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Citation

Bell, Simon (2015). Formations of terror - can systems approaches help us to model and avoid the tipping point? In: 21st International Sustainable Development Research Society Conference Tipping Point: Vulnerability and Adaptive Capacity, 10-12 Jul 2015, Geelong, Australia, ISDR Society.

URL

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Formations of Terror - can systems approaches help us to model and avoid the tipping point? ¹

Abstract

Human beings are naturally prone to fear as an instinctive reaction and this is not a bad thing. However, in this paper I argue that social and cultural formations in contemporary life play on and use fear as a response which can be counted on to prompt our behaviour. Furedi's 'paradigm of vulnerability' (1, page 164) could be seen as a natural consequence. It would not be too much to suggest that contemporary society is largely controlled and conformed by fear and, further, that this is most markedly and viscerally demonstrated in the fields of Climate Change and environmental management (although it is just as stridently evident in broadcast concerns over terrorism, killer viruses, etc.).

Being fearful at an instinctive level is, by definition, not conducive to problem structuring, change managing and innovation.

The argument of this paper is that fear, when manipulated in civic life, becomes a series of 'Formations of Terror' which lead to 'learned helplessness', vulnerability without grace and knee jerk, instinctive reaction. Following over thirty years in studies relating to information technology, sustainability indicators and environmental management, I explore examples of the Formations of Terror (FoT). The paper investigates the basis for these formations by use of systemic devices. If fear can create vulnerability and exacerbate it then systemic modelling and conceptualisation may provide valuable assets for mitigation and even reversal of the worst effects.

The uber-super-tanker of collective human consciousness takes time to turn around. A systemic mindset will help us to understand the cage of fear, provide us with the means to figure out the causes of most terror and enable us to collectively push back on those causes.

1. Introduction - Personal Fear

"It's not the despair, Laura. I can take the despair. It's the hope I can't stand"

John Cleese as Brian Stimpson, in the film Clockwise

I have just finished reading Naomi Klein's best seller: 'This Changes Everything' and forgive me if I am feeling a little depressed. Klein is a gifted writer and tremendously well intended. One cannot doubt her good intentions and her sincerely held view that there is hope but, behind the offer of hope there looms a huge mountain of despair. Forecasts of despair around the prospect of a modest 2 degrees temperature rise sound stark:

"brutal heat waves that can kill tens of thousands of people, even in wealthy countries, would become entirely unremarkable summer event on every continent but Antarctica" page 38

but this needs to be seen as comforting because:

"Much more frightening than any of this is the fact that plenty of mainstream analysts think that on our current emissions trajectory, we are headed for even more than 4 degrees of warming" (page 40).

Building on this Klein asks:

"But what should we do with this fear that comes from a planet that is dying, made less alive every day?" (page 66).

Of course Klein has great arguments for change. Much of her radical agenda for improvement is community based and could, arguably, be ramped up to a massive scale. This kind of innovation might avert the worst of what is to come but the majority of the book constitutes what I think of as the most recent addition to my library of terror. How did the library begin?

¹ Professor Simon Bell. Paper prepared for ISDRS Conference, Geelong, Australia. 12th July 2015.

In 1978 I went to my first lecture in the School of Development Studies at the University of East Anglia. The new intake of around 90 students were about to begin our study of the world development system. You would wish to take an undergraduate degree in development if you were interested in the state of the world and this intake, a blend of fresh faced and mature students were universally keen to understand how the world was working – or not. One of the key texts in our first year was ‘Ecoscience’ by Ehrlich, Ehrlich and Holdren (2). I recall that this was my first experience of a genre of development literature I was to go on to self-reference as ‘the dooms’. Ecoscience predicted – based on what appeared to be very good science at the time – all kinds of doom, most of which related to over-population and the consequent exhaustion of natural resources. There were too many of us, we consumed too much and the western capitalist model was eating the world. *Plus ça change*. Over the coming years the literary output of the dooms outnumbered any kind of hopeful books by what felt like a million to one. But I was sympathetically inclined to be grimly happy with those kinds of proportions. It suited my neo-Trotsky, fashionably depressed ennui. My highly confused and confusing mindset. This mindset might be summarised as: “Damn the West and nothing to be done”. Or, “ We are all going to hell in a handcart – whoop!”. Doing the kind of degree I did made the dooms an occupational *sine quo non*. A particular doom favourite of mine was Paul Harrison’s ‘Inside the Third World’. The portrayal of the horror of daily life for the vast majority of the population was visceral and haunting. Similar doom works by Clifford Geertz on the realities of ecological disaster in Indonesia, Colin Leys on the iniquity of underdevelopment in Kenya and Andre Gunder Frank’s narrative of historical global immorality. All weighed much more heavily in the scales than the modest hopefulness of authors such as the Brandt Commission and Schumacher (3–8). Irrespective of concepts of truth or fact I was temperamentally attuned and sympathetic to the dooms. At some point the intellectual conceit of this literature came home to me as a sense of global apocalypse. With this came fear. My first adult experience of existential fear was as an overwhelming sense of dread – rather than a worry or an anxiety or an instinctive ‘jump’ such as is experienced in a good horror movie. This was fear in the mind and the marrow. My view of world development was that, if you counted up all the beans there really was only one conclusion that was viable – human activity was going to lead to the end of history. By a process of irreversible underdevelopment, thoughtless inhumanity, consumer greed and environmental recklessness the world was indeed doomed. At some point, my original sense of fear and the associated hyper-depressive mindset became institutionalised as fatalism or what Martin Seligman termed ‘learned helplessness’. I think that this condition remains as an obstacle in the background of my psyche. As a development/ sustainability professional I would still try to do what I could in my own way, but the end point was inevitable and no-one could do much about it. Doom. The literature of doom has passed from early iteration to maturity and erudite compilations can be found on websites such as Dark Mountain - <http://dark-mountain.net/about/the-dark-mountain-project/> - which says of itself:

“The Dark Mountain Project is a network of writers, artists and thinkers who have stopped believing the stories our civilisation tells itself. We see that the world is entering an age of ecological collapse, material contraction and social and political unravelling, and we want our cultural responses to reflect this reality rather than denying it.”

Dark Mountain is one response to an assessment of the ‘facts’ which we have to hand re. Climate Change and other environmental issues. But what about the academics? Over thirty five years after my first experience of Ehrlich et al and coming full circle, now as a veteran of the development/ sustainability narrative; I attended the 17th ISDRS conference, held at Columbia University in 2011. A key note speaker on that occasion was Lester Brown – Founder and President of the Earth Policy Institute at Columbia. Lester gave all delegates a copy of his book ‘World on the Edge’ (9). Brown is one of our most eminent and respected authorities on food security and the environment and also a master of doom narratives. For example, opening his 2011 book at random I read:

“Bolivia is also fast losing the glaciers whose ice melt supplies its farmers and cities with water. Between 1975 and 2006, the area of its glaciers shrank by nearly half. Bolivia’s famed Chacaltaya Glacier, once the site of the world’s highest ski resort, disappeared in 2009” (Brown, 2011 page 53).

I am not suggesting for moment that Brown is doing anything other than telling the truth. He is a superb scholar. Also, Brown does not appear to be a depressive and in a recent interview (10) he expressed his belief in the human capacity to change and change quickly but the strategies he sets out seem hugely

dependent upon implicit systemic change and – as with Brandt and Schumacher – the optimism appears late in his works, a minor cord in the disaster opus. There is something about the manner of Lester Brown which discourages the belief that he himself is convinced we are going to make it. In short, Gladwell's tipping point seems never far away in Brown's description of the dynamics of environment and food security. I understand how the development/ sustainability/ environmental narrative can lead to fear and then to learned helplessness but is there a cure other than closing our eyes to the inevitable? In terms of responding to the overwhelming issues of climate change Naomi Klein, argues:

“rather than responding with alarm and doing everything in our power to change course, large parts of humanity are, quite consciously, continuing down the same road. Only, like the passengers aboard Flight 3935, aided by a more powerful, dirtier engine. What is wrong with us?” (11).

What is wrong with us may in part be our capability to conceptualise and respond to fearful things - but, what is fear?

2. Scope - What is Fear?

If you google fear you come up with a range of definitions. Fear is both a noun and a verb - here are definitions which I find useful:

Fear the noun - “an unpleasant emotion caused by the threat of danger, pain, or harm.”

Fear the verb - “be afraid of (someone or something) as likely to be dangerous, painful, or harmful.”

I also need a working understanding of terror. Again google gives me a useful start: “extreme fear”! This is a bit brief - the term is open to a wide variety of inferences which colour the meaning – for example Maximillian Robespierre said of terror:

“Terror is nothing other than justice, prompt, severe, inflexible; it is therefore an emanation of virtue”

So terror it would seem can also be cathartic. To assess the systems of fear and emerging terror I will need to build up a profile of what I mean by the term and to do this in a way which is systemic, seeking the gathering wholeness of the formations of terror. But, what does this wholeness comprise?

For the purposes of this brief paper I will limit my brief overview of fear to biological, social / environmental and personal experiential forms.

I suggest that the understanding of fear begins with our personal experience of it and so with biology. Many have written about the biology of fear. First a definition. Ralph Adolphs writing in Current Biology in 2013 (12) suggests the following outline of what we mean by fear in biological terms:

“fear is an intervening variable between sets of context-dependent stimuli and suites of behavioral response. Its usefulness is explanatory, and one can be agnostic about any correspondence with other psychological, let alone neurobiological, states. Such a variable could take on a consistent set of values within an individual, and differ systematically between individuals, making it a candidate for a personality trait.” (Adolphs, 2013 page 79).

This is a little beyond a lay description. If I translate into terms which are less technical I would suggest:

Fear exists in the gap between a stimulus and a response. It helps to explain the response. Fear is different to different people but may have a social nature.

Adolphs suggests that there is an issue about fear being biological at all. Here is his worry:

“are we discovering ‘fear’ through objective scientific investigation, or are we imputing it through our concept of ‘fear’? In the same way that studies in physics would not reveal to us a material object category such as ‘chairs’, neurobiological studies of fear might not carve out a state of ‘fear’. Instead, fear, like chairs, might be a psychologically constructed category” (ibid page 80).

So, fear is not just biological (leaving aside the issue of fear in animals other than humans for now) but is also a psychological property. Another view of fear is provided by Steimer (13). Steimer suggests:

“Ethologists define fear as a motivational state aroused by specific stimuli that give rise to defensive behavior or escape.” (Steimer, 2002 page 233)

The manifestations of fear (fear in our experience) is explained in the following terms:

“External auditory, visual, olfactory, or somatosensory stimuli are relayed by the thalamus to the amygdala and cortex. ... After ... processing of the emotional stimuli, the central nucleus of the amygdala (CeA), on the output side, activates the locus ceruleus (LC) and central and peripheral noradrenergic systems ..., and the hypothalamus In addition, the CeA directly activates various midbrain regions or nuclei responsible for different aspects of the fear/anxiety response: freezing or escape ..., increased respiratory rate ..., startle ..., and the dorsal motor nucleus of the vagus (DMN) in the medulla, which ... is responsible for the increase in heart rate and blood pressure associated with emotional events.” (Steimer, 2002 page 236).

Fear is an abstract quality with very physical consequences and (according to Adolphs) in our mind even as we rationalize it. Adolphs does go on to say that this does not remove fear from being of biological concern and capable of biological assessment - it just means that fear is both a psychological and a biological construct. Later in this paper I will look at fear as a social and a cultural phenomena too.

So, at the level of the individual, fear is an emergent property. It emerges in the gap between our experience of some form of shock or stimulus. It results in instinctive reaction – we react but instinctively, without thought. Again, in systemic terms fear has the capacity to perturb; to confound the rational human system.

2.1 Scope2 - What is Environmental Fear?

Before looking at the nature of environmental fear I want to introduce a concept which may help in explaining the human response to fear. The Nobel Laureate Daniel Kahneman talked about two systems which human beings use in the assessment of the world we experience – he called them system 1 and system 2 (14). Essentially system 1 is our instinctive reaction to stimuli and system 2 is our considered and rational response. Daniel Gardner in his book on the ‘Science of Fear’ (15) describes them as ‘gut’ and ‘head’. Gardner explores the ways in which our primitive gut reacts to things we find worrying and how this can in turn make us fearful of the wrong things. To some extent we are victims of our biology. Gut is primitive, reptilian, but too often takes charge of our reactions to stimuli. We read the world wrong – too fractured, too instinctive and too reductive. Environmental fear can be seen in these reductive and instinctive terms. To help clarify this point Gardner refers to research into concerns about global warming. The research undertaken by Anthony Leiserowitz focused on surveys taken about global warming. Surveys were taken before and after people saw the movie *The Day After Tomorrow*, an environmental disaster movie. People who saw the film were more concerned by climate change and more sure of disaster than those who had not seen the movie. We can rationalise the unlikelihood of the film’s scenario and we can question the science which was apocalyptic in the extreme but people ‘feel’ scared and anxious – system 1 is in charge of our responses even following what is clearly a fictional piece of entertainment.

To some extent I have already touched on environmental fear. I described it as inspired by Ehrlich et al in my undergraduate experience in 1978 and it is clear that many academics have explored the causes of environmental collapse and the resulting impacts in great depth. One of the great texts of environmental fear is Mike Davis’s ‘Ecology of Fear’ (16). In this book Davis describes Los Angeles in terms which depict it in multiple apocalyptic forms. From the geology to the climatic to the social and cultural – LA manifests in terms of a sequence of past disasters known and remembered and of future disasters which are sure to come. In a function known as hindsight bias the past disasters seem to point to and emphasise the inevitability of future chaos. Nevertheless, Davis’s book does not describe a citizenry living in terror. Despite the list of “biblical” disasters he describes – ranging from storm and flood to earthquake and firestorm – life in LA goes on. Gardner provides a similar description of normal civic life proceeding in the face of potential environmental disaster. In describing the population of Tenerife living on the slopes of a volcano which has erupted three times in the last 300 years. He says:

“Now, we might think that the residents of the Canary Islands would find it somewhat unsettling that they could wake to a cataclysm on any given morning. But one would be wrong. Teide’s² flanks are covered by pleasant towns filled with happy people who sleep quite soundly” (page 60).

The point is we have no experience of this volcano erupting. Our heads know it could happen but our guts win out – there is no immediate fear stimulus and it would seem complacency rules. A premise of this argument is that human beings are confused and confusing in our capacity to manage risk. We tend to get insured after we are burgled. We often fear that which is presented in fearsome terms (immigration, asteroids, bird flue, computer bugs) whilst missing the obvious (the sleeping volcano under our beds). We oscillate between complacency in the face of what Jared Diamond refers to as “creeping normalcy” (17) – and terror. Returning to my literary encounter in 1978, Gardner quotes my early mentor Ehrlich as a source of Environmental fear. Ehrlich can be considered as one of the first of the “catastrophists”. In his book *The Population Bomb* (18) Ehrlich wrote:

“In the 1970s, and 1980s, hundreds of millions of people will starve to death in spite of crash programs embarked upon now”.

Ehrlich referred to the loss of up to four billion people as the “Great Die-Off”. But the catastrophe did not happen. As Gardner puts it:

“Governments did not embark on the emergency measures to control population advocated by Ehrlich and others. And yet mass starvation never came for two reasons. First, fertility rates declined and the population did not grow as rapidly as predicted. Second food production soared”. (page 303).

Gardner goes on to show how catastrophists (my “dooms”) have not stopped and continue to show supreme foreknowledge of the global plight and this takes me back to Lester Brown and a piece on him in the UK Guardian in February 2015: “Vast dust bowls threaten tens of millions with hunger”. What is one to make of such dire predictions from such eminent sources? Ehrlich used the science and evidential material of the late twentieth century to support what proved to be mistaken claims. No one doubts Lester Brown’s credentials, as Suzanne Goldenberg notes:

“Brown has previously used his broad vision and his fluency with data to identify and explain major developments in the global food system and environment” (10).

But it would seem that experts like Brown provide authoritative evidence which often has the consequence of creating a degree of public fear. As part of my research I have been consulting with environmental experts over the nature of fear in the environmental debate. I have interviewed senior and eminent academics, activists and leaders of NGOs. The questions I asked were:

1. Specifically regarding climate and environmental issues, are you aware of fear among those you meet in your work?
2. If so, what is the main cause of fear in the current environmental debate?
3. Do you think policy makers and populations more generally should be fearful?
4. Is there a problem with the way in which news in the environmental debate is broadcast to the general public?
5. Can a response of fear be useful with regard to complex problems?

The responses so far have been intriguing.

On the question of fear among those we meet, the response was generally “yes” or a qualified “not really”. The “not really” response is qualified by the observation that professionals are cultured not to show or discuss fear or a recognition that climate change is too slow to elicit rapid and sustained fear from those who study it or work within the field. A typical response was:

“People I work with fear that action will be too little, too late. But they have lived with this for so long now that they are inured to it.”

² The third largest volcano in the world.

Of those who admit to fear, the second question – what are the causes, produces linked but various answers. The reductive mindset which atomizes the world could be said to be fear engendering. Winning the argument but still losing in the long run. Confusion over messages and consequences is another great cause of fear along with existential projections of individual and civilizational fear. When asked if fear could be useful, my respondents have generally given a guarded ‘Yes’ but with qualification. As a prompt or a catalyst for anger and sustained, thoughtful change – yes fear can work. But purely as a weapon to terrorise. That is not of use. When asked about the nature of the broadcast of environmental news my correspondents were pretty unanimous in contempt for the media. A response which was widely shared was:

“The primary problem with the news, and the general media, is what is not said rather than what is said. Coverage of environmental problems, especially climate change, is completely disproportional to the actual level of threat.”

Finally, in terms of the use and value of fear my interviewees suggested that it could have value but only if linked to deeper and more systemic responses.

“I think the research suggests that fear is 'useful' when it can be linked closely to a pro-active response to reduce the threat/fear”.

This is work in progress but responses so far are varied and conflicting. One theme which emerged in response to several of the questions was the need for better thinking – for cybernetic or systemic thinking – in order to address the complexity experienced.

Society can tend to react with terror to the prospect of an overwhelming catastrophe but, over time this results in learned helplessness and a sense of vulnerability and then complacency; until the next dose of fearful evidence and resulting terror³. The cycle repeats and to understand cyclic behaviour a systems approach can be helpful.

3. Exposition of the Formations of Terror

Fear is a multispectral phenomena. For example, it is objective and subjective, noun and verb, cause and effect. It is also an emergent property, emerging from a gap. Casting about for a term to help me understand the forces at work on our psyches I have stuck on the Formations of Terror or FoT. In using this term I refer to any attempt at systemic mapping of the origins and /or process and /or outcomes of fear as experienced by the individual, community or society more widely.

In reading the vast and chaotic literature on fear fear manifests emergent in the gap between stimuli and response. It is one way of responding – it has a biological tsunami of instinctive reaction supporting it and system 1, or “reptile brain” to govern its exposition. It is not sustainable as a raw emotional response but tends to lead to fatalism and apathy; risk aversion and vulnerability; defensiveness and conservatism. But fear is more than this. Fear can be exported by stealth and by intent. We can induce fear and we can spread it – there is a viral quality⁴ in the FoT. Despite living with the best human beings in the best of times (or so Stephen Pinker portrays it - (19)) we are beset by fears of all kinds – risks abound (Beck, 1992, 2013 (20, 21); - for a recondite exposition of risk culture and fear see Furedi, 2006 (1)). The formation of terror induced by fear seems to evidence certain characteristics. Joanna Bourke (22) provides an elegant and compendious overview of fear in history - focusing mainly on the UK and the USA in the 19th and 20th centuries. Fear evolves culturally, the causes change with some fluidity. Fear is important but there is a sub-strata to her book which relates to manipulation by fear. In considering her work a systemic manifestation of fear emerged. Fear is not just an emotion it is also a weapon, a target, an outcome and a means to an end. Figure 1 - a systems diagram - attempts to capture these themes in overview.

³ Frank Furedi has discussed the long term reaction to fear and risk in what he refers to as a ‘Vulnerability Paradigm’ (1). The paradigm is characterised by help seeking behaviour, scepticism about knowledge, risk aversion, celebration of caution, focus on the negative consequences of change, sceptical that individuals or communities can cope and a belief that people are defined by their vulnerability (page 164). I

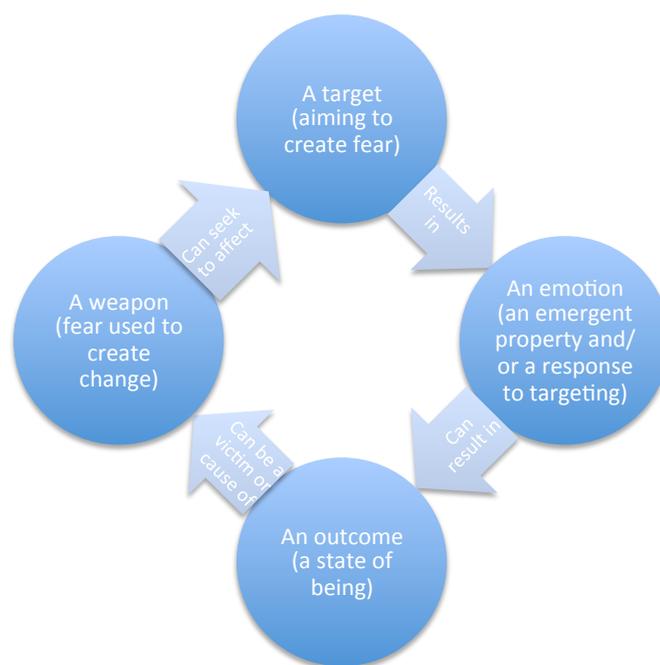
⁴ Here taken to mean “a harmful or corrupting influence” (OED).

This Figure implies to me that fear has the fluidity of dynamic emergence. Fear is a shape shifter and the causes of the shift can be multiplex. The understanding of the FoT points beyond Kahneman's system 2. System 2 is rational thought. As implied by Gardner, system 2 needs system 1 to make a whole in a human being but even the most holistic and rational of mind-sets can still be deeply un-systemic and capable of catastrophe. The eminent authors Hanah Arendt and Aleksandr Solzhenitsyn separately pointed out in the holocaust and the gulag how the most meticulous system 2 thinking can be mechanistic, reductive, deeply inhuman and catastrophic in its outcomes (23,24).

System 2 left to itself is not a cure to the FoT. Indeed, picking up on the work of Furedi (1) it can be argued that the impact of fear is to focus rationality on risk aversion and vulnerability. If fear leads to vulnerability and hyper-caution then a related system 2 rationality will probably be obsessed with risk aversion and little may be achieved by systemic approaches.

However, if rationality is applied in what Furedi refers to as a 'Humanist Paradigm', rationality, as cradle of systems approaches may be a means to operationalize systemic responses contesting the inertia effect of fear.

Figure 1. A system of fear – one expression of Formations of Terror



5. Discussion - Systems vs fear – the System 2 first step to System 3?

The tipping point is a catastrophist or doom scenario. Multiply supported by the best minds on the planet – it is the mother of all catastrophes. Gladwell's phrase does more than point to a bleak outcome – it suggests an irreversibility and this in turn suggests fearful consequences and despair. What is more, the joined up nature of the world means that fearful events can lead to each other – recently noted in the public forum by a UK Guardian newspaper piece on climate change and resulting social disruption (25). But, by the same reasoning, by un-looked for systemic relationships, fearful outcomes may be avoided.

I need to be clear, I am no climate change denier and I respect the likes of Naomi Klein, Lester Brown, Jeffrey Sachs, etc. These are inspiring academics, activists and practitioners with impeccable credentials. But in the 1960s and 1970s the qualifications of the Ehrlich's, William and Paul Paddock and George Wald were seen as being impeccable. As Gardner argues:

“anyone rattled by catastrophist writing should also know that many of the horrible and wonderful things that come to pass are not predicted and there is a very long history of smart, informed people foreseeing disasters .. that never come to pass” (page 301).

There are numerous reasons why our evidence based experience and our progressive empirical science can misinform us but that is not my main point, there are many reasons why the unintended outcome of our science and consequent prediction can result in the outcome we fear most. Fear is an emergent property of the gap and it carries with it an emotional charge which, far from encouraging strategies to avoid the cause of the fear, can produce inertia and helplessness - the cause of counter-productive tendencies such as fatalism resulting in minimal change and the continuance of the status quo. But we do need change. As Lester Brown says:

“We need an economy for the twenty-first century, one that is in sync with the earth and its natural support systems, not one that is destroying them” (Brown, 2011, page 183).

Who would not agree with this? My point is, we are more likely to achieve this in the clarity of un-fearful systemic thinking than in a reactive state of terror and fatalism. I do not want to stop the science or the prediction but I do want to consider the therapeutic qualities of a systemic means to understand and manage the results of doom scenarios. If we respond equally to all predictions our fatalism may increase to the point where we ignore the one prediction which proves to be accurate. If we accept that fear is an unhelpful response to complex issues then the global environmental community might serve change well by moderating its appeal to fear (what can be considered to be the “weaponization” of fear) and find a means to deal with the frightening consequences emerging from the results of environmental science. Such a means would need to be commensurate to the complexity of the cause of our fear and capable of making a system 2 assessment which is consistent with the evidence to hand. It is not enough to have a rational response – I suggest we need a *systemic* response – System 3 maybe? This is not a new or novel idea. Indeed, Gregory Bateson, one of the founders of modern cybernetics pondered environmental issues in depth. Specifically:

“As Mary Catherine Bateson wrote: “Bateson was haunted in his last years by a sense of urgency, a sense that the narrow definition of human purposes, reinforced by technology, would lead to irreversible disasters, and that only a better epistemology could save us”. Perhaps it is only now, as ecological disaster becomes more and more pressing, that Bateson’s originality and importance can begin to be fully appreciated.” (26, page 14)

But, what might a systemic response look like? Jared Diamond implies such a systems approach in a five element framework for understanding ecological collapse (environmental damage, climate change, hostile neighbours, friendly trade partners and social responses to environmental problems) but does not fully tie them together into a systems model or make allowance for the inclusion of fresh insights (17). In the space I have here I will refrain from skipping inadequately over a detailed example and, for the sake of demonstrating my thinking use a very personal scenario for how such an approach might work.

6. Free-fall – and conclusions

Since my childhood I have suffered from anxiety attacks. Anxiety is defined by Steimer as: “a generalized response to an unknown threat or internal conflict, whereas fear is focused on known external danger” (Steimer, 2002 page 233). In systems terms, anxiety is an *emergent property* of the gap Adolphs has already defined. In systemic terms, it is anxiety which allows the disturbing energies in the external environment or the internal environment to penetrate to the heart of the autonomous system which is me. I can try to understand this using systems ideas. Let me explain by means of a metaphor but first, what are the system elements I want to work with? What systems ideas will help? Well, I want to use ideas about boundary, environment, autonomy, control, sub-system, hierarchy, positive re-enforcing loops, and monitoring

Imagine a system as an egg. External to the egg is an environment which the egg has no control over. The egg is vulnerable in this environment and has its work cut out to even try to make sense of it. If the external environment is a frying pan then egg beware! The egg system is based around the central controlling mechanism of the yolk. The yolk will become the new bird if the egg is in a benign environment .. an environment good for yolk gestation. The Yolk is the centre of the egg system, the point of the egg system if you like. No yolk .. well, who needs a yolk-less egg? But, within the yolk (which can also be seen as a system) there is an environment. Into this yellow, creamy environment which harbours the hope of the egg, alien pathogens and antibodies can emerge or be injected which also

harm the egg. The egg can be attacked from without or within. Now, my egg is my systems metaphor. A person or a planet can be put in place of the egg. The planet or the person exists in space, surrounded by an environment which can be benign or malign. Snapshot.

Enough metaphor, what happens when fear operates on the Simon system?

Recently anxiety emerged in my yolk. I was fearful that I had written some words in a report without the permission of the people about whom I was writing. It was a typically silly anxiety. I was not worried the day I handed the report in but I was worried the next day at 4.30 in the morning. I woke up, had the thought that I had written what I should not and I broke out in a cold sweat. Most sensible people would have turned over and gone back to sleep. Maybe they would have got out of bed and gone to read the report to see if the fear was grounded. But, I was not being sensible – well not at 4.30am. Further, I have a long standing aversion to my own work and cannot bear to read it once published. So I did not. How did the FoT work in systems terms?

The report was in my external environment. It was gone. Sent out. The seed of anxiety is in my mind, my internal environment – in the yolk. The external report thought emerged from my monitoring and checking my work. Unfortunately for me this happened in my unconscious at 4.30am (a popular time for those suffering from anxiety). The monitoring of the report sent into the environment resulted in a positive feed back loop informing my consciousness or autonomous control centre that an artefact made by me was in the environment and could cause great disturbance - the anger of important people and other forces in the environment, outside my shell, and with power to crack in a major way. Not just crack the shell but make an omelette! The monitored issue was reported back to the heart of the Simon system and the yolk became molten. Fear emerged in the gap between stimulus and response. Worry and anxiety emerge. The boundary is breached, autonomous intelligence is questioned (did you send the report out like that you idiot?), sub-systems of reflexes (fright and flight mainly) are switched on and the entire system, sub-systems, etc. go into free fall. Now, vitally, monitoring and evaluation are flipped from rationality and instead are firmly based in system 1. They are instinctive and not penetrating or thoughtful. Instincts are casting about without data (too scared to check the data) and increasing the worry – a positive feedback loop is making things worse. From top to bottom of the hierarchy the system is in fearful anxiety. From the cause to the effect, fear has emerged and is within my system. Fear is also considered to be in the world and the Simon/egg/system is self-perceived to be in great peril. OK, snapshot, freeze the frame.

I have set out the panic in systems terms and by a systemic understanding the nature of the cause of the terror. I have an assessment of the critical points in the broken model and from this sense can be made. So if the key issues are:

- The control mechanism is sub-optimal. A sleepy mind and unconscious experience of worry
- Monitoring is switched off. Lack of checking of facts (checking the report which was sent out)
- The historical context is not being assessed. A known proclivity to worry

Then a series of fear reducing strategies emerge – critically they involve the concepts of reflection and choice:

- Choose to engage the control mechanism. Wake up!
- Chose to monitor with system 2. Be brave - check your file
- Consider the environment without egotism. Consider if it is really the end of your world if the report with the words you fear has been circulated? Reflect with humility.

It is interesting to note that “critical reflection and humility” are noted as recommendations “for all participants in climate discourse” in a recent research report by a team of distinguished Climatologists (27, page 11). My anecdote suggests the activism of forces of the FoT and some suggested systemic means to address them. If this works at the level of the individual, the next task surely is to scale it up to the community and to addressing more global issues?

'Litany against Fear'

"I must not fear.

Fear is the mind-killer.

Fear is the little-death that brings total obliteration.

I will face my fear.

I will permit it to pass over me and through me.

And when it has gone past I will turn the inner eye to see its path.

Where the fear has gone there will be nothing....only I will remain"

Frank Herbert – from the novel 'Dune'

References

1. Furedi F. Politics of Fear: Beyond left and right. London: Continuum International Publishing; 2006.
2. Ehrlich PR, Ehrlich AH, Holdren JP. Ecoscience: population, resources, environment. San Francisco: Freeman; 1977.
3. Harrison P. Inside the Third World. London: Pelican; 1984.
4. Geertz C. Agricultural Involution. Los Angeles: University of California Press; 1963.
5. Leys C. Underdevelopment in Kenya. Norwich: Fletcher and Son; 1975.
6. Gunder-Frank A. World Accumulation 1492-1789. London: Macmillan; 1978.
7. Brandt Commission. Common Crisis - North - South: co-operation for World Recovery. London.: Pan; 1983.
8. Schumacher EF. Small is Beautiful. London: Abacus; 1974.
9. Brown L. World on the Edge. New York: W W Norton and Co. ; 2011.
10. Goldenberg S. Lester Brown: "Vast dust bowls threaten tens of millions with hunger." The Guardian Online [Internet]. London; 2015 Feb; Available from: <http://www.theguardian.com/environment/2015/feb/25/lester-brown-vast-dust-bowls-threaten-tens-of-millions-with-hunger>
11. Klein N. This Changes Everything: Capitalism vs the Climate. London: Penguin; 2015.
12. Adolphs R. The biology of fear. Curr Biol [Internet]. Elsevier Ltd; 2013;23(2):R79–93. Available from: <http://dx.doi.org/10.1016/j.cub.2012.11.055>
13. Steimer T. The Biology of Fear - and anxiety -related behaviours. Dialogues Clin Neurosci. 2002;4(3):231–49.
14. Kahneman D. Thinking fast and slow. London: Penguin; 2011.
15. Gardner D. The Science of Fear: why we fear the things we shouldn't - and put ourselves in greater danger. New York: Dutton; 2008.
16. Davis M. Ecology of Fear. New York: Vintage Books; 1999.
17. Diamond J. Collapse: How societies choose to fail or survive. Los Angeles: Penguin Books; 2013.
18. Ehrlich P. The Population Bomb. Los Angeles: Sierra Club/ Ballantine Books; 1968.
19. Pinker S. The Better Angels of our Nature: A history of violence and humanity. London: Penguin; 2011.
20. Beck U. Risk Society: Towards a new modernity. London: Sage; 1992.
21. Beck U. Twenty Observations on a World in Turmoil. Chichester: Wiley; 2013.
22. Bourke J. Fear: a cultural history. London: Virago; 2015.
23. Arendt H. The Origins of Totalitarianism. New York: Harvest Books; 1950.
24. Solzhenitsyn A. The Gulag Archipelago. New York: Perennial Library, Harper and Row; 1977.
25. Guardian. The Guardian View on climate change and social disruption: how one form of chaos breeds another. The Guardian Online. London; 2015;
26. Ramage M, Shipp K. Systems Thinkers. London: Springer; 2009.
27. Rapley CG, de Meyer K, Carney J, Clarke R, Howarth C, Smith N, et al. TIME FOR CHANGE ? Climate Science Reconsidered. 2014; Available from: http://www.ucl.ac.uk/public-policy/Policy_Commissions/Communication-climate-science/Communication-climate-science-report/TIME_FOR_CHANGE_Final_Proof.pdf