhn 1970, p. 202).

Nor does Kuhn's work imply that adjudicating between paradigms is

impossible; indeed the very fact of scientific revolutions arises from the fact that

scientists *do* adjudicate between paradigms (Kuhn 1970, p. 152). In practice there is a

variety of reasons upon which they base their choices, but perhaps the decisive

characteristic of successful paradigms is that on the one hand they provide answers to new problems that the old paradigms could not explain, while on the other still being able to provide answers to at least some of the core problems of the old paradigms. Kuhn emphasises that it is normal for *neither* paradigm to explain more than a small portion of the full set of problems acknowledged by both, particularly when a paradigm is relatively new (Kuhn 1970, pp. 110, 153-5). Nevertheless, implicit in this account of paradigm change is a criterion for paradigm evaluation: for one paradigm to be superior to another, it should have a set of answers (or at least partial answers) to the characteristic problems of *both* paradigms that on the whole is better than the set offered by its competitor.

This paper will suggest that some of the core problems, concepts, and theories of emergentism and functionalism, are sufficiently different for the two approaches to be conceived of as incommensurable in Kuhn's sense. It is perhaps more debatable whether they fulfil the other criterion for being a paradigm in even the restricted sense introduced above. As Vessela Misheva has pointed out, it is not clear that Luhmann's work is clearly enough specified as a model for further work for it to be operationalisable by other researchers, and similar challenges could be made to emergentism.[5] Hence it may be more valid to see these two traditions as proto-paradigms, though for simplicity I shall continue to use the term *paradigm* in this paper. If we are to begin to evaluate these paradigms against each other, then we must begin by identifying the problems that each takes to be paradigmatic. We can then

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[5] (a) Misheva's comments were made in response to this paper in Durban. (b) Note that Luhmann himself gave the introduction to his *magnum opus* the title 'Paradigm Change in Systems Theory' (Luhmann 1995, pp. 1-11). (c) I have developed one part of a method for operationalising critical realist emergentism in (Elder-Vass 2007b).

compare them by considering the response of each paradigm to the core problems of the other, as well as to its own.

The core problems of emergentism and Luhmann's systems theory

Although there have been many varieties of emergentism over the last 150 years,[6] they have all been formulated as responses to the same core problem: how to account for the apparent causal significance of entities without succumbing to either (a) eliminative reductionism – the idea that it is really only the parts of the entity that have the causal influence; or (b) explanatory dualism – the idea that it is impossible to explain the causal influence of entities in terms of the effects of their parts and the relations between them. The validity of any science higher than fundamental particle physics depends on finding such an account. In the social sciences this has been a central concern, expressed in perpetual debates over methodological individualism and methodological collectivism.

Although emergence is widely relied upon as a response to this problem of reductionism and dualism, most notably by critical realists and by complexity theorists, there has been relatively little systematic explanation in these traditions of its ontology. Partly as a consequence of this, there are a variety of discrepant usages of the concept in the literature. Hence it is necessary before building an argument on the foundation of an emergentist ontology to clarify *which* version of emergentism is being advocated. In particular, this paper does not adopt the 'strong' emergentism characteristic, for example, of the early twentieth century British emergentists (McLaughlin 1992) or of many of those who have discussed this question recently in the philosophy of mind, notably Jaegwon Kim (1998; 1999). Instead it advocates what

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[6] Useful (though partial and thus complementary) accounts of the history of emergentism can be found in (McLaughlin 1992; Blitz 1992; Sawyer 2005, ch 3).

I call relational emergentism. This is the version that has been adopted by critical realists like Roy Bhaskar (e.g. 1978) and Margaret Archer (e.g. 1995), complexity theorists like Murray Gell-Mann (1995) and John Holland (1998), and by a few philosophers such as John Searle (e.g. 1992) and Mario Bunge (e.g. 2003).

By contrast with this tradition, Luhmann is much less interested in general problems of causality and reductionism. Instead, Luhmann's system theory is oriented to problems that are more specific to the social realm, and to its constitution, as he sees it, by meaning and communication (Luhmann 1990b). In particular, he is concerned with the question of *self reference*. Thus, for example, he opens his virtual interview with Sciulli with the statement "The changes in my theoretical perspectives from the 1960s until now have been incited by and are concerned with the importance of self-reference or circularity in theoretical reasoning and in other realities" (Sciulli 1994, p. 37). He sees social systems as systems that can only function effectively if they are self-referential (Luhmann 1982b, p. 60), and a central theme of his work is its orientation to the characteristic problems of such systems. In particular he is concerned with the question of how self-referential systems can develop and sustain a degree of complexity that enables them to respond appropriately to their environments. And he emphasises the need for social theory, as a social system itself, to be self-referential – to explain itself.

How, then, do these two paradigm candidates respond to these core problems? I begin with emergentism's response to its own core problems of causality and reductionism.

Emergence, reduction, and cause

Perhaps the most fundamental concept for any social systems theory is the concept of *system* itself. But even this most fundamental of concepts has a radically different meaning in the two traditions discussed in this paper. For emergentists, systems are (and are composed of) entities; for Luhmann systems are composed of events. These terms are mutually comprehensible, but this means that any usage of *systems* in the context of this debate must be qualified with a recognition of what it means for the paradigm concerned.

For emergentists systems are *entities*. Typically, entities may be identified with *things*, though perhaps not necessarily material things. Thus, for example, atoms, cells, trees, stars, and organizations may all be treated as entities in an emergentist ontology, and thus as systems, and also as parts or wholes in an appropriate context.

In this respect, the emergentist paradigm is continuous with the mainstream of systems thinking. Thus, for example, von Bertalanffy writes "It will be readily agreed that a galaxy, a dog, a cell and an atom are *real systems*; that is, entities perceived in or inferred from observation, and existing independently of an observer" (Bertalanffy 1971, p. xix-xx). His *real systems*, then, are clearly entities. He goes on, however, to add *conceptual systems* to his definition, composed of *symbolic constructs*, and to point out that we represent real systems through a subclass of conceptual systems which he calls *abstracted systems*. It is open to debate whether *symbolic constructs* and the conceptual systems composed of them are entities; the usual approach seems to be to treat them as entities, but of a different sort to *real systems*.

Similarly, Buckley writes:

A systems view of reality allows one to see that it is made of successive layers of

bonded elements, each layer with properties emergent from the previous one:

atoms are particular bondings of more elementary particles (to start at an arbitrary

level); molecules are particular bondings of atoms; biological organs are bondings

of particular biomolecules; organisms are particular bondings of organs; and social

groups are particular bondings of organisms (Buckley 1998, p. 78).

This last comment stresses the point that for emergentists, social systems are

also entities, composed of parts that are in turn entities - human beings. Thus social

systems are to be identified with collectivities, as these are defined by Luhmann.

Entities such as states, business corporations, and families – generically, organizations

– are the most obvious form of social collectivity (Elder-Vass 2005b, 2007a).

However, social institutions such as marriage and property can also be seen as

properties of collectivities – what I have called norm groups or normative

communities (Elder-Vass 2007b). Human beings themselves are also entities with

emergent properties – causal powers that are unique to human beings, but which can

ultimately be explained by the way their physical parts are related together when they

are organised into the form of a human being (Elder-Vass 2007c). Thus, both

collectivities and human beings have emergent properties or causal powers[7], and

social events are co-determined by the interaction of these causal powers (and indeed

those of natural entities that impact on society, such as weather systems and natural

resources exploited by the process of economic production).

Parts and wholes in the emergentist paradigm

The part/whole relation is central to emergentism's response to its core

problem. The very concept of *emergent property,* which is fundamental to its

ontology and its response to reductionism, is defined through such a relation:

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[7] In the critical realist literature, the two terms may be used more or less interchangeably.

emergent properties are properties of wholes that would not be possessed by the parts, individually or collectively, if they were not organised into this sort of whole (Elder-Vass 2005a). In the relational version of emergentism advocated by critical realists and many complexity theorists, such properties can be explained by causal mechanisms.[8] Causal mechanisms are processes that depend upon interactions between the parts, interactions that only occur when those parts are organised in the particular way that constitutes them into wholes that possess this emergent property (Buckley 1967, p. 42; Bunge 1999, ch. 2).[9]

Although emergent properties (and thus the causal powers of entities, whether natural or social) can be explained, they cannot be explained away. They exist only when the relevant type of whole exists, hence they are causal powers of this type of whole and not of its parts. This means that relational emergence resolves the problem of reductionism: it allows higher level properties to be explained scientifically, but it does not allow them to be replaced with properties of the parts in causal explanations because it is only when the parts are organised into this particular type of higher level system that the causal power exists (Elder-Vass 2005a).

In its response to this problem, however, the critical realist version of emergentism under consideration here does not confine its attention to the part/whole distinction. Although its account of causal powers is founded on the part/whole relationship, its application of this to the causation of actual events recognises that

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[8] As Andreas Pickel has reminded me, some emergent properties come about through random interactions of entities. I have discussed the *fleeting* emergent properties that may result from such interactions in (Elder-Vass 2005a, particularly pp. 334-7).

[9] This distinguishes the relational concept of emergence from the strong variety, in which emergent properties cannot be explained at all.

such causation arises from the interaction of systems with other relevant systems in their environment. Events are caused by (actual) interactions between the real causal powers of the entities involved. Thus they are not usually determined by a single mechanism or a single 'law' as in Hempel's nomological-deductive model of causation, but rather are 'multiply determined' or co-determined by a variety of interacting mechanisms, which may be attributable to entities at a variety of levels of the hierarchy of composition (Bhaskar 1978). Causal powers, then, cannot be understood adequately without theorising part/whole relations, but their effects cannot be understood adequately without understanding the relation of a system with its environment.[10]

This, then, is emergentism's response to the problems of reduction and causality. Does Luhmann have one?

Luhmann: autopoiesis and causality

The assumption that systems are entities, composed of parts that are also entities, is widespread in the systems literature outside sociology. But Luhmann, and before him Parsons, offer a very different conception of systems. Luhmann argues that his systems theory has

separated itself from the paradigm of whole and part. The first move in this direction was to replace the traditional difference between *whole and part* with that between *system and environment*… What had been conceived as the difference

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[10] As we shall see, Luhmann's analysis of systems and their environments is very different. In addition to the points discussed below, Luhmann insists that the environment does not consist just of other systems (Luhmann 1982a, p. 230).

between whole and part was reformulated as the theory of system differentiation and thereby built into the new paradigm (Luhmann 1995, pp. 6-7).[11]

Both Luhmann and Parsons break down social systems into unit elements, but for both, these elements are not entities. For Parsons, social systems, and indeed personality systems, are composed of actions, and the fundamental unit of action is the *unit act* (Parsons 1937, pp. 43-5, 731). Although Parsons refers to the unit act as an entity, he makes clear that he means something out of the ordinary by this: "It should be noted that the sense in which the unit act is here spoken of as an existent entity is not that of concrete spatiality or otherwise separate existence, but of conceivability as a unit in terms of a frame of reference" (Parsons 1937, pp. 43-4). In the terms of an emergentist ontology, unit acts are not entities at all; rather, they are a particular type of *events*. As Luhmann has pointed out, Parsons sought to avoid this interpretation of action: "Parsons introduced action as a *relation, and thus not as an event*" (Luhmann 1982b, p. 50). However, "this relation assumes a temporal form, on the one hand by being a process over time, and on the other by being oriented to goals lying in the future. In this sense, action is 'inherently temporal'" (Luhmann 1982b, p. 50). In other words, there is a deep ambivalence in Parsons' conception of the unit act – he seems to conflate the idea of action as an event with the relations involved in it.

Although Luhmann rejects (or at least qualifies) Parsons' attempt to theorise social systems as action systems, and thus to identify the fundamental unit of social systems as the unit act, he embraces the belief that systems can have events as their elements. Indeed he explicitly calls for "the radical temporalization of the concept of element" and a recognition of "the fact that the elements composing the system can

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[11] See also (Luhmann 1982a, p. 229). Knodt sees the system/environment distinction as the "guiding difference" of his theoretical system (Knodt 1995, pp. xviii-xix).

have no duration" (Luhmann 1995, p. 11). But he offers a different kind of event – communications – as the fundamental unit of social systems (Luhmann 1995, pp. 137-9, 163-5). Just as Parsons suggests that the undecomposable unit of action systems is the unit act, Luhmann argues that "The elementary, undecomposable units of the system are communications of minimal size… An elementary unit has the minimal meaning that is necessary for references by another communication" (Luhmann 1990a, p. 4). While Parsons seems to have been ambivalent over the question of whether unit acts were really entities or events, Luhmann is quite explicit that his theory describes "fully temporalized systems that use events as elements" (Luhmann 1995, p. 449).

Luhmann does recognise that he has made a break from the systems theory tradition, and in particular from first-order cybernetics, when he writes:

In fully temporalized systems that use events as elements, there can be *no causal circularity* on the level of the elements. Theories that give foundational significance to such circularity, for example, theories of cybernetic regulation, overlook the elements' temporal 'nullity'. Events disappear as they emerge: they are no longer available to react in the following instant… In order to achieve reversibility, one must form structures. This is an insight of far-reaching significance. It implies, among other things, that feedback control-loop cybernetics cannot be a foundational science (Luhmann 1995, p. 449)

Here the argument is that first order cybernetics depends upon the persistence from one moment to the next of the system being regulated, but a system composed of events has no such persistence; it exists only as a series of events. This argument, however, begs an obvious question: is it cybernetics that is wrong, or the concept of a system whose components disappear as they appear? Whether or not it is

"foundational", first order cybernetics clearly has many practical applications in physical and biological systems. Hence at least some systems do demonstrate persistence, and this would seem to validate the conventional way of theorising them: as systems composed of entities. Luhmann stops short of dismissing first-order cybernetics entirely, but fails to explain how we should reconcile his view of systems with the consequence: that any tenable systems paradigm must accommodate entity-based systems, whether or not there are also event-based systems.

A more radical challenge to the coherence of Luhmann's event-based systems arises if we question whether it is compatible with *second-order* cybernetics. Luhmann makes this, the study of self-observing, self-referential systems, the centrepiece of his systems theory. But the problem of persistence is of fundamental importance here too. How can a system observe itself if its elements disappear from moment to moment? What is it that is doing the observing? In the conventional sense of 'observe' this seems no more plausible than the possibility of a system regulating itself if its elements disappear from moment to moment.

What about self-reference? Is this possible in event-based systems? Again, some sort of persistence seems to be a pre-requisite, unless the self and the reference can occur simultaneously. The only way I can conceive of this is if the reference is a conceptual one, inherent in the structure of the event itself – as might indeed be possible if that event were a cognitive or communicative one, but not, perhaps, in any other sort of event. This could occur, for example, when a communication expresses a sociological theory's account of itself. But even this sort of self-reference can only be formulated in the first place, and made sense of afterwards, if there is some persistence of the meanings involved. As Luhmann himself recognises, this is only possible if there is an entity that carries the meaning across the intervening periods of

time – generally a brain, or some sort of symbolic artefact that is capable of being re-interpreted (Luhmann 1990a, p. 9).

The temporalized *elements* of these event based systems are not *parts* of the systems concerned in the sense adopted by emergentist systems theories; rather, they are elements of analysis.[12] This reflects a further difference in the usage of *system* in these two traditions: for functionalist systems theorists, systems are not entities but may be described instead as *the set of interacting factors that produce the particular phenomenon of interest*. In this tradition, systems have no necessary relation to the boundaries of particular entities; their basis is not ontological but rather analytical: as the range of factors affecting some phenomenon of interest varies, so does the boundary of the functionalist's *system*.

Autopoiesis

Such a conception of *system* makes it appear possible to neglect the influence of *parts* almost entirely, and this is the consequence of Luhmann's adoption of the concept of *autopoiesis*. The concept of autopoiesis was developed by the biologists Maturana and Varela, originally to describe certain critical characteristics of living systems (Maturana and Varela 1980). As Geyer puts it, "An autopoietic system was defined as a network of interrelated component-producing processes such that the components in interaction generate the same network that produced them" (Geyer 1994).

In designating a system as autopoietic, two claims are implicitly made. The first is that although the system's components have lower level physical parts, their influence can be ignored for the purpose of explaining the reproduction of the system and its components (Viskovatoff 1999, p. 486). Thus, Luhmann tells us,

everything that is used as a unit by the system is produced as a unit by the system itself. This applies to elements, processes, boundaries, and other structures and, last but not least, to the unity of the system itself. Autopoietic systems, then, are sovereign with respect to the constitution of identities and differences. They, of course, do not create a material world of their own. They presuppose other levels of reality, as for example human life presupposes the small span of temperature in which water is liquid. But whatever they use as identities and as differences is of their own making (Luhmann 1990a, p. 3).

And he explicitly counterposes this to the emergentist view:

Whether the unity of an element should be explained as emergence 'from below' or as constitution 'from above' seems to be a matter of theoretical dispute. We opt decisively for the latter. Elements are elements only for the system that employs them as units and they are such only through this system (Luhmann 1995, p. 22).

The second claim is that, although the system is affected by its interactions with its external environment, it is capable of controlling the impact of these on its reproduction. In discussion with David Sciulli, for example, Luhmann says

The living cell does not find all causes which it needs for continuing life and reproduction … within itself. But it can control (to some extent) the selection of external causes by internal operations. If this control breaks down… the system stops its autopoiesis and dissolves into its environment (Sciulli 1994, p. 42.)

Autopoietic reproduction, then, is always contingent; the organism can always die. But it also contains the possibility of change – the organism can develop over time, taking on different structural forms as it grows, matures, and ages, for example.

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[12] I am grateful to Vessela Misheva for pointing this out in her comments in Durban.

Hence "the structure (the actual components and their relations) may change dramatically over time, or may be realised in many ways, so long as the *organisation* maintains its relations of self-production" (Mingers 2002, p. 280).

Luhmann's innovation was to find a way to apply this concept to social systems, which he achieved by considering social systems to be networks, not of human individuals, but of communications (Knodt 1995, p. xxiii; Sciulli 1994, p. 38): "Social systems use communications as their particular mode of autopoietic reproduction. Their elements are communications that are recursively produced and reproduced by a network of communications and that cannot exist outside of such a network" (Luhmann 1990a, p. 3). And: "We can think of society as the all-encompassing system of communication with clear, self-drawn boundaries that includes all connectable communication *and excludes everything else*" (Luhmann 2002, p. 106).

Quasi-autopoiesis

Emergentist accounts of systems have a certain amount in common with autopoiesis. The idea that systems must be maintained over time and that this requires explanation is represented in the emergentist tradition by the concept of morphostasis, introduced into social systems theory by Walter Buckley along with its complementary term, morphogenesis, which describes those processes "that tend to elaborate or change a system's given form, structure, or state" (Buckley 1967, p. 58). Buckley recognises that to some extent the functions of morphostasis and morphogenesis can be ascribed to internal capabilities of systems, which can qualify the impact of external causal factors: "as open systems become more complex there develop within them more and more complex mediating processes that intervene between external forces and behavior" (Buckley 1967, p. 58). And the recognition that

D. Elder-Vass   18

morphostasis is contingent, so that systems may fail or dissolve, but also may develop over time, is also central to Buckley's perspective. Buckley's emphasis on morphogenesis is central in the realist emergentist social theory of Margaret Archer (notably Archer 1995).[13]

Emergentism, then, is consistent with the possibility that some systems in some contexts may have significant similarities to the autopoietic model: that they may have internal mechanisms that mediate the effects of external inputs within a certain range, and that we may be able to abstract from the influence of the lower-level parts of the primary components for certain purposes. Emergentism, then, is consistent with the view that autopoiesis could be regarded as an *ideal type* of system behavior, with some systems approximating more closely to it than others, but none conforming strictly to its pure description. Those that approximate more closely to it might then be labelled *quasi-autopoietic*. Intriguingly, Bhaskar uses this term to describe the production of scientific knowledge, which is "accomplished by means of (anterior) knowledges" (Bhaskar 1986, p. 54; Mingers 2004, p. 407).[14]

Within the emergentist paradigm, however, the claim that a particular system can be treated as quasi-autopoietic cannot be taken for granted; it must always be supported by an explanation of *why* lower-level mechanisms and external causal factors can be neglected in a particular range of cases. In general, such explanations will be highly context-dependent – we may argue that a whole range of external

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[13] Luhmann also appears to draw on Buckley, for example in his own use of the term 'morphogenetic' to describe the processes that create emergent structures (Luhmann 1990c, p. 179). In *Social Systems*, however, he uses the term more narrowly (Luhmann 1995, pp. 351-2).

[14] Other uses of 'autopoietic' by Bhaskar, cited by Mingers, seem to have little in common with the sense in which it is used by Luhmann.

factors can be ignored because they rarely vary enough to have an impact on the system concerned, but on the occasions when they do vary more radically, the illusion of autopoiesis may be shattered.

Thus, for example, in the case cited by Bhaskar, the production of scientific knowledge by means of anterior scientific knowledge is very far from being an autopoietic system. On the plus side, the production of scientific knowledge does tend to build on previous knowledge, and to employ previous knowledge in the construction of tests for knowledge. But the production of scientific knowledge is patently done by human beings – scientists. Now, we could validly abstract from the contribution of these human beings if it could be shown that the only significant input (i.e. the only one that has an effect on the outcome) to their thinking is pre-existing scientific knowledge. But scientists are influenced by a broad range of factors other than previous scientific knowledge. For example, the problems they address, and hence the areas in which they extend knowledge, are predominantly those for which research funding is reasonably readily available. Hence both lower-level mechanisms (the motivations of scientists) and external causal factors (the availability of funding) must be taken into account. Even more crucially, the answers they produce to these problems depend ultimately on the characteristics of the real systems they are studying (what Bhaskar calls the intransitive dimension) and not just on pre-existing knowledge (Bhaskar 1978, pp. 21-4).

Here, then pre-existing scientific knowledge contributes causally to the production of modified or extended scientific knowledge, but other causal factors are also important. It is not at all clear that it adds any value to our explanations of such cases to label this as *autopoiesis*, and even if we do, this leaves autopoiesis as merely one type of causal process amongst a variety of others. Rather than autopoietic

systems, here we are discussing systems whose morphogenesis merely includes some autopoietic processes.

Are systems of communications autopoietic?

If social systems are to be seen as autopoietic, then, we must be provided with some stronger examples. Luhmann, as we have seen, argues that social systems are networks of communications, and that such networks can indeed be autopoietic; that communications are produced by the network itself, which thereby reproduces its own components. There is, however, some ambiguity about how he justifies this claim.

On the one hand, one might offer the argument that although it is human beings that communicate, they do so (more or less) entirely on the basis of earlier communications, and hence their own contribution to the causation of *which* further communications occur is negligible.[15] This is a variation of the traditional social determinist view of human behavior, which implies that whatever our feelings may be, we are not really in control of ourselves but merely channels for a process that is determined by some higher logic.

On the other hand, one might offer a more semantic argument: that the conceptual content of any communication is interdependent with and thus determined (in a non-causal sense) by the meanings of other concepts as uttered in other communications, and hence that the *meaning* of any given communication is produced by its relations with other communications.[16] On this reading, social systems are to be seen not as systems of material interactions between human beings, but as evolving systems of concepts. But if this is what he intends, then autopoiesis has been thoroughly detached from its roots in biology. A concept that described a particular

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[15] A position that is reminiscent of Foucault's archaeologies of discourse.

[16] An argument that is more in line with Saussure and Derrida.

causal dynamic is now to be used to describe a set of purely semantic relations. We will return to this reading of Luhmann's argument in the section on self-reference below.

There are already a number of replies to the first sort of justification in the literature, which resemble my discussion above of scientific knowledge. The theme of these is that communications do not produce other communications – people do (Viskovatoff 1999, p. 494, 496; Mingers 2002, p. 290).[17] Luhmann does recognise that autopoietic systems are ontologically dependent upon their material substrata, but argues that this is irrelevant to their autopoiesis. In effect, he argues that we can abstract from the dependence of communication on human beings in considering how systems of communication develop. But as Mingers says, Luhmann makes "little attempt to show how societal communication, as an independent phenomenal domain, emerges from the interactions of human beings who ultimately underpin it" (Mingers 2002, p. 290). In other words, he fails to demonstrate what mechanism might make it valid to abstract from the human element.

It is hard to see how he could make such an argument. Humans do indeed produce communications, and in doing so they are influenced not only by previous communications, but also by their biological nature (consider the communication "I need something to eat") and by their previous non-communicative experiences of the world (consider "we need flood defences") or indeed their previous non-communicative interactions with other people (consider "please don't hit me"). Hence, just as it is not *only* scientific knowledge that produces further scientific knowledge, it is not *only* communications that produce further communications, even when we take into account the extent to which the human individuals concerned have

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[17] Indeed Maturana himself has made the same point (Maturana and Poerksen 2007, p. 70).

been shaped and influenced by previous communications. The causal argument for communication systems being autopoietic therefore seems untenable.

As Viskovatoff has argued, this leaves it entirely unclear "how his theory can be linked up with 'neighbouring' empirical sciences such as psychology, social psychology, or biology" (Viskovatoff 1999, p. 483). Any given act of communication, for example, is simultaneously a psychological event, a biological event, and a physical event, as well as an event in a social system. But Luhmann gives no indication as to whether or how we are expected to theorise these other aspects of the same event in terms of fully temporalized systems.

From the perspective of a causal analysis, then, the concept of autopoiesis is untenable as a general ontological approach to systems, it is ontologically viable only as an ideal type, and there is no evidence to suggest that real social systems, even if they are conceptualised as being composed of communications, approximate to this ideal type. Autopoiesis, then, fails to provide an answer to the core problem of the emergentist paradigm: how to explain the relations between the causal powers of wholes and their parts.

For Luhmann, however, "problems of causality are secondary to problems of self-reference" (Luhmann 1995, p. 240) and it is now time for us to consider his preferred problematic of meaning and self-reference. Is it possible, perhaps, to justify autopoiesis in the context of the semantically rather than causally-oriented analysis that Luhmann develops in response to these issues?

Luhmann on meaning and self-reference

For Luhmann, his work represents a paradigm shift towards "a theory of self-referential systems" (Luhmann 1995, p. 8). This theory

maintains that systems can differentiate only by self-reference, which is to say, only insofar as systems refer to themselves (be this to elements of the same system, to operations of the same system, or to the unity of the same system) in constituting their elements and their elemental operations. To make this possible, systems must create and employ a description of themselves; they must at least be able to use the difference between system and environment within themselves, for orientation and as a principle for creating information (Luhmann 1995, p. 9).

Although phrased as if it is a general argument about systems, this claim would seem to apply only to those systems that are capable of self-reference as Luhmann defines it. In particular, he seeks to apply it to social systems, which he regards as being composed of communications, but he stresses that this is not intended primarily as a causal account of such systems: "The theory of self-referential systems bypasses this causal model. It considers causality… as a sort of organization of self-reference" (Luhmann 1995, p. 10).

Rather than offering a causal account, Luhmann is seeking to generalise "the traditional epistemological problem that all cognitive processes refer at least in part to a domain of reality that they themselves have created (i.e. their own efforts to understand reality)" (Luhmann 1982b, p. 60).Thus he is trying to explain the internal structure of systems of concepts, which depend on each other in the sense that the meaning of any concept (or communication) is interdependent with and thus determined (in a semantic rather than a causal sense) by the meanings of other concepts (as uttered in other communications?), and hence that the *meaning* of any given concept (or communication) is produced by its relations with other concepts (or communications).

This brings us back to the semantic interpretation of autopoiesis which was passed over rather briefly in a previous section. In relation to the problem of self reference, Luhmann implies, any attempt to introduce the physical underpinnings of concepts and communications would merely be irrelevant; there is no part of these elements that can help us answer this question, so for the purposes of his argument they can be seen as indivisible. What matters is the relations in which concepts and communications stand to each other, how these relations enable them to represent aspects of the external environment while recognising that it is indeed external to the system itself, and how these relations can be conceptually reproduced and developed over time.

Here, then, we have another example of paradigm incommensurability: while an emergentist may be inclined to dismiss arguments about autopoiesis on the grounds that they are causally implausible, Luhmann is not actually offering autopoiesis as a solution to a causal problem. The very objectives of work done within the two paradigms are different. Emergentists are trying to build causal explanations, whereas Luhmann is trying to clarify semantic structures. He is interested in the production of meaning by reference to other inter-related meanings rather than in the production of meaningful events (even communicative events) by some causal process.

This, of course, is why Luhmann cannot solve the core problems of the emergentist paradigm. From within his paradigm, such problems are merely irrelevant or perhaps even incomprehensible. Thus, for example, he writes:

In the paradigm of the whole and its parts one had to accommodate inexplicable properties somewhere – whether as properties of the whole (which is more than the sum of its parts) or as the properties of hierarchized apex that represents the whole. By contrast, in the theory of self-referential systems everything that belongs to the

system (including any possible apex, boundaries, or surpluses) is included in self-production and thereby demystified for the observer (Luhmann 1995, p. 10).

But this demystification seems to proceed by simply eliminating the attempt to explain properties or powers in causal terms, replacing causal explanations with explanations of the conceptual relations within the system. There are two kinds of challenges to be made to this move. First, can we have a viable account of conceptual relations that ignores the extra-communicative and causal world? And second, does Luhmann in fact succeed in constructing such an account, or does he re-introduce causality when, as it were, our ontological backs are turned?

The first challenge is fundamental to semiotic theory. On the one hand, with Luhmann and Derrida, we can adopt a post-Saussurian account of signs in which their meaning – the signifieds – is accounted for entirely by their relation with a network of other meanings. On such a foundation, the theory of communications can indeed be autopoietically closed against the influence of the extra-communicative world, and the influence of causality can be largely ignored. But for realists on the other hand, meaning rests instead on a Peircean foundation, in which the meaning of signs depends in part on their relation to other signifieds, but also on their relation to extra-discursive referents (Archer 2000, pp. 154-7; Bhaskar 1993, pp. 222-3; Nellhaus 1998, pp. 1-4). The meaning of the *concept* of hunger, for example, can not be determined solely by its relation to other meanings, but rather rests fundamentally on the real physical experiences we have of hunger itself. And once we admit the referent to our theory of meaning, we must also admit that there is a causal relation – mediated, of course, by the discursive context – between those real physical experiences, our concepts of them, and above all between those experiences and the occasions when we *employ* those concepts. Communications, in other words, may use

a language which is a network of inter-related meanings, but they also use words that have real referents and are prompted by real causal impacts on the communicators (Archer 2000, pp. 156-7).

For emergentist systems theory on the realist model, then, we can not have a viable account of conceptual relations that ignores the extra-communicative and causal world. Nevertheless, Luhmann could maintain internal consistency by sticking to the Saussurian model of semiotics and rigidly excluding causality from the accounts he develops of social systems. But despite his best efforts, when Luhmann applies his schema to the analysis of social systems in practice, causal logic is unavoidable. For example, in the essay 'The Differentiation of Society' we find: "an increase in aggregate wealth has a tendency to revolutionize stratified societies" (Luhmann 1982a, p. 235); and "functional differentiation is the latest outcome of sociocultural evolution" (Luhmann 1982a, p. 236). In other words, Luhmann's applied analyses of social systems appear to involve causal claims, yet on the semantic reading of autopoiesis, he makes these claims from within a system of thinking whose construction makes it incapable of addressing causal questions.

Not only, then, does Luhmann fail to provide a viable response to the problems of causality and reductionism, but his response to the problems of meaning and self-reference only achieves internal coherence by denying the influence of causality on communications, a move that is ultimately untenable.

Emergentism and self-reference

Luhmann, then, does not have an adequate response to the core problems of either paradigm. But does emergentism have one to the problem of self-reference? This is a difficult question, not least because it is not a question to which emergentist

or realist thinkers have devoted much attention, and in consequence this will be the shortest section of this paper.[18] But a number of brief comments are in order.

First of all, even though emergentists might wish to strip away some of the autopoietic and event-oriented phraseology that Luhmann uses to express it, they cannot dismiss the problem of self-reference any more validly than Luhmann can dismiss the problems of reductionism and dualism. If social theories claim to explain human intellectual activity, they must accept responsibility for explaining themselves. The ability to do so is one test of a valid theory.

No doubt part of the emergentist response would be to offer a more causally-oriented account of how self-referential systems can develop and sustain a degree of complexity that enables them to respond appropriately to their environments. Thus, emergentists might argue that this happens as a consequence of the material impact of the environment on human individuals and the part those individuals play in synthesising such new experience with their previous conceptual understandings. Adherents to Luhmann's paradigm would no doubt find this unsatisfactory, but if emergentist theory is essentially causal, a self-referential account of itself by emergentist theory should also be causal. It is hard to see why a causal theory should be expected to offer a semantic account of self-referentiality.

However, emergentism purports to offer not just a social theory but also, and indeed more fundamentally, a social ontology. If this is to be comprehensive, it must include an ontology of conceptual systems. On the one hand, emergentist sociologists have theorised some aspects of conceptual systems, for example Archer has done so

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[18] It is symptomatic of this neglect that the entry for *self-referentiality* in the recent *Dictionary of Critical Realism* relates primarily to self-emancipation by human individuals, rather than to semantic systems (Hartwig 2007, pp. 416-7).

in some detail in her book *Culture and Agency* (Archer 1996a). On the other, however, Archer pays little attention to the ultimate ontological foundation of her 'cultural emergent properties', and without this it is unclear, for example, whether we can justify treating conceptual systems as being composed of entities, as the emergentist model would seem to require. If, for example, there is some smallest unit of conceptual systems, such as von Bertalanffy's *symbolic constructs*, then what are the parts of these units? And are those units themselves really entities, or perhaps properties, or something else entirely? Perhaps the best we can say is that for emergentism, conceptual systems can possibly be treated *as if* they were emergent from lower level conceptual entities, but no-one has yet shown clearly whether and how the entity-based approach to systems applies to conceptual systems.

This problem is at least recognised in a fascinating paper by Fairclough, Jessop, and Sayer that not only bemoans the neglect of semiosis by critical realists but also makes some first step towards an understanding of the role of emergence in semiotics (Fairclough, Jessop, and Sayer 2002). Pickel has also offered some stimulating glimpses of the ontological relationship between semiotic structures and social communities (Pickel 2006, pp. 40-42). Nevertheless, it is clear that there is a great deal to be done before realist emergentists can offer a coherent account of meaning and self-reference; and only if and when this can be done will emergentism be able to provide a coherent account of itself.

This paper, then, asserts the possibility of emergentism offering an adequate response to the problem of self-reference; but recognises that it does not yet do so.

Conclusion

This paper has touched on only some of the conflicts between the Luhmannian and emergentist traditions. But these divisions are so fundamental that we are justified in seeing these two systems of thought as competing paradigms of social systems theory. First, they have radically different understandings of the core concept of *system*; for Luhmann, the fundamental units of social systems are communicative events, whereas for emergentists systems are entities, and are composed of entities, and events are produced by their causal interaction. Second, while contemporary emergentism sees higher level properties as products of mechanisms that depend on the properties of lower level parts and the relations between them, a central element of Luhmann's theory is autopoiesis – a model of systems that denies the influence of lower level properties on the behavior of the higher level system. Third, the two traditions are primarily concerned with quite different core problems that imply very different styles of theory: for emergentists the resolution of the core problem of reductionism provides resources for developing causal theory, whereas for Luhmann the resolution of the core problem of self-reference entails the analysis of the meaning of communications.

One consequence, however, of identifying these two schools of thought as conflicting paradigms, is to raise the spectre of incommensurability. It is difficult (though not impossible) for someone thinking from within either paradigm to find any sense or any value in the other, and the paradigms do not even seem to share any internal criteria of what a good theory must achieve. Evaluation of these paradigms against each other is therefore problematic, but a beginning has been attempted here by assessing each paradigm against the core problems recognised by both itself and its competitor: the problems of reductionism and self-reference.

As far as reductionism is concerned, this paper has argued that emergentism's concept of a system composed of entities in a hierarchy of part-whole relations is able to resolve this problem successfully.[19] Luhmann, by contrast, seeks to render this problem irrelevant by use of the concepts of autopoiesis and self-reference. This paper has argued that autopoiesis is untenable as a causal theory of systems, and hence cannot be used as grounds for ignoring the problem of the relations between emergent levels. The emergentist framework does leave open a space for quasi-autopoiesis in certain circumstances, but any claim that a given system operates in this way must itself be justified in terms of its relations with adjoining levels and systems.

If we turn to the problem of self-reference, this paper has expressed doubts over the capability of Luhmann's system to resolve this adequately, both on the grounds that it is inadequate as an account of meaning due to its neglect of the referents of signs, and because it offers a purely semantic analysis, yet often seeks to apply this to what appear to be causal questions. Nor, however, has emergentism yet offered a fully coherent response to this problem. At the very least Luhmann's work demands a response from emergentism to the problem of self-reference, and it is perhaps the recognition of this absence that is the most important consequence of counterposing these two traditions: we need a theory of social systems that can encompass both causality and meaning.

Neither paradigm, then, decisively resolves both its own core problems *and* those of its competitor. This is entirely typical of paradigm conflicts as Kuhn portrays them. In such cases, "the issue is which paradigm should in the future guide research on problems many of which neither competitor can yet claim to resolve completely. A

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[19] Though this is by no means an uncontroversial claim, and would be disputed by advocates of other varieties of emergentism (see, for example, Stephan 2002, p. 79).

decision between alternate ways of practicing science is called for, and in the circumstances that decision must be based less on past achievement than on future promise" (Kuhn 1970, pp. 157-8). This is, indeed, a personal decision for the scientist concerned; as this paper has argued, it seems to me that emergentism offers a more coherent perspective. No doubt others will take their own decisions.

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