

Abstract

Realist synthesis is often offered as a useful strategy to understand intervention complexity. Its unique selling point is its basis in a critical realist philosophy of science. However, we argue that the philosophical basis of current approaches to realist synthesis is closer to positivism, notably the focus on bringing a theoretical reduction to complex problems, a strategy eschewed in critical realism's concern with complex independent ontology. We critique three recently published reviews to illustrate our arguments and apply an analytic strategy to findings from a realist review that, we argue, is more in line with critical realism.

Background

In recent years, attempts have been made to base evidence reviewing on a critical realist philosophy, drawing on the work of Bhaskar (1975, 2015). Some have argued that syntheses based on critical realist meta-theory will ensure fuller explanations of social change than can be offered by current approaches to meta-analysis as these are based on the thin inferences of causality from standard experimental studies (Fleetwood et al. 2017). This focus on critical realism in synthesis methods reflects a broader impetus to adopt the philosophy as the basis for all sociological research (e.g. Gorski 2013, Porpora 2015) since it allows the researcher to draw on a combination of empirical data and hermeneutics in our explanations of social life. This article is a reflection on attempting to use critical realism in the course of reviewing a set of studies looking at compensation schemes for birth injury and it critiques the current critical realist strategies for synthesis. It aims to explore what critical realism means for systematic review methods.

The consequences of taking up a different philosophical approach to conduct evidence reviews are profound. This philosophical move necessarily affects the epistemological approach taken by investigators. It affects the type of evidence that is admissible in explanations; the role of theory and prediction; and the strategies of synthesis itself. We question whether the current realist review establishment has managed to divest itself of its positivist antecedents to face in a new and radical direction.

The most notable attempt to develop an approach to synthesis using Bhaskar's work has been the RAMESES project which has published quality guidelines for realist reviews (Wong et al. 2013) and run training events and conferences, promoting its approach to synthesis. We acknowledge that Pawson (2013), a leading figure in the realist synthesis programme, has been critical of Bhaskar's work. Indeed, the label 'realist' suggests a distancing both from critical realism and positivism which can make it problematic to argue the connection to critical realism. However RAMESES and others cite Bhaskar's publications as the basis for their methods (Wong et al. 2013). Further, their approach

has been described in a volume devoted to methods informed by critical realism (Greenhalgh 2014). So we must conclude that promoters of realist synthesis are comfortable with the association with critical realism.

The impetus of this article comes from our experiences of conducting a realist review, and our own confusions about the methods advocated by RAMESES. We were struck by the similarity of expectations of the realist review to our more orthodox style of reviewing, although we understand that the philosophical foundations of both are very different. This has led to a deeper engagement with critical realism, leading to fundamental revisions as to how we represent our findings. We present examples of our new analytic strategy at the end of this paper to illustrate this.

Firstly, we attempt to distinguish the critical realist philosophy of science from positivism, the dominant philosophical approach to studying interventions and carrying out evidence reviews. Then we critique three recently published reviews, conducted in the light of the RAMESES promotion of a particular brand of critical realism, based on the work of Pawson et al. (2005). Finally we propose a way forward that might more closely reflect the implications of critical realism for evidence synthesis, with our example from our own review.

Critical Realism vs. Positivism

Few researchers would defend positivism in its conception as an objective search for certainty through measurement, or describe themselves as positivists, but the methods that have emerged from it are still very much in use (Gorski 2013). Broadly these are the strategies of comparison, as in comparing treatment groups with control groups, the observation of repeated occurrences and ensuring the validity and reliability of measurement. As they carry out their day to day work, researchers leave much of its underlying philosophy unquestioned and their work still contributes to the understanding of our social world (Gorski 2013). However, methodologies and methods are linked to ontologies (Archer 1995) and critical realism presents particular difficulties for empiricists because it does not deny the existence of a material world unlike positivism's major philosophical rival, social constructivism.

Like positivism, critical realism holds onto the idea of a real world out-there, which is independent of our knowledge of it, but unlike positivism, it does not constrain its explanations to what can be observed and measured. Positivism is concerned, primarily, with the limits of our knowledge and thus it focuses on what can be observed empirically (Reed and Harvey 1992). Since positivism is predicated on what can be observed, its concept of ontology is flat (Sayer 2000) in that the world consists of what can be observed. Critical realism, on the other hand, is concerned with the ontology of the world, so that we might know it, separating out the world from our knowledge of it.

Bhaskar conceptualises reality as being made up of different strata, the empirical, the actual and the real, and develops the idea of depth ontology. The empirical involves how we sense and interpret reality; the actual involves observable events, objects, relationships independent of our understanding of them; the third deeper level is the real, entities that are unobservable, but have causal properties. The real world involves these underlying mechanisms. An example in physics is gravity, and an example in social science is class. These unseen realities generate observable patterns and events of the empirical and actual worlds. The powers may be latent, and they almost always work in open systems where they conflict with other powers (gravity is countered by jet engines, class interacts with many other social systems and influences), but nonetheless they are part of the enduring real world out-there. Fundamentally, critical realism is concerned with three-layer depth ontology whereas positivism is concerned with representing and measuring the empirical and actual (Reed and Harvey 1992).

For critical realists, the world is conceived of as a series of nested levels from the microbe to the broad social systems of society. Each of these levels consist of entities with powers and modes of reproduction which are particular to that level and serve as the ground for the production of the higher level. This higher level therefore emerges from lower levels in the hierarchy. An example is the brain emerging from the body, mind from brain, and consciousness from mind. They are all interdependent but also irreducible to one another (Bhaskar 1975, Reed and Harvey 1992).

In terms of causation, positivism derives explanations of cause from observing correlations, constant conjunctions, which suggest interactions between causes and their effects. To positivists, assuring unbiased observations becomes an important marker of quality since the number of true observations is believed to increase the level of predictability. Critical realists, on the other hand, argue that observed repetitions are effects of deeper causes that are often beyond empirical proof. An analogy is to watch many falling objects and tracing patterns between them, but not looking at deeper unseen causes such as gravity (or natural selection, or molecular structure). They explain change as arising from these underlying mechanisms when conscious agents interact with powerful social structures, over time. Agents' motives, values and reasons are seen as causal mechanisms (Archer 1995, Bhaskar 2008) within the evolving and dynamic system of society. Further, systems, cultural expectations and material resources can have causative powers understood through analysis more than repetition. Prediction is not the goal of critical realism in social science, but rather a fuller analysis of change through an uncovering of mechanisms at the level of the 'real' that generate the empirical and actual worlds.

In their explanations of change, positivists reduce interventions to their component parts and explain interventions as no more than the sum of its parts. In contrast, critical realists argue that interventions are not reducible to their component parts, although they are made up of them. To reduce interventions in this way destroys their systemic nature since the parts and the whole co-constitute each other (Bousquet and Curtis 2011). The proposed engagement with interactions between structure and agency allows critical realists to consider the historical and emergent nature of change which is denied by the attempts of empiricists to isolate the variables of interest.

To unpack the notions of structure and agency, critical realists understand structures as entities with causal powers which agents may try to use to change themselves, their situation and that of others (Archer 1995). Structures make agency possible (Giddens 1984) and can include material resources, such as money, cultural ideas, such as patriarchy, and systems, such as the healthcare system. Structures pre-date the action of the agent whose actions transform or reproduce structures. For changes to society, agency is the property of humans, whether they represent themselves or collectives such as organizations or governments (Elder-Vass 2008), though the effects of agents are often partial, unintended or counterproductive. Critical realists engage with the evolving and complex nature of society through the idea of the emergent and latent powers of structures, which are triggered by human agents.

In summary, critical realists believe that the world is made up of different levels, the world of experiences as evidenced in empirical data, the actual world made up of objects and events and the real world made up of mechanisms that generate experiences and events. Therefore they allow for explanations to be based on wider evidence than observable data. Their ideas about how change occurs are anti-reductionist and insist on the historical and emergent nature of change. They are cautious about prediction since they argue the open nature of social systems, competing causal powers and unpredictable human agency deny the possibility of exact replication and precise forecasting. Critical realists do not claim to be 'unbiased' or inhumanly free of all personal views and values. Instead, they try to be critically aware of their own perceptions and how these could be influencing their work.

Having attempted to lay out some of the differences between positivism and critical realism regarding the task of explaining change, we move on to some explicit criticism of the way critical realist philosophy is used to advocate for a form of realist synthesis as laid out in 'RAMESES publication standards: realist synthesis' (Wong et al. 2013).

The Critique

The strapline ‘what works for whom in what circumstances and how?’ (Wong et al. 2013 pg. 2) echoes a positivist epistemology that fits well with a more straightforward orthodox approach to reviewing since it suggests effectiveness, prediction and an analysis predicated on a reduction to variables. This allows for the inclusion of randomised controlled trials into reviews since these experiments usually attempt to answer this kind of question. The recent efforts to develop realist RCTs (Bonell et al. 2012) suggest that researchers have been misled into thinking that the conflation of experimental models can be imported, unproblematically, into methodologies informed by critical realism.

Context plays a key role for realists since they argue that all interventions, conducted in open systems, will be affected by wider social factors, often not predicted at the start of the intervention. Consequently, proponents of realist evaluation and synthesis have made much of the importance of including a description of context and its effects on interventions when they account for change (Pawson and Tilley 1997, Pawson et al. 2005). They also advocate for the development of theory which they conceptualise as a configuration of context and mechanism (resources plus human reasoning) and outcomes, usually written as $C+M=O$. These theories are then taken to be the general principles which drive interventions of a similar nature.

This accounting of change shares with the critical realists a concern for uncovering mechanisms acting at a deeper level of reality than the levels of experience and events. However, we argue that the $C+M=O$ approach to theory development is far from the critical realist conceptions of change as propounded by Archer (1995). The notion of ‘mechanism’ presents particular problems since it appears as one component, possibly the key explanatory part of the configuration, yet it conflates structure and agency (Porter 2015). Usually, it is described as an amalgam of resources and reasoning which implies that it is both structure and agency. This conflation makes it impossible to tell the contribution of agents or structures to change, and runs the danger of it being designated as ‘the intervention’ without further explanation. Using the word ‘mechanism’ in this way is problematic since it suggests that the generative mechanism that Bhaskar identifies as the underlying causative process producing the patterns of reality, has been discovered. However, these patterns must be the combination of these components at least, and not one component of the hypothesis.

Further, the focus on empirical testing (Wong et al. 2013) betrays the depth ontology proposed by Bhaskar where reality consists both of observable and unobservable entities. The emphasis on reducing interventions to their constituent ideas so each may be tested, contradicts Bhaskar’s

notions of the irreducible strata of reality where ideas and resources constitute an intervention, but an intervention cannot be reduced to these parts.

The analytic strategy as outlined in Wong et al. (2013) is also confusing. Most critical realists advocate the use of retrodution to theorise the links between the interaction of structure and agency and the mechanisms that generate an observable pattern of events (e.g. Fleetwood et al. 2017, Edwards et al. 2014). In realist synthesis, Wong et al. (2013) have to grapple with the problematic configuration of $C+M=O$, where it is unclear which category refers to structure and which to agency, and which of these has an empirical basis and which a theoretical basis. We wonder if mechanism is always theorised, for example. So Wong et al.'s (2013, pg. 10) suggestion that researchers theorise the links between the variables is challenging if one variable is of a different epistemological nature to the other two.

To see how this critique affects researchers conducting reviews, we analyse three recent realist reviews taken randomly from a database search (Fernee et al. 2016, McVeigh et al. 2016, Mogre et al. 2016) to illustrate the problems this conceptualisation of critical realist philosophy creates for the researcher. These serve as an illustration rather than a condemnation of the research teams involved.

Fernee et al. (2016) reviewed the evidence for 'wilderness' therapies in order to shed light on how it worked for young people with mental health problems. McVeigh et al. (2016) aimed to provide evidence for the development of leadership policies in the field of rehabilitation in the developing world and Mogre et al. 2016 looked at the evidence for educational interventions to improve the delivery of nutrition care. Mogre et al. (2016) expressed a particular interest in nutrition education in sub-Saharan Africa.

The Problems with Data

Archer (1995) argues that consideration of the ontological basis of research is an important step in examining our conclusions about the world. Positivist research restricts itself to empirical data, and researchers in this tradition may not see, let alone consider, data that reveals the causative powers of systems and cultural ideas, since these are unobservable and unmeasurable. However, they have explanatory power which may be more potent than reductive explanations ascribing causation to individual behaviour.

The understanding of the world as consisting of hierarchical strata means that more complete descriptions of the world must include explanations of the different levels of reality. Thus, causative powers can be found at the empirical level of individual behaviour and at the level of systems and at

the level of cultural ideas (Archer 1995). Therefore in realist reviews, we might expect explanations based on empirical data and also on information as to how systems and cultural ideas contribute to change.

However, in two of our reviews, (Fernee et al. 2016, Mogre et al. 2016), the researchers restricted themselves to empirical data only. Mogre et al. (2016) acknowledge the complexity of the health systems in delivering nutrition care, but they restrict their explanations to the behaviour of individuals. Their exploration of context, mechanisms and outcomes relate mostly to the individual professionals receiving the nutrition training (see table 3 page 15) and there is no discussion about how the health care system affects the outcomes for the individuals.

Fernee et al. (2016) aim to unpack the 'black box' of wilderness therapy but fail to do this, since they do not explore the cultural idea of 'wilderness' and how it might affect the young people's responses to the therapy. Such an exploration may have enabled a more critical look at the programme theory as put forward by Russell and Farnum (2004), which does not fully explain the causal powers latent in our notions of the 'wilderness', or factor in how this motivates the young people to examine their lives. Without this theoretical development, the authors are able to assert that guidelines developed in clinical settings can be applied to programmes of 'wilderness' therapy. This seems an unconvincing conclusion without a fuller account of the action of 'wilderness'.

In these examples, explanations based on systems and cultural ideas are missing. An explication of the relationship of nutrition training and care to the health systems and other national systems of countries in sub-Saharan Africa would help us to understand this intervention more specifically and possibly give us an insight into nutrition training in other national health systems whether similar or not. An exploration of ideas connected to the healing effects of isolation in a natural setting would have added a richness to our knowledge about wilderness therapy.

The Problems with Reduction

Realist reviews are often described as theory-driven reviews (Wong et al. 2013, Pawson et al. 2005) and researchers are encouraged to identify a-priori theory or theories and through searching the literature test this theory as it is implemented in various settings and with different populations. The intention is to refine the theory further. In realist reviewing, researchers are pushed in two directions. They are encouraged to engage with context and add it as a factor in their explanations, but at the same time they are asked to strip out context as they identify a generalizable theory that can be tested in various contexts (Wong et al. 2013). These instructions seem contradictory.

McVeigh et al. (2016) grapple with the problem of simplifying a complex system by suggesting that realist synthesis offers a way of 'providing broad recommendations for successful policy related leadership and governance of health related rehabilitation in less resourced settings, rather than to offer a strict formula, which would fail to recognize the diversity and complexity of specific national, regional and local contexts' (page 2). This sentence seems to provide two ways of dealing with complexity, to broaden recommendations so they can fit any situation or apply strict formula that cuts out the specifics of context. Either way a detailed explanation of the intervention, describing how it co-evolves with its environment, is unlikely since how context is incorporated into these explanations is unclear. This extract from the abstract illustrates the form of these broad recommendations that were developed as a result of their evidence review:

'.....participation of persons with disabilities in policy processes to improve programme responsiveness, efficiency, effectiveness, and sustainability, and to strengthen service-user self-determination and satisfaction; collection of disaggregated disability statistics to support political momentum, decision-making of policymakers, evaluation, accountability, and equitable allocation of resources; explicit promotion in policies of access to services for all subgroups of persons with disabilities and service-users to support equitable and accessible services; robust inter-sectoral coordination to cultivate coherent mandates across governmental departments regarding service provision; and 'institutionalizing' programmes by aligning them with pre-existing Ministerial models of healthcare to support programme sustainability.' (from abstract).

This list of recommendations gives us glimmers of how complex leadership within rehabilitation services must be, but it does not unpick the agency of the disabled person, the policy makers and the practitioners in rehabilitation services. These recommendations make rehabilitation within health systems appear unproblematic, with the use of abstract nouns such as 'efficiency' which bundle up assumptions, avoiding the very complexity of this issue. In insisting on separating out the actions of structure and agency, critical realists advocate expansionist explanations of change in order to fully understand interventions within dynamic systems. The consequence for this review of a critical realist philosophy would have led, perhaps, the researchers to examine how rehabilitation services coalesce to produce disability and reduce service users' self-determination and what action may counteract this, given the constraints of health systems in developing countries. This is a difficult undertaking, and realisation of how much information one would have to gather and make sense of in order to do this necessitates a reduction in ambition. Now reduction becomes important, as we recognise that complex systems only allow an understanding of partial and situated systems rather than whole and general ones.

The idea of testing theory in different contexts (Wong et al. 2013) is also problematic since it is unclear how a theory might pass a test. This strategy relates to secessionist notions of causation where repeated observations of phenomena strengthen associations and encourage the linkage between variables, increasing the likelihood of more accurate prediction. In an orthodox review, the synthesis of studies applies this principle of constant conjunction by bringing together the associations between variables in comparable interventions in order to make predictive statements. However, critical realists reject secessionist notions of change since, in the open system of society, there are never true replication and the procedures of observing repetitions means stripping out contextual details in order to make them comparable (Bhaskar 1975, Sayer 2000). Further, secessionist ideas of causation restrict explanations to empirical data and do not allow for explanations based on structures that are unobservable and unrepeated, such as health systems or the notion of wilderness.

This rejection of secessionist ideas about causation suggests that realist reviews would not advocate for extensive and narrow searching for similar studies and would eschew aggregation as a strategy. Indeed Pawson et al (2005) encourage researchers to search broadly as they are developing their initial ideas about how interventions might work. However, all the studies discussed here, carried out narrow searching and aggregation that follow strategies established by the orthodox systematic review methods.

The Problems with Causation

In order to understand social change, critical realists argue for comprehensive explanations of the interactions of structures and agency. In particular, Archer criticises research methodologies, such as the randomised control trial, which conflate structure and agency. Likewise, Pawson and Tilley (1997) are disapproving of such experiments, arguing that interventions are treated as ‘black boxes’ where it is impossible to understand the interactions of the participants with the resources offered by interventions in the accounts of trial reports.

Pawson and Tilley (1997) introduce the term ‘mechanism’ in order to make more explicit the importance of separating out the material resources (the structures) and the reasoning of participants (the agency) in explanations of how interventions work. However, these explanations suffer from conflation as they are brought together into programme theories, where agency seems to disappear. For example:

‘...the stigma that is often attached to mental health treatment appeared to dissolve in the wilderness therapy setting...’ (Fernee et al. 2016, pg 7).

Indeed the equation $C+M=O$ is a deceptively simple one, but one that is difficult to operationalise. The context of individuals will contribute to their reasoning, for example people from lower socio-economic groups may be more eager to engage with interventions because of their circumstances than other more resourced groups. The question becomes where do socio-economic structures appear in the equation, under context or under mechanism? The concept of mechanism might appear in all three categories, for example:

Mogre et al. (2016): Extract from table 3 page 16.

Context	Intervention Characteristics	Mechanisms triggered	Outcomes
Lack of confidence to deliver nutrition care Among future and practising healthcare professionals	Improving self-efficacy ('I feel that I can do it, so I will do it')	Feeling motivated Feeling confident	Self-reported changes in practice behaviours Intentions to change behaviour

In Mogre et al. (2016), the researchers appear to have identified the reasoning of the participant before, during and after the intervention. There is no description of the intervention, per se, rather a stating of one of its aims. This is not surprising if the reviewers are relying on evaluation reports that track motivations, values and self-efficacy before and after the training, where the intervention may be self-evident to the evaluators.

McVeigh et al. (2016): Extract from table 3 page 7

Context	Mechanism	Outcome
Teamwork and Leadership There was an informal team of leaders acting in parallel at different levels and with a shared vision	Leaders shared common features: "politically friendly" and trustworthy; good at forming alliances; able to apply technical information: and good communicators.	Effective teamwork and leadership facilitated the creation of powerful strategic alliances, which facilitated institutionalizing the programme within the ministerial framework.

In the example above, mechanism is reduced to the characteristics of leaders. Context seems to be the pre-conditions of the interventions with the outcome containing both an explanation of the mechanism of change as well as the change itself. This explanation seems a historical progression rather than an explication of the interactions between structures and agency.

These lines of reasoning follow a pattern of reporting that occurs in evaluation and trials that we are all familiar with. In McVeigh et al. (2016), the process of data extraction was described as simply transcribing the descriptions of contexts, mechanisms and outcomes directly from the text as if they are apparent to the reader. However, given the complaints of Pawson and Tilley (1997) about the black box of intervention in most experimental reports, one must assume that mechanisms are not particularly clearly laid out in these accounts.

The research teams in all the papers had difficulties in making theoretical links between the patterns in their empirical data and the underlying mechanisms that generated those patterns. We maintain that the configuration C+M=O confuses researchers since it does not separate out the empirical, actual and real levels clearly enough so that they can engage in the iterative and retroductive theorising that should take place between the different levels.

We argue, therefore, that the shared methods of orthodox reviews and realist reviews confuse researchers into believing that a realist review is just another way of adding things up. We think that critical realism offers greater opportunities for genuinely transdisciplinary explorations of social change that fully exploit its philosophy.

What does critical realism offer evidence synthesis?

As a philosophy of science, critical realism does not prescribe a methodology, unlike positivism. However, others (e.g. Reed and Harvey 1992, Byrne 1998, Hatt 2009) have identified Bhaskar's realist philosophy of science as providing the underpinning of complexity theory. Complexity theory has been characterised by Walby (2007) as a conceptual toolkit which enables a sensitivity to systemic properties and relationships, identified as the components of emerging social change (Bousquet and Curtis 2011). This toolkit has supported researchers to develop analytical tools that express the pathways of change, taking into account its non-linear nature and the action of co-constitution.

Hatt (2009) uses critical realist ontology to justify an analytic strategy developed by Maruyama (1962), which enables an understanding of the dynamic processes of change in complex systems. This strategy moves away from the non-reciprocal causal models proposed in cause and effect

explanations of change, where influence flows from cause to effect, towards multilateral mutual causal-loop models based on positive and negative feedback loops.

The non-linearity of change is the assertion that small inputs can cause large effects, as might be experienced in weather systems, or in political systems, for example a tweet by Donald Trump can affect relations between the US and China. This goes against the linear notions of cause and effect, where small inputs lead to small outputs, as is found in studies, based on positivist philosophy. Maruyama (1962) uses a loop epistemology to map out relationships that magnify and speed up elaboration, as well as loops that maintain equilibrium. This approach has been used to describe ecological systems (Hatt 2009). This seems a more satisfactory approach to a critical realist synthesis than the CMO model since it demonstrates how structures evolve through the action of agents and how structures affect agency. In effect, how they constitute each other. His loop diagrams enable a modelling of change where the contribution of structures and agents can be explored.

They also diagram instances of bifurcation where one process is nudged by an intervening force to split the loop into two (or more) directions. These instances offer opportunities to theorise the generating mechanisms that cause that split, both in enabling the reproduction of the status quo and the transformation of the loop as it moves in a different direction.

We argue that developing feedback loop diagrams could be an analytic strategy to synthesise material from reviews of evidence to map out pathways of change in complex interventions and to identify generative mechanisms. Thus, we have applied this strategy to the synthetic text from a realist review undertaken to understand the factors that affect the uptake of no-fault compensation schemes.

This review (Dickson et al. 2016) was conducted over a short period to inform policy work at the UK Department of Health as they developed an administrative compensation scheme for birth injury. A realist scoping review was attempted since there was little directly relevant material regarding compensation schemes focused on obstetric practice. The realist process appeared to allow us to include material from other types of schemes to explore the mechanisms of compensation relating to iatrogenic injury. A full version of the review can be found on the EPPI Centre website.

Following a configurative review strategy, we pursued a saturation approach to searching, where we looked for papers that added new information to our understandings of how the schemes worked, rather than repeated explanations, and we did not test for bias but judged the papers for their relevance (Levinsson and Proitz 2017).

An Example of Synthesis Using Maruyama's Feedback Loop Diagrams

Maruyama's diagrams aim to present how components interact to either amplify deviation so that activity within the system produces escalation, i.e. change, or how components interact to maintain homeostasis or equilibrium. For this review, the notion of escalation is an increase in the uptake of administrative compensation schemes by claimants. The change loops are termed positive feedback loops and the stasis loops are negative feedback loops. Maruyama (1962) proceeds in this way:

1. Identifies key activities or components
2. Establishes the way they are linked in mutually causative loops
3. Identifying whether the loop is equilibrating (negative feedback) or escalating (positive feedback)
4. Assessing the overall impact of the system.

The boxes include the important components and activities contained in the original text and the + and – symbols establish the direction of effect. A + symbol means that when the first box shows an increase then the second box shows an increase, and also that when the first box shows a decrease then the second box shows a decrease. Both these loops are escalating. A – symbol means that the first box shows an increase but the second box shows a decrease and vice versa. These are equilibrating loops. The loops are escalating if the – symbols are even or 0. They are equilibrating if the - symbols are an odd number.

So in the first example, all the loops are escalating, even though in loops 3 and 4 two of the relationships are equilibrating. The explanations for the loops are provided in full.

Generating Mechanism 1 – Eligibility and Damages

INSERT FIGURE 1 HERE

1. $U+C+P+U =$ Escalating
2. $U+E+P+U =$ Escalating
3. $U+C-T-P+U =$ Escalating
4. $U+E-T-P+U =$ Escalating

1 – Uptake of no-fault schemes is improved by a cap on damages in tort system, increasing claimant perception of benefit.

2. Uptake of no-fault schemes is improved by broader eligibility criteria, increasing claimant perception of benefit.

3. Uptake of no-fault schemes is improved by the removal of the possibility of high damages awarded in the courts, so decreasing the use of the tort system and increasing claimant perception of benefit of no fault schemes.

4. Uptake of no-fault schemes is improved by offering broader eligibility criteria than the courts, so decreasing the use of the tort system and increasing the perception of benefit of no fault schemes.

Context: These loops are a summing up of findings from schemes in Florida and Virginia, USA. Other compensation schemes in New Zealand and the Scandinavian restricted access to the courts but to balance this reduction in citizens' rights made the eligibility criteria broader.

Generating Mechanism: The two intervening forces here can be theorised as the eligibility criteria and the cap on damages in the court system. These worked to change the perception of the claimants so they did not pursue their claims in the courts but accepted the administrative process.

Generating mechanism 2 – Trust

INSERT FIGURE 2 HERE

1. $U+C+L-U=$ Equilibrating
2. $U+C+L+F+R+RB-P+U=$ Equilibrating
3. $U+C+L-R+RB-P+U=$ Escalating
4. $U+C+NF+ME+D+F+R+RB+P+U=$ Escalating

1 Claimants do not take up no-fault schemes if they use legal representation

2. Claimants who take up legal representation and perceive their lawyer to be fair, will settle the dispute quickly, and receive earlier care, but will not perceive any benefit of no fault schemes and so will not take them up.

3. Claimant who takes up legal representation is less likely to settle early because clinicians distrust lawyers and thus do not co-operate in claims. Claimants will delay receiving care, and so will perceive a benefit of no fault schemes and will take up in future

4. Claimant who makes a claim through no-fault schemes perceives the process as consistent (opinions from medical doctors and referral to previous decisions) and transparent (recording of decisions) and therefore fair. There will be a timely resolution of disputes and faster rehabilitation, and therefore greater perception of benefit and greater uptake of no-fault schemes.

Context: Loop 4 is a characterisation of administrative schemes in New Zealand and Scandinavia.

Loop 2 is based on the findings from one study conducted in the Netherlands and the USA.

Generating Mechanism: Trust plays a key role in these processes. In loop 2, claimants saw lawyers as their representatives as they took on the medical establishment which they had come to distrust because of their treatment injuries. In loop 3 the distrust of lawyers by clinicians led to a reluctance to co-operate with the claims process and so delayed care. In loop 4, the administrative system was designed to create trust through transparency and consistency of decision making.

Generating mechanism 3 – Clinician Reputation

INSERT FIGURE 3 HERE

+

*Loop 1 only

1. U-LP-A+CC+IE+T+U=Escalating
2. U-LP-A-DR+IE+E+U=Equibrating
3. IE+LE+PS+IE=Escalating

1 Uptake of schemes decoupled from disciplinary procedures results in lowering of liability pressure on clinicians, this increases admission of error and increases their support for claims. This improves the information about error and promotes the timely resolution of compensation claims and thus increases the likelihood of uptake of no-fault schemes.

2. Uptake in schemes results in lowering of liability pressure, this increases the admission of error and damages the reputation of doctors. This results in suppression of information and delays in or inability to resolve compensation claims and therefore the lack of take up of the scheme.

3. Information about error increases the learning about error and improves patient safety which in turn increases the information about error.

The original hypothesis from the policy team was that compensation schemes would improve information about error but we found that there is no direct relationship between patient safety and uptake of compensation schemes. There are two types of information about error – one concerning compensation and one concerning learning – and there is some evidence that they are incompatible. So we conclude from this diagram that compensation schemes may not serve patient safety directly. This is more likely to be delivered by disciplinary procedures, performance review and training of errant doctors.

Context: Loop 1 describes the system in New Zealand where patients are required to have the support of their doctor before making a claim and loop 2 describes the same scheme before decoupling was established.

Generating mechanism: the reputation of clinicians seems to be the key mechanism here where the scheme in New Zealand faltered when the compensation process was linked to disciplinary procedures.

Discussion

As a result of this synthesis, we are able to make some recommendations to the designers of the no fault compensation scheme at the Department of Health, arising from our identification of the mechanisms underlying the empirical and actual data we gathered together. Firstly, designers should consider how to reform tort in order to make an administrative system more attractive to claimants; then, they should incorporate some kind of mechanism that generates trust in the scheme for claimants; and finally, if they wish timely resolution to disputes, they should find a way to protect the reputations of clinicians in order to facilitate information sharing.

The process of developing these diagrams was not straightforward but we think they are useful in thinking about how different factors affect the schemes. The key factor was the motivations of the patients, something that was rarely discussed explicitly by the papers we reviewed, but a central consideration of any intervention as Pawson and Tilley (1997) originally argued and of principal concern to the policy team. So, in creating the diagrams, we came to a much better understanding of how the schemes worked in their various jurisdictions. The jurisdictions could not be an integral part of the diagram and there were some key differences between the countries, specifically how the state's role in providing compensation for iatrogenic injury was viewed by the polity (Esping-Andersen 1990). This element of the review may need to be discussed more fully in the accompanying text.

Conclusion

In this article we have presented an alternative way of synthesising evidence which is closer, we argue, to the critical realist philosophy put forward by Bhaskar than the current methods of realist reviewing. This is a departure for us as evidence reviewers and the first time we have used methods connected to complexity theory. Maruyama's feedback loop analysis has allowed us to express the more continuous and evolutionary nature of social action, articulated in the work of Bhaskar and Archer. Our own struggles to incorporate critical realist philosophy into our practice has led us on a rich journey into complexity and introduced us to some alternative ways of thinking about and

representing evidence. Rather than relying on evaluation research models, we might usefully consider what other research traditions could offer evidence synthesis.

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