Engaging with Climate Change: Comparing the Cultures of Science and Activism.

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Introduction

The links between people's emotional responses to climate change and their commitment to action are only just beginning to be explored (Carter 2015; Büchs, Hinton & Smith 2015). Although surveys which ask people directly about the risk of climate change suggest that the majority of the population take it seriously, surveys which ask people to rank it amongst other concerns find it placed at the bottom of the list or not mentioned at all, eclipsed by other issues (Capstick et al. 2015; Ipsos-Mori, April 2016). One explanation for this is that many of the population are in that state of denial that psychotherapists term disavowal (Weintrobe 2013). This is a state where uncomfortable or upsetting knowledge is split off and placed in a box where it cannot disturb the smooth running of everyday life. The person remains indifferent or only mildly or temporarily concerned. Emotional equilibrium is maintained.

Taking this analysis as our starting point, we decided to examine the emotional impact of climate change on the minority who we imagined *did* allow its disturbing reality to penetrate their day-to-day lives. We chose two groups: firstly, climate scientists who confront the evidence daily in their research and thus have no choice about whether or not to think about it and secondly, climate activists and campaigners who have chosen, deliberately, to place it at the centre of their lives. The cultures of the two groups are very different. Scientists are located in quasi-public institutional settings while activists and campaigners operate though the network-based forms of organisation that characterise social movements. We set out with the expectation that

a thorough understanding of climate change would in itself be emotionally disturbing but that the organisational setting in which a group operates could influence the way in which it manages this challenge. Do these differences affect the way in which these two groups respond to the challenges they face? We were particularly interested in what supported the emotional resilience of members of these groups in the face of this challenge because such resilience contributes to peoples' capacity to sustain action in stressful environments (Luthar, Cicchetti & Becker, 2000).

Before introducing our own research we briefly consider existing research on climate change and emotions, research on the different ways in which organisational actors process difficult emotional experience and discuss the contrasting organisational settings and cultures of climate scientists and activists.

Emotions and climate change

There is strong evidence that an understanding of climate change and its present and future impacts can provoke powerful emotional reactions such as grief and anxiety (Head, 2016). Whilst such feelings can motivate action, if too strong they can immobilise or trigger powerful defences. A growing psychological literature now examines human responses to climate change, responses which include denial on the one hand, and political engagement and lifestyle change on the other. While behavioural approaches have tended to focus on the way in which emotions or cultural allegiances can get in the way of adaptive responses (for example Lorenzoni et al. 2007; Moser & Dilling 2007) an increasing number of writers have drawn on psychoanalytic and psycho-social theories of psychological defence to explore aspects

of denial about climate change (for example Lertzman 2015; Norgaard 2011; Randall 2009; Weintrobe 2013).

Extreme forms of psychological disturbance are associated with trauma where, as Caroline Garland says, the mind is "...flooded with a kind and degree of stimulation that is far more than it can make sense of or manage" (Garland, 1998:10), experiences which can lead to the confusion, nightmares, depression and anxiety attacks of PTSD. Recently personal and anecdotal accounts registering the distress of those working in the climate science field have begun to appear (Thomas, 2014; Kearns, 2015) and there is now a website (http://www.isthishowyoufeel.com/) chronicling some of these experiences, particularly those of scientists.

Two established and complementary research traditions study how potentially stressful emotional experiences are managed in organised settings. The Tavistock tradition (Armstrong & Rustin, 2015) focuses on social defences against anxiety. These are organised and largely unconscious ways in which anxieties, inherent in forms of work such as nursing (Menzies Lyth, 1960) and social work (Cooper & Lousada, 2005), find expression in the culture, structure and procedures of institutions. In many contexts where psychological trauma is likely to affect workers – for example in medicine and the emergency services – institutional practices develop which contain, sometimes effectively, sometimes ineffectively, the distress that people feel. In her ground breaking work on nursing Isobel Menzies-Lyth described how the systems which hospitals used in the 1950s to organise nursing split it into depersonalised tasks, encouraged a culture of emotional detachment and denied the disturbing feelings engendered by the work. The result was high turnover, sickness levels and dissatisfaction as unbearable anxiety broke through the inadequate defences (Menzies-Lyth, 1960).

In contrast Arlie Hochschild (1979, 1983) stresses the more conscious 'emotion work' through which emotions, such as anxiety, shape and are shaped by organisational actors. Hochschild's work emphasises the way in which people take their cues from others when expressing emotion according to rules which are implicit to the cultures of the groups to which they belong. Hochschild also stresses the dramaturgical dimension of emotion: the ways in which emotion can be deployed strategically by organisational actors.

The two traditions are complementary and combining these perspectives enables us to envisage a continuum of emotional responses. At one pole are intentional and strategic responses, such as the deliberate suppression of pessimism, or the open celebration of celebration of success which are part of the 'emotion work' of the group or organisation. At the opposite pole there are unconscious and unreflexive ways of responding, involving organised denial or dissociation. We wondered whether climate scientists and activists might adopt different ways of responding and whether this might be influenced the settings in which they operate.

In a recent study of 'Climategate' Ramirez-i-Olle (2015) used the concept of 'boundary work' to refer to the process through which the scientific community defensively represented itself in an idealised way, one which typified science as objective, consensual and impartial, akin to the norms of the 'scientific ethos' in Merton's (1973) major sociological study of science. Much of the philosophy and sociology of science of the last 50 years has of course progressively problematised both the nature of scientific discovery (Kuhn, 1962) and everyday scientific practice (Knorr Cetina, 1995), challenging the idea of its objectivity. Rather than standing above social processes it is seen to display familiar human characteristics such as observational selectivity, heuristic short cuts and group pressure (Mulkay, 1991). Our

assumption was that climate scientists would experience the same emotional reactions to the implications of climate disruption as any other human being – that in all likelihood the findings would elicit dismay, anxiety and perhaps even despair - and we were interested to establish what effect the idealized concept of scientific practice had on their ability to deal with such feelings.

In contrast to the hierarchy and bureaucracy of universities, social movement organisations are generally non-bureaucratic and based on social networks (Diani & McAdam, 2003). Recent research such as Debbie Gould's study of Act Up in the USA has thrown light on the role that emotions such as anger, shame and despair play in the mobilization and decline of social movements (Gould, 2009). Downton & Wehr's study (1997) of peace activists also usefully distinguished the characteristics of the 'persisters' - a subgroup in their sample who sustained a long-term level of commitment rather than oscillating between over-commitment & burnout. Our expectation was that the flatter, network based forms of organization that supported activism would offer a more flexible setting in which to manage some of the disturbing feelings aroused by climate change.

Method

Given our focus upon the affective dimension it was appropriate to draw upon methodologies which are not only qualitative but also psycho-social. Psycho-social methods are designed to investigate the lived, embodied, less tangible and more affective dimensions of human experience (Hollway & Jefferson, 2013; Clarke & Hoggett, 2009). They situate interviewees' accounts in the context of their life history so that the thematic focus of an interview which might, for instance, relate to fear of

crime (Hollway & Jefferson, 2013) or the way in which professionals negotiate ethical dilemmas (Hoggett, Mayo & Miller, 2008) can be understood holistically in relation to other aspects of the interviewee's life.

Through key contacts in the climate science and activist communities we were able to interview six climate scientists and ten climate activists. Interviews lasted for up to 90 minutes, focused on the ethical and emotional challenges that had recently faced our respondents but then situated this in the context of their broader life history. We undertook a 'thematic analysis' (Braun & Clarke, 2006) of the data in order to let the data 'speak' free from our own theoretical preconceptions as much as possible. Following this, the findings from each group of interviews were fed back for further discussion, an opportunity that our activist subgroup seized with much greater enthusiasm than the scientists.

With the exception of one young climate scientist the rest of our sample were senior figures in the field, four being past or present leaders of research centres. With the exception of one activist in his late 50s our sample of activists were all in their late 20s, 30s or early 40s. The older ones had become involved in environmental campaigning in the 1990s. The younger ones' involvement dated from around 2005. At the time of the interviews five of the ten were working for environmental or specifically climate change based NGOs. Their roles included workplace and community engagement on carbon reduction, communication and media work, fundraising and research. Two others had previously worked for environmental or climate change NGOS in community engagement and in policy development and now worked freelance. The other three were involved in climate related research in economics, housing and energy supply. Nine of the activists had been involved at some point in direct action and four of them were still closely involved in actions

against airport expansion, coal mining, against financial institutions, and against oil companies' involvement in the art world.

In the following sections we draw upon our interview data to examine what drew scientists and activists into engagement with climate change and the impact this had on them. Extracts from interviews are coded (A for activists, S for scientists) and numbered (1 -10 for activists, 1-6 for scientists). This is a small piece of research and therefore the findings need to be seen as indicative.

Knowing About Climate Change: The Emotional Impact

The Activist Trajectory

Whilst the majority of our activists could trace a love of the natural environment going back to their childhood they were motivated primarily by social justice values rather than more recognisably environmental ones.

> "I don't want to be in a new system where we don't have fossil fuels but we still have racism, and we still have sexism." (A9)

Several interviewees also expressed a diffuse but strongly felt sense of social responsibility, something they often connected to their family/cultural background, for example, to grandparents who first settled in the UK from India, or to Christian Socialist or Catholic parents.

Virtually all of our interviewees described passing through a number of phases of engagement, so much so that we feel justified in referring to the activist trajectory as one that typically involves a rapid awakening to the issue followed by total immersion and then, for some, crisis and burnout, and a subsequent shift towards a more

sustainable, proportionate and enduring activism based upon the creative ways of coping we list later.

Epiphany:

For most of the activists the sudden awakening to the issue was an epiphany which involved an adjustment of their sense of what life meant:

> "the implication of that (the concept of tipping points) – so that was what had driven me to put, you know, everything on the line, and you know, stop doing what I was doing and just focus on climate change." (A3)

The findings had a big emotional impact even when returned to after a while:

> "I always do a couple of days each year updating myself on all the things that have happened in the climate change world, then I teach the session…and then I need a week of emotional recovery from it because it is absolutely frightening" (A10)

Immersion:

This epiphany was followed by a period of complete immersion, reading, thinking, talking and acting:

> "It just became the primary thing that I worried about." (A6)

The idea of epiphany also captures the life changing aspect of the awakening:

> "...a friend said 'Oh, there's going to be an action, a coal action, a protest against the government's policy of building a whole new generation of coal-fired power stations and would you...you know, it'll probably be arrestable, but you know, would you like to get involved?' and I just thought yeah…that feels, that would feel like an empowering thing to do." (A2)

Crisis:

For all the activists immersion in the issue involved intense periods of activism which required considerable organisation and often quite high risks. All the time the urgency of climate change was on their mind. Some remembered the impact of the knowledge:

> "...constantly engaging with this stuff, every day...yeah, that was absolutely terrifying..." (A3)

For others there was a point when their increasing knowledge had made them feel the problem was possibly insurmountable and they felt overwhelmed, disillusioned or disempowered:

> "I did some lecturing at the time on the process of the UN Convention on Climate Change and so I really understood how that part of the UN works and I think it was that process that ended up making me feel very depressed." (A6)

More often people described states such as anger, guilt, self-doubt, confusion and bewilderment, states that are often seen as an important part of the process of dealing with major loss, as the person struggles to remake a sense of what life is about and find new meaning:

> "I was constantly anxious... I just couldn't cope...it was an existential crisis...I had to like coach myself to let go of the stupid things that society tells you that have actually no, no bearing." (A1)

And sometimes the problem of how to respond felt almost impossible to resolve:

> "I think...lots of us, kind of didn't know where to...where it's OK to draw the line between what you need, what you want for your own well-being and what your duty is as a citizen of the world to do, given that we're in his huge position of privilege." (A2)

Resolution:

In their resolution of this process almost all the activists emphasised three forms of emotion work. The first was the development of a sense of agency:

"Just the day to day experience of agency makes the intellectual feeling of despair a bit less." (A8)

"Once you confront the enormity of the thing, you know the whole thing of climate change, actually despair is a very rational reaction to that. But basically action is the antidote to despair..." (A3)

The second was the need to find a path that was proportionate both to climate change and to living a normal life:

"You definitely kind of have this sense when you're young and you're fresh to it of why are people not…why isn't everybody doing this? And then you realize that well, you can't…you can't stay in that place for ever." (A2)

The third was a conscious moving away from an intense preoccupation with the facts and the pain of knowing them:

"I don't click on it...there's a psychological element, like what would it be like if everyday you got up and thought about were we or weren't we likely to stay within 2 degrees…whether you could sustain that…" (A7)

"I barely think about climate change now. It's in the background of my life all the time but I rarely sit and actually talk about climate change or read very much about it." (A6)

"I don't think I've suppressed it...I've accepted it, found my own kind of path of like how I live my life with those kinds of things going through it." (A1)

Although a slight exaggeration there is some truth in Carter's suggestion that "activists have an unwritten agreement never to mention the subject in order to avoid depression" (Carter, 2015: 577). This distancing felt like the process people go through when they come to terms with living with a difficult condition such as arthritis. After a first stage of finding out everything they possibly can, people settle into a stage of getting on with life as best they can. The difficult knowledge is not ignored or denied but is put into the background. For the activists this did not mean that distress did not sometimes return, breaking through the protective barrier:

> "I still do sometimes get my climate panic on, you know, thinking about it...yeah, yeah, existential gloom you know..." (A3)

> "If I let open the floodgates, it's there, I know it. I know what the depressive, overwhelming 'I feel lost' feeling is. It's not something I enjoy..." (A4)

Despite these painful recurrences the activists all seemed to have made healthy and realistic adjustments and we discuss later the culture of the movement which contained and supported this.

The scientists' trajectory

The experiences of the scientists and the paths they followed were quite different. For some the realization of the implications of climate research came gradually. Typically it was not the findings generated by any single piece of research which were disturbing but the accumulation of findings in connected fields of research combined with the lack of commensurate policy response:

> "Yes, I can't think of a point when I said 'Oh my God, got to get into this because this is really important,' I don't think it was, I can't find a moment, at

least I can't recall a moment. There could have been one but I can't recall it
now." (S4)

In general the scientists were more reserved in talking about the personal impact of
scientific knowledge. Where the activists' stories spilled out and they spontaneously
shared what they felt, the scientists found our questions about their personal feelings
harder to answer. Although they felt deeply concerned about the possible futures
which their knowledge opened up, they tended to talk about it in terms of the burden
of responsibility which they felt. This strong sense of social responsibility was an
ethic which had played a role in drawing several of them into this field in the first
place:

> "I always liked science and this is science with a purpose really essentially and
> I find it very satisfying." (S1)

But, as the following example indicates, this motive then brings its own problems:

> "I mean one of the reasons (I went) into this research was because of the value
> it has for society. But I also…I felt burdened by this responsibility...I had a
> period of months where I felt very scared because I thought well if the carbon
> sinks are saturating I'm one of the world experts on carbon sinks. What if I
> miss it? What if I don't see it? " (S2)

This theme of the burden of the responsibility appeared in several interviews.
Speaking about the so-called 'Climategate' affair which erupted alongside the
Copenhagen negotiations in 2009, one said:

> "And the context of course in which that all came out made it that much
> worse...And you couldn't help them, for they couldn't help but think well
> we've actually put the boot into that whole process." (S5)

Where the realization of the implications of climate research occurred more suddenly the emotional impact seemed to be greater and the effect on personal lives and careers more significant. One researcher temporarily withdrew from the work, another has gone very public about his concerns and has tried to use innovative methods of getting the message across. A third, recounting how this realization had offended both his commitment to social justice and his love of "the beauty of this stunning planet", said:

> "[It's] completely changed how I view my life and what I should have to do in my life... it's coloured my view on almost all aspects of what we do now, in ways that I must admit from a personal perspective has not been positive. It's affected friendships, it's affected family, it's affected the things that I enjoy doing. It's affected my career." (S4)

The scientists were quite varied in how much they had allowed their knowledge of climate change to affect their personal lives. The activists' understanding of the issues had led them to make deep and often difficult decisions about issues such as flying and they all led very low-impact lives. This was also true of some of the scientists but for others the impact was more restricted.

> "It's interesting that I did not properly calculate my carbon footprint for years, in spite of the fact I knew I could. I always put it off and of course it was because I didn't want to know." (S1)

Engagement in the Public Sphere: The Emotional Impact

The activists' experience

Given our initial expectations what we hadn't anticipated was that for both groups their most difficult experiences arose not from their deepening understanding of climate change but when using this knowledge to engage with a resistant public. The most difficult experiences for the activists concerned police assault, police raids, police infiltration and court hearings. Although all those involved in direct action emphasised the excitement, solidarity and sense of purpose involved there were also experiences that had been traumatic:

> "..when the police have come round and they've fucking walked on our bed in their boots and emptied all the cupboards and drawers out, to no real effect you know, it's just what they do...that's traumatic and the neighbours seeing the police pouring into the house and things..." (A3)

> "After we'd done the action and found out that we were going to be defending ourselves in court I was in a very lost...I was really lost. I remember coming out of the court…coming to the train station with my two girl friends and saying I don't know where to go from here...I was pretty fragile..." (A2)

These experiences had sometimes been very serious and created psychological damage that was not easily recovered from. One activist who had stepped back from direct action was still distressed many years later as she talked to us. However in the group as a whole there was recognition of what these experiences were, what their effects were likely to be and what was needed if people were to survive them and recover from them.

The more insidious and less dramatic effects of continual overwork, burnout or depression were mentioned by nine out of our ten activists. The worst experiences had taken place in larger NGOs where in one case the culture of overwork and in another

the intransigence of bureaucracy had led the interviewees to leave their jobs. All the other mentions of burnout and depression however were countered by discussion of how the interviewees had managed to deal effectively with these experiences and although the people in the two more serious cases had taken longer to recover their stories featured a similar mix of self-care, psychological insight, management of disturbing news and commitment to a different kind of future. The following quote was typical:

> "I had... three, really depressing emails in a row about how far it's gone and I just remember thinking that… Oh, my good God, like this is just a lost cause you know, it's a lost cause. But then I have…you know…I talk to a friend…I talked to my neighbour and he said something like 'I just built a wind turbine today, we've just got a community wind project' and 'da-da-da' and I just think great, that's brilliant, that's exciting, so that's what I mean about the solutions keep me going." (A4)

The scientists' experience

Although it was not our intention to be selective we began to realise that the scientists we accessed through our contacts were part of a minority in their profession who were engaged in public communication, in discussions with policy makers and in challenging their colleagues about the responsibilities of climate scientists. This confronted them with the puzzling phenomenon of public indifference and had put them at the forefront of media attacks but they had also experienced conflicts within their own profession which had been very distressing. Discussing public indifference their strongest emotions were frustration and anger:

"So we're running out of time to be able to avoid the worst risks and...the public debate on the policy process is simply not reflecting the scale and the urgency of the problem." (S3)

However their deepest distress focused first on battles that developed with colleagues about how the science should be presented to the public and then on the reception that some of them had received in the press when they tried to explain the implications of the science. They described bruising disagreements with colleagues:

"We just become so aggressive with one another in a way that is really not supportive... I was completely attacked by one of the colleagues that I respect the most...he said things like, 'Oh you're giving food to climate deniers with your presentation.'" (S2)

There were occasions where people became fearful of speaking out:

"Climate scientists have now become afraid of any sort of situation in which they feel there is a dispute, and they're trying to avoid that at all costs...they don't want to have a conflict with their opponents and I think that's not helpful to anybody." (S3)

There were accusations and counter-accusations that information had been wrongly presented:

"What we've been saying is challenging to other groups... So we have had a lot of problems I think there and it's mostly been behind the back type comments." (S4)

And there were frightening attacks from the press:

"There are people out there who watch everything that I say...wait and try and find something, and then when they find it they use it to cause trouble. So I

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feel very threatened and intimidated, and you see it's changing my behaviour." (S1)

Managing the Emotional Impacts: Building a Supportive Activist Culture

In contrast to the scientists, the activists were more easily able to express and discuss what they felt, partly through the active creation of a culture that could face and support the difficulties they encountered. There were three aspects to this: a positive and concrete view of the future, a sophisticated and supportive network of practice, and an emphasis on self-care and proportionality of response.

Ideas of the future

Despite their pessimism and despair the activists had a clear sense that they were working towards something valuable. Positive ideas of social change offered an anchoring which gave them strength:

> "Ultimately, solutions are going to look like more active citizenship...more democratic forms of decision making, decentralised everything really from energy generation to food production." (A5)

A network of practice

More important than this idea of the future however was the sense of community that existed now. Trust, support and solidarity were words that recurred frequently when they described their movement:

> "There's an incredible sense of solidarity that comes out of doing a direct action." (A1)

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> "Climate camps were really something special, friends I made then are still
>
> friends now." (A10)

Innovative ways of organising which emphasised inclusiveness, consensus decision-

making, flat hierarchies, psychological preparation and proper debriefing were

mentioned by all our interviewees:

> "We build into it after the event doing something where we talk about the
>
> emotions of how to deal with that." (A10)

> "We have Activist Trauma Support, we have medical support, we have
>
> debriefings, we have a really good way of helping people. We know what
>
> burnout is now. We know what post-traumatic stress disorder is." (A4)

Self-care

Individually they were careful to make time for restorative practices, such as

meditation, yoga, spending time in nature, maintaining other interests, getting enough

sleep, taking holidays and time off, and spending time with family and friends:

> "The things that create resilience are just the fairly standard things...just
>
> making sure you've got good support around you and having fun when you
>
> can." A6)

> "...being out of doors is really important to me. So walking, running, being out
>
> of doors generally, really noticing, looking, noticing beauty." (A5)

Managing the Emotional Impacts: The Use of Institutional Defences

The low-impact, consensual culture which the activists created and participated in

was seen by them as a pre-figuring of the future. Although it might sometimes be

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idealised, it provided a clear way forward at both a personal and political level. Scientific culture in contrast creates social defences which seem to have made any working through of anxieties either unnecessary, a source of ambivalence, or a source of continuing pain and difficulty.

The scientists described several characteristics of science and its practice that we thought protected people against anxiety but they also described points where these social defences were breached. The characteristics we identified as performing these defensive functions were ideas of scientific progress, scientific detachment, rationality and specialisation, scientific excitement and normalisation of overwork. These characteristics tended to isolate the scientific work from its implications, cut the scientists off from many of their natural, human responses to their discoveries and allowed the idealisation of science as a neutral good in itself. All the people we interviewed participated to some extent in these defences but had also been involved in challenging them and had suffered as a result.

Scientific progress and the excitement of the work

All the scientists conveyed a strong sense of how exciting the work of scientific discovery could be and the older ones had come into the work with a straightforward sense of scientific progress: science was a neutral force whose discoveries would contribute to the greater, human good. However a sense of inevitable progress can easily lead to the avoidance of the negative consequences of scientific knowledge and to its idealisation. Several of our participants spoke of the moment when for them this assumption had been challenged and some of them saw it as still holding sway amongst colleagues:

"Yes it [the idea of progress] clearly has been challenged and the naïve view if you like that science is just science and do it because it's worth doing and interesting." (S5)

One of them described the conflict of being very excited by a discovery which showed that matters were getting worse:

"I mean part of me was excited when I made the discovery, and oh my God the carbon sinks are saturating, isn't that exciting. Oh my God I should be having the opposite feeling." (S2)

And a number of them described how colleagues would bury themselves in the excitement and rewards of the work, denying that they had any responsibility beyond developing the models or crunching the numbers:

"I know so many scientists that all they want is to do their research and soon as it has some relevance, or policy implications, or a journalist is interested in their research, they are uncomfortable." (S2)

Detachment, rationality and specialisation

The idea of scientific progress and the excitement of its tasks are closely linked to ideas of scientific detachment and rationality. Several of the people we interviewed talked about the way that colleagues used the ideal of scientific neutrality to distance themselves from the implications of their research:

"...and many of them will say, oh well it's just my job to chip away at the frontiers of knowledge, and toss my knowledge in and it's up to somebody else what to do with it." (S1)

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The scientists described a culture where feelings tend to be distrusted and not acknowledged, where responsibility could be split off and passed to others and where it was easy to become numb to the implications of their work:

> "I think a lot of scientists convey the impression that they have no feelings at all about these issues." (S3)

Rationality and logic are clearly second nature to scientists: their operation was apparent in the careful and measured responses of the scientists and the words themselves are repeatedly frequently across all six interviews. In contrast the word 'rational' appears just once in only one of the ten interviews with activists and the word 'logic' makes no appearance at all.

The need for specialisation in science made the abdication from responsibility particularly easy:

> "...I mean what scientists do is they – many of them, they pick a bit of it - they pick a bit of the jigsaw and work at it in the hope that other people are working on other bits...and in the end someone, or some way it will be put together and we'll understand the picture." (S5)

Whilst not deliberately designed to avoid anxiety, specialisation nevertheless serves this purpose. One of our respondents was very clear about this. For him it was the process of joining up the pieces that contributed to his mounting sense of anxiety. To grasp the explosive truth of climate change the total system must be kept in mind but this contradicts the constant pull towards ever greater scientific specialisation:

> "Climate science is very vulnerable because virtually nobody knows first-hand all the pieces of the argument." (S1)

Overwork

Overwork also seemed endemic in the scientific community stemming usually from the pressures of career, competitiveness and fascination with the subject. For our interviewees however overwork seemed to be connected to their urgent sense of responsibility:

> "And I think you're right because my reaction to that feeling [anxiety] is to just get on and do the next thing, because that gives me - isn't it a feeling of efficacy, I've feel that I've got a grip of things, I'm in control." (S1)

> "I don't like switching off." (S4)

In the admission that he didn't like switching off, this last interviewee displayed the defensive function of overwork. Manic activity can defend against depression and the loss of hope: the culture of academic science certainly offered many opportunities for this line of protection. This is perhaps the one defence that both groups had in common for, as we noted earlier, the hyperactivity of many activists also seemed to serve as 'the antidote to despair' as one put it.

Managing the Emotional Impacts: Comparing Scientists and Activists

The activists thus had opportunities that did not seem available to the scientists: the weight of scientists' existing culture did not offer many openings for innovative ways of relating and there were many people around them who would not have been interested, or who would not have seen the point, in developing the kinds of emotional literacy and support systems that characterised the world of the activists. When they spoke of these more difficult experiences the language and metaphors used by the two groups were striking. Both evoked images of warfare and hunting but

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where the activists described themselves as protagonists, deliberately thinking about strategy and tactics, the scientists described themselves as the prey.

< Insert Figure 1>

Figure 1 maps the different kinds of defences that the two groups used to manage the traumatic and distressing experiences they had encountered. The informal, networked milieu of the activists offered little opportunity for the social defences endemic in the academic community of the scientists. Nonetheless, when the activists talked of the larger NGOs they had worked in we did get a flavour of social defences operating here as well: "You're not allowed to cry at Greenpeace", one joked, while others spoke of a culture of late hours, overwork and bureaucratic systems that stifled both feeling and creativity. Two of the activists were also critical of the movement itself for creating a self-contained bubble that defensively excluded people who were culturally different. In both of these phenomena we saw hints of unconscious defences that coped with anxiety through idealisation of the movement and by setting up rigid boundaries and expectations of what is acceptable. We also caught glimpses of a more individually based unconscious defence in a strand of apocalyptic thinking but in general the activists' ways of coping used the more reflexive forms of emotion work described by Arlie Hochschild and found on the left-hand side of Figure 1.

In general the scientists seemed to have a harder time of it. They were operating in organisations whose cultural norms were ill-adapted to the enormity of their discoveries and which struggled to cope with the pressures placed on them by policy makers and the press. They all felt very responsible: for getting the science right, for communicating it well and for repaying the trust placed in them by the public who funded their work. Although they spoke of getting support from colleagues and their institutions, this was qualitatively different from the support that the activists

described. Often the scientists were referring to support for the work they were doing, rather than support for themselves personally. They were more likely than the activists to speak of feeling alone or attacked and to show signs of struggling with experiences that were hard to understand or process. Where the activists openly acknowledged the traumatic edge to many of their experiences and had developed quite sophisticated ways of dealing with this, the scientists were more likely to discuss the traumatic experiences of others, moving attention away from themselves, and they seemed to have fewer resources to cope with their own dark or despairing feelings.

Unintended Consequences of the Use of Social Defences Against Anxiety

Whilst it is clear that social defences such as hyper-rationality and specialisation enable scientists to get on with their work relatively undisturbed by the implications of climate change it is also clear that this approach generates problems. There is a danger that these defences against anxiety eventually break down and anxiety re-emerges, leaving individuals not only defenceless but with the additional burden of shame and personal inadequacy for not managing to maintain a stiff upper lip. Stress and burnout may then follow, and as we saw earlier there is mounting anecdotal evidence of scientists either speaking out about this or dropping out of research altogether.

Even if the defences are successful and anxiety is mitigated, this very success can have unintended consequences. By treating findings as abstracted knowledge without personal meaning climate scientists have been slow to take responsibility for their

own carbon footprints, running the risk of being exposed for hypocrisy by the denialist lobby. One research leader candidly reflected on this failure:

> "Oh yeah and the other thing, yes, very, very important I think that we ought to change the way do research so we're sustainable in the research environment, which we're not now because we fly everywhere for conferences and things." (S2)

Secondly these defences contribute to the resistance of the majority of climate scientists to participating in effective forms of public engagement and intervention in the policy arena, leaving this to a minority who, as we saw in the previous section, are then often attacked by their own colleagues as well as the media. The social defences of logic, reason and careful debate have been of little use to scientists in this public sphere and we could hypothesise that the failure of these defences contributed to internal conflict and disagreement as anxiety could no longer be tolerated. This in turn makes those that do engage excessively cautious which encourages collusion:

> "There is a mentality in that group that speaks to policy makers that there are some taboo topics that you cannot talk about. For instance the two degree target on climate change...Well the emissions are going up like this (the interviewee points upwards at a 45 degree angle), so two degrees at the moment seems completely unrealistic. But you're not allowed to say this." (S2)

Worse still, the minority who are tempted to break the silence run the risk of being seen as whistle blowers by their colleagues. Another research leader suggested that in private some of the most senior figures in the field, including government chief

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scientists and oil company CEOs, believe that the world is heading for a figure more like six degrees:

> "So repeatedly I've either heard from researchers, academics, senior policy makers, government chief scientists, they can't say these things publicly...I'm sort of deafened, deafened by the silence of most people who work in the area that we work in, in that they will not criticise when there are often evidently very political assumptions that underpin some of the analysis that comes out."
>
> (S4)

It seems that the idea of the 'socially constructed silence', a concept first introduced by Eviator Zerubavel (2007), applies to some aspects of the interface between climate scientists and policy makers.

Conclusions

Our initial assumption was that detailed knowledge of the risks of climate change would arouse powerful feelings for the two groups in our study – climate scientists and activists. We imagined that this would have had a galvanising effect for them, providing a powerful motivation for action. Our research indicated that the reality was rather more complex. The climate scientists in our sample *had* been motivated to engage the wider public about the risks but they felt themselves to be part of a relatively small minority. They felt that a significant number of their colleagues appeared to remain unaffected and resistant to any action beyond the routines of research. Our analysis suggests that a number of aspects of scientific culture and practice probably provide significant social defences against anxiety for this majority. There is a danger that those scientists that do engage with the public are left

emotionally isolated and as a result tend to be overly cautious in their dealings with the media and with policy makers. In contrast, knowledge of the risks of climate change had a sudden and disruptive impact on the lives of nearly all of the climate activists in our sample. Far from defending themselves against these impacts the activists had developed an emotionally supportive culture which helped them sustain their commitment over time.

We were also interested to find that for both groups in our research it was not so much knowledge of the risks of climate change per se that was most emotionally challenging but the actions which both groups were then motivated to undertake. For the scientists this included having to deal with anxious policy makers, predatory journalists and rivalrous colleagues, for the activists this mostly involved dealings with the police and justice system. Both groups found this emotionally demanding but whereas activists had been able to integrate 'emotion work' into their practice, the culture of science left climate scientists ill equipped to face these challenges.

Clearly age and gender may play an important role in the differences we found. The activists tend to be younger and the gender balance more even. But there can be little doubt that the activist community is much more emotionally literate than the scientific one and had found more satisfactory ways of dealing with the psychological difficulties they encountered. Could the scientific community learn anything from the activists about how to manage the emotional impact of their findings?

Chris Rapley has recently called for a culture change in the climate science community so that it becomes more open to public engagement (Rapley 2014). We believe there is a strong case to be made for introducing ways of increasing the emotional resilience of the climate science community particularly if, given the rise of climate denying populism, climate science becomes increasingly politicised. The

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forms of professional supervision and mentoring which are common in nursing and some branches of medicine may be too counter-cultural. It might nevertheless be possible to sail with the prevailing scientific culture by introducing approaches such as action learning (Brockbank and McGill 2004) which provide practitioners with a safe but challenging space to reflect upon the ethical and emotional challenges that they face.

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Creative and defensive responses to climate anxiety

Figure 1: Individual and social defences