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‘THE HARVEST OF DESPAIR’

Catastrophic fear and the understanding of risk in the
shadow of Mount Etna, Italy

Lauren Ware and Lee John Whittington

The Gods laugh in their sleeve
To watch man doubt and fear,
Who knows not what to believe
Since he sees nothing clear,
And dares stamp nothing false where he finds nothing sure.
Empedocles Empedocles on Etna, Act I, Scene II, ll.88–92

(Matthew Arnold, 1852)

Arnold’s poem depicts uncertainty and its relation to fear as a mortal problem. A decade later, Longfellow wrote about Mount Etna, but this time, it is the humans at a distance who watch ‘with eager eyes’, playing guessing games about when the volcano will next erupt, while ‘the old gods, the austere oppressors in their strength, stand aghast and white with fear, at the ominous sounds they hear’ from beneath the Sicilian land ‘sown with the harvest of despair’ (Longfellow 1893).

The largest volcano in Europe, far eclipsing Vesuvius, Mount Etna has been the subject of reports of powerful activity throughout the classical period, and from the late Middle Ages has behaved in a more vigorous fashion than ever before (Chester *et al* 2000; Dibben 2008, 289). Its summit sees continuous volcanic activity to this day (Plate VI). As with the host of other natural disasters that struck medieval Europe, volcanic eruptions and their ‘climate-forcing’ effects (Gerrard and Petley 2013, 1054) have inspired detailed attempts, both poetic and analytic, to capture and explain their violently unpredictable terror (Chester *et al* 2000, 184; Rohr 2007).

In this chapter, we offer an account of fear and risk in anticipation of catastrophe. We draw on the narrative response to the Mount Etna volcano to frame an evaluation of how fear can be seen to impact the understanding of risk when the event of that risk is the catastrophic suffering of an entire community. Our approach is from the field of philosophy: we provide a contemporary conceptual analysis of the nature and value of both fear and risk in this context in order to consider the extent they play in societal responses to natural disasters in particular and to threatening possibilities generally.

We begin by introducing the philosophy of emotion. Next, the literature concerning the philosophy of fear and the philosophy of risk is reviewed. We subsequently demonstrate how fear and risk assessment can be seen to interact, and how we might

then think about human understanding of and responses to natural disasters. We hope to show how an exploration of the philosophical questions surrounding the emotion of fear and the understanding of risk can contribute to broader, interdisciplinary dialogue on the experience of the disastrous and deadly.

THE PHILOSOPHY OF EMOTION

The vibrant subfield of philosophy of emotion aims to set out the nature and value of emotions: what emotions are, what they can do and what—if any—value they have for those creatures that can be said to possess or be possessed by them. A starting point for philosophical analyses of emotion often consists in setting out what the necessary and sufficient conditions for emotion in general are, and then what they are for a specific emotion. Consider a given emotional episode: you awaken suddenly to the smell of heavy smoke entering your bedroom and leap up to discover your house is on fire. There are a variety of things happening to you right now: your heart is pounding, you are already heading to the most viable escape, you are making mental scans of where your loved ones might be. We can identify in this episode a number of candidate components for an emotion:

1. sensory perceptions, or other information-gathering processes
2. appraisals, or other evaluative processes
3. physiological changes
4. conscious feelings of those bodily changes as they occur
5. attentional processes
6. action-tendencies and motivations
7. underlying cares or concerns (Tappolet 2010, 326)

The question then is, which, or which set, of these components *are* the emotion. What, if anything, could be left out without sacrificing the emotion? Within contemporary philosophy of emotion, we can identify three broad theoretical camps which offer different answers to this question (de Sousa 2013; Solomon 1993). We very briefly characterize these camps here, to situate our discussion of the emotion of fear specifically in the next section.

First, there are *feeling* theories of emotion. The philosopher William James and, independently, the physiologist and psychologist Carl Lange were early developers of this way of thinking about emotion, sometimes called ‘non-cognitivist’, and the view has been championed more recently in analytic philosophy (James 1884; 1890; Lange 1885; Prinz 2004a; 2004b; Goldie 2009). For the non-cognitivist, bodily changes are primary. According to this theory of emotion, upon perceiving the emotion-inducing object, our bodies not only change but we also feel those changes (for example, the ‘pang’ you experience as the adrenaline kicks in; or the sensation of your stomach ‘dropping’ when you suddenly realise the disconcerting truth; or, more pleasantly, the quickening of butterflies in the chest when the one you adore walks into the room); our awareness of these bodily changes is itself the emotion. As James asserts, ‘My thesis is...that the bodily changes follow directly the *perception* of the exciting fact, and that our feeling of the same changes as they occur *is* the emotion’ (James 1884, 189).

One common criticism that has been put to feeling theories of emotion is that even finely tuned accounts of the bodily changes that occur in a given emotional episode are not enough to distinguish satisfactorily between emotions that we would intuitively consider quite distinct (fear and rage, for example) or between emotions and non-emotional states such as fever and asphyxia (Cannon 1929; Schacter and Singer 1962, 28–29; Brady 2013, 41).

Second, there are *perceptual* theories of emotion. According to this model, emotions bear sufficient similarity to sensory perception that they can function in the same way as perceptions do to constitute reasons or evidence for evaluations of a given situation (Döring 2003; Deonna 2006; Tappolet forthcoming). On this account, emotions and perceptions: are both typically 'passive'; both have representational content—that is, 'they present the world as being a certain way, and thus have correctness conditions' (Brady 2013, 48); both share phenomenal properties—that is, in at least paradigmatic cases, there is something it is *like* to feel fear just as there is something it is *like* to see the colour green; both can diverge from our beliefs; and, interestingly, emotions can play a role in justifying evaluative belief, in an analogous way to how perceptions can plausibly justify empirical beliefs (Brady 2013, 46–48, 69). Whilst perceptual models overcome some of the concerns philosophers have with purely feeling theories of emotion, they are not without their own difficulties. Michael Brady, for example, has compellingly argued in a recent book-length treatment against the perceptual model that the proposed analogy between emotions and perceptions central to the model breaks down significantly at the epistemic level. In particular, he argues, there are significant disanalogies with respect to the way emotions and perceptions relate to attention. Whereas the former 'capture and consume attention' in a way that can motivate a search for the reasons behind an evaluative judgement, perceptions do not (Brady 2013, esp. 5, 45–117).

Third, there are *cognitivist* theories of emotion. Three features differentiate emotions for the cognitivist: (1) emotions exhibit intentionality, that is, they have objects (for example, I am afraid *of* the tiger, I have admiration *for* my friend); (2) they are world-directed, that is, they depict the world as being a certain way, and can therefore be assessed according to the correctness condition of whether they fit the world; and (3) crucially for the cognitivist, they are characterized by cognitions: judgements, evaluations, interpretations, beliefs or appraisals of some kind. On this model, what it is to feel fear is—in part—to *believe* that the object (and emotions must have an object) is, for example, dangerous or a threat. One way of motivating this element of fear as an emotion would be to ask: would you sincerely be afraid of the tiger's dangerousness without *believing* that it is, in fact, a dangerous creature? A significant worry arises for the cognitivist concerning 'recalcitrant emotions': emotions whose belief set appears to be in tension with other beliefs the agent holds. As Justin D'Arms and Daniel Jacobson (2003, 129) explain, 'A recalcitrant bout of fear, for example, is one where the agent is afraid of something despite believing that it poses little or no danger' (see also Brady 2009). Whether recalcitrance can be satisfactorily explained—for example, by reference to a distinction between conflict and incoherence, as Bennett Helm (2001, 42) argues, or that one of the beliefs of the agent has the decisive influence over the emotion, as Martha Nussbaum (2001, 35–36) argues—remains a topic of current debate.

For the remainder of this chapter, we will take a cognitivist approach to the emotions. Part of our motivation to do so is that emotions understood as containing an evaluative component bear a significant relation to our knowledge of value. For, as Brady argues,

[e]motions can inform us about value, as when my feeling of happiness on seeing her again tells me how loveable she is, or when my feelings of suspicion let me know that the salesman isn't to be trusted. Emotions can tell us things about ourselves, as when my pride upon hearing about English football hooligans rampaging through a European city informs me that I have dubious nationalistic commitments, or when my disappointment upon being overlooked for the role of Head of Department tells me that I really wanted the job.

(Brady 2013, 9)

The cognitive model of emotion offers uniquely rich epistemic and educational benefits to analyses of our own emotions and the emotions of historical populations.

One pre-emptory caveat. There exists a 'persistent cultural script' that reason and emotion are at odds with each other, that emotions are fundamentally irrational or threatening to reason (Maroney 2011, 629). This script is as oft recited at various points in the history of philosophy as it is in popular discourse. Montaigne (1910, Book 1, Ch. 17) asserts, 'there is no emotion that can more swiftly bring our powers of judgement out of balance' than the emotion of fear. Edmond Burke goes further: 'nothing robs consciousness so effectively of all reason as fear' (Burke 1998, 53; Svendsen 2007, 38). Martin Heidegger claims that one 'loses one's head' when afraid, citing cases of people discovering their house is on fire and saving whatever objects happen to be near them, often items of zero consequence (Heidegger 1976, 342).² In literature, we have the Bene Gesserit *Litany Against Fear*, in Frank Herbert's *Dune* series, which begins, 'I must not fear. Fear is the mind-killer' (Herbert 1979, 16). And following the Grenfell Tower fire in London in June 2017, MP Michael Gove responded to public anger at notable governmental oversight, and fear regarding similarly constructed buildings throughout the city and beyond, with the following: 'It doesn't help anyone if we allow—understandable though it is—emotion to cloud reason' (Gove 2017).

The emotion versus reason script is by now, however, established as a false dichotomy in philosophy (Jones 2008; de Sousa 2013; Tappolet forthcoming). Here, it will be important to distinguish between a cognitive state being a-rational and its being irrational. One's emotional response of fear can, of course, be irrational: for example, when I am afraid for 'no good reason', or more afraid of the object than it is worth. This is not, however, because that response is an *emotion*, but rather 'because our rational grasp of the world is so often, in this as in other respects, fallible; after all, our beliefs can also be irrational, when they are not properly grounded in or proportional to the relevant evidence' (Duff 2015, 193). We can therefore understand emotions to be rational (as we can with beliefs) when they are appropriately grounded in reality.

THE PHILOSOPHY OF FEAR

In his essay on fear and the supernatural, Lovecraft writes:

The oldest and strongest emotion of mankind is fear, and the oldest and strongest kind of fear is fear of the unknown. [...] The unknown, being likewise the unpredictable, became for our primitive forefathers a terrible and omnipotent source of boons and calamities visited upon mankind for cryptic and wholly extra-terrestrial reasons, and thus clearly belonging to spheres of existence whereof we know nothing and wherein we have no part.

(Lovecraft 1927, 12)

How can we begin to assess whether fear of cataclysmic disaster is appropriately grounded in reality when it is taken to be the effect of (superhuman?) forces beyond our control, or proportional to the relevant evidence when the disastrous event in question is unpredictable, or worse, has never happened in living memory? The philosophy of fear aims to articulate what fear is and does: what distinguishes it from other emotions, and how it operates in our lives. In what follows, we review the philosophic literature on fear in light of these questions, focusing on four areas of the discourse: fear-as-information theory; the intentional object of fear; fear and creative problem-solving; and the motivations of fear.

First, the emotions-as-information theory maintains that emotions can function as sources of information about the world (Schwarz 1990; Schwarz and Clore 1983; Brady 2013, 118–191). Fear can tell us something about reality, in particular by capturing and sustaining our attention. It has been seen that emotion aids in information-gathering, to the extent that motivationally relevant objects and events receive greater attention. Further, fear improves the speed at which we notice these elements in our environment (Lang and Davis 2006). That fear directs our focus to such objects has clear prudential benefits from an evolutionary perspective. What can be more troubling for contemporary audiences, however, is when this attention can also blind us. Fear during a search test—for example, when participants are asked to visually locate a particular image on a screen of various images—leads to an impairment in the subjects' ability to detect targets at the periphery of the screen, when compared to response times for participants in neutral or positively valenced emotional states, like amusement or contentment (Derryberry and Tucker 1994; Weymar *et al* 2013). Further—and perhaps more problematic when considering how fear might impact disaster planning and preparedness or disaster mitigation—we see that when people are afraid, they demonstrate a cognitive bias that favours 'local' rather than 'global' attention and information-processing: judging images to be more similar when they exhibit more superficial rather than broader associative connections (Kimchi and Palmer 1982, 521–535; Fredrickson and Branigan 2005). Fear constricts attention. This can pose a problem when 'the future, as a field of possibilities, is restricted since one directs one's attention solely' or significantly to a present threat at the expense of attention to and reflection on what is 'all-things-considered' important to us, or to long-term planning (Svendsen 2008, 43; Brady 2013, 165).



Figure 8.1 People fleeing from the tsunami wave in Hilo, Hawaii, in 1946 (USA)

Another way in which fear can tell us something about reality is, as Brady argues, by its motivating a search for the reasons behind that fear (Figure 8.1). When we feel afraid, our fear not only draws our attention to the source of the fear and possible means of escape, but we also scan for further information to confirm or deny whether our fear is and continues to be justified. Relatedly, fear can function as a source of information by prompting an assessment of the “evaluative information” that the fear itself provides (Brady 2013, 101–109). If part of fear involves evaluations of, or beliefs about, its object, being surprised by fear in a given context can encourage us to seek out further information to confirm or deny whether those evaluations and beliefs are accurate and appropriate.

The second element of the philosophy of fear we want to highlight concerns fear’s intentional object. Two conceptual claims arise from the literature. First, perhaps uncontroversially, part of the cognitive content of fear is that its objects are evaluated as dangerous, harmful, or in one way or other a threat to the fearer. Note that our fear at this perceived threat can be unfounded (we can err in our assessment of the object as a threat), and fearsome objects need not be real (the eldritch horror imagined in the dark really *is* what is feared).³ What is important, though, is that this threat be to something we care about. As F H Bradley (1930, §63), put it, ‘The man who has ceased to fear has ceased to care’. More recently, Martha Nussbaum explains (see also Nussbaum 2015, 44):

I do not go about fearing any and every catastrophe anywhere in the world, nor (so it seems) do I fear any and every catastrophe that I know to be bad in

important ways. What inspires fear is the thought of damage impending that cuts to the heart of my own cherished relationships and projects.

(Nussbaum 2001, 30–31, 53, note 23)

A second, perhaps controversial, conceptual claim about fear's intentional object is that it is always forthcoming—a view particularly common in medieval theories of fear (Knuutila 2018, 14–17; King 2009, 169–173). Fear always contains a projection about the future, an assumption or prediction of a negative or painful future situation (Svendsen 2007, 38–39). While it might sound intuitive to fear, in the afternoon, having left the ironing board on before leaving the flat in the morning, we argue this is either not fear or it is fear of a future situation. Consider the following: I am uncertain right now whether my flat burned down this morning. There are two possibilities. If my flat burned down in the past, and as follows, is burned down now, fear is not fitting; it is fitting, perhaps, to be angry (at myself, or at the iron), or to be sad (at the loss of my possessions); if I *am* genuinely afraid, it is of how I'll get by without a flat, or how I will pay for the damage I caused, and is therefore fear of a future pain. If my flat did not burn down in the past, and as follows is not burned down now, fear is also not fitting. As Hume (1739, 2.9) emphasizes, 'Tis evident that the very same event, which by its certainty would produce grief...gives rise to fear when only probable and uncertain'.

Third, we can see that emotions create different mental sets that are more or less useful for certain kinds of problem-solving. Happiness, for example, facilitates a mental set useful in creative tasks in which one must think flexibly, intuitively, or expansively—such as inventing novel uses for everyday items (Fiedler 2001, 85–98). Sadness (Figure 8.2), whereas, better conduces to the mental set in which problems are solved more slowly, with particular attention to detail, and through deliberate and more focused strategies (Isen *et al* 1987, 1122–31). Tibor Palfai and Peter Salovey (1993, 57–71) have argued that these two different styles of processing fit themselves to different kinds of problem-solving: 'positively valenced' emotions making one better at inductive problems such as analogical reasoning, and 'negatively valenced' emotions making one better at deductive logical tasks.

Of particular interest to discussions about how fear might impact imaginative problem-solving is the work of Alice Isen and her colleagues, and the more recent debates that have ensued from this work. Two findings have become so robust that they are now sometimes used as 'affect checks' (that is, checks that participants are experiencing the emotion a study requires them to experience): first, that people in whom positive emotion is induced are found 'to give unusual (but reasonable) first associates, and have a more diverse set of associates, to neutral words', and to produce artistic creations that are judged as more creative (Isen *et al* 1985, 1413–26; Hirt *et al* 1996, 245–261; Fieldler 2001).⁴ However, when fear-inducing words or images (spiders are a frequent example) are used, these numbers drop dramatically (Neubert *et al* 2017). It is plausible to suggest, then, that while fearsome situations attract and sustain attention to the source of a threat, that attention may also limit our abilities to be successful in creative problem-solving to mitigate it.

We should note at this point that an increasing number of theorists object to identifying emotions as 'positive' or 'negative', preferring to either refer to emotions on the



Figure 8.2 A mother visiting her house in Avezzano destroyed by the 1915 Fucino earthquake (Italy)

basis of their being ‘pleasant’ or ‘painful’, or else to abandon the categories entirely and treat individual emotions as they stand (Elster 1999, 40; Kristjánsson 2003; de Sousa 2013). We discuss painful emotions below.

This brings us to the fourth area of philosophic debate we will highlight: the relation between fear and motivation to action. Thucydides (1910, I.75.3) famously listed fear as the strongest and ‘principle motive’ to political action, followed by honour, and then by plunder. One of the key differences between a cognitivist theory of emotion and feeling and perception theories is that for the latter two theories, emotions do not specify any particular behaviour or action in a given situation (Prinz 2004b,

194; Tappolet 2010, 335). The problem seems to be then, that while fear 'involves a desire to avoid harm or loss, [it is] not at all clear whether achievement of this goal would necessitate selling one's stocks, listening to the weather report, or running away' (Clare 1994, 111).

One of the methods to generate situationally specific motivation is to look to the appraisal component in cognitivist theories. If beliefs about the nature of a fear-object (what you believe it can do to you, and how) are part of the emotion itself, this provides a mechanism for fear to be goal-setting and thus, action-guiding (Tappolet 2010, 335). A further strand of research on the emotional motivation of fear concerns the motivational power of pain. Brady has, for example, recently argued that painful emotions—including fear—motivate both towards epistemic goals (goals of understanding and of intellectual virtue) and prudential goals (goals of well-being and of moral development) in a way that 'outperform[s] rival motivational elements' (Brady 2013, 146, 149–150, 189; Brady 2018). As Lovecraft acknowledged, 'we remember pain and the menace of death more vividly than pleasure' (1927). This leads us to as-yet unresolved tensions in the philosophy of emotion: if fear is action-guiding, and painful fear motivational towards the active development of moral and intellectual virtue, can it legitimately be cultivated (or imposed) for the benefit of the individual, or of a society (Bain *et al* 2019)?

We might consider here cases, historical or contemporary, where it appears a fitting intentional object of fear is not receiving the attention it ought. For example, interviews carried out in 2003 with inhabitants of Trecastagni, a large agricultural village located 18 km south-east of the summit of Mount Etna, reported that 'immediate problems—in this case unemployment and the journey to work—were more to the forefront of public concern than the more remote risks posed by volcanic activity', despite the volcano erupting three months prior to the survey. The eruption threw up a column of ash so thick it could be seen from space, and footage of the eruption was recorded and used to form part of the hellish landscape of the volcanic planet of Mustafar in the 2005 film *Star Wars: Episode III—Revenge of the Sith*, yet 'lack of social life' was mentioned more than twice as frequently as the volcano when residents were asked to list three major sources of concern facing the city (Chester *et al* 2008, 224; Davis and Ricci 2004; Davis *et al* 2005; Dibben 2008). Is this a matter of fear regarding immediate, local concerns (getting to work on time) getting priority over plausibly more significant concerns (destruction of the village)? Or is it sanguinity regarding the volcano allowing for long-term planning (a life with friends and a good transit system)? Dibben (2008) has argued that reminders of heightened risk can function to 'encourage the search for information to support the validity' of a decision to inhabit a dangerous area. We now turn to the philosophy of risk to set the scene for an analysis of how fear impacts on imagination in the evaluation of disaster risk.

THE PHILOSOPHY OF RISK

The philosophy of risk is an area of research that attempts to understand the nature of risk and apply this understanding to topics ranging from technological ethics to epistemology (theories of knowledge). Unfortunately, definitions of risk are extremely varied, partly due to the multitude of disciplines that employ the term, and partly due

to disagreements over how one should go about measuring and understanding risk. However, a list of the most widespread definitions includes:

- an unwanted event which may or may not occur (Rosa 1998)
- the cause of an unwanted event (Möller 2012)
- the statistical expectation value of unwanted value (Campbell 2005; Willis 2007)
- the probability of an unwanted event (Graham and Weiner 1995)

What most of the current definitions of risk do tend to agree on is that risk is a measurement of probability of some event that is undesirable. The way in which a risk assessor might arrive at this measurement depends upon the way in which they measure the probabilities. For example, the statistical probability of some unwanted event occurring is measured by calculating the frequency of which that event has occurred in the past. Alternatively, one might employ a Bayesian understanding of probability, where we start with a prior credence (degree of belief represented as a probability) that some event will occur, and as we gain more experience, we update that credence using Bayes' theorem (Joyce 2016). Both of these methods also have their variations, for example, objective or subjective Bayesianism, or are used in tandem with each other, for example using frequentist methods to ascertain Bayesian priors. Hopefully this demonstrates why there are so many definitions of risk, and why it is difficult to offer anything other than a general definition.

However, we want to raise a problem for thinking about risk in terms of probabilities. The problem is the idea of a near miss, which cannot feature as part of the probabilistic analysis. To give an example, imagine a stretch of road that has so far had relatively few accidents, but regularly has near misses where an accident comes extremely close to happening. The question is, is this road dangerous, *i.e.*, high risk? We would think that the answer to this question would be yes, but it is not entirely clear how the probabilistic accounts of risk can accommodate this thought. Maybe they could include these near misses into the probability calculation, but this just appears to be a calculation of the risk of a near miss, which in themselves are not unwanted events, and certainly not the same as the unwanted event of a car accident.

Even if we could somehow include the near misses as part of the probability calculation, what would be lacking from such a solution is an explanation of how near misses and actual unwanted events are related in such a way that warrants including near misses in the calculation in the first place. To use our dangerous road example again, in order to warrant using the 'nearly accidents' alongside the actual accidents in the probability calculation, we need some explanation of how 'nearly accidents' and actual accidents are related.

To further deepen the problem, even if we could offer that explanation (and we think that we can), that explanation would just act as the risk assessment itself, prior to the need to include any probabilistic risk assessment. Back to the road example—if we offer an explanation of why lots of near misses mean that the road is dangerous, *i.e.*, indicators that an accident could easily occur, then that explanation we offer will be good enough as a risk assessment of the road, without the need to even look at any probabilities. In fact, this is the way most of us do risk assessments in our everyday lives. Most of us make pretty accurate risk assessments, but most of us do not go

around making probability calculations, but instead are armed with complex causal and counterfactual explanations and narratives about how the world works around us which can often function just as well (or better) as genuine risk assessments compared to any of the probabilistic analyses.

Let's call this view of risk the counterfactual explanation view of risk. A similar view has been put forward by Duncan Pritchard (2015). This view of risk assessment holds that risk is a measurement of how easily an event could occur using what philosophers call modal semantics. The idea is that for all the ways in which the world is, there are plenty of ways in which the world could have been. For example, although you had coffee this morning, you could have had tea. Some of these ways in which the world could have been are more 'modally/counterfactually close', or could have more easily occurred, than others, because less dramatic changes overall need to occur. If you like tea and coffee and it just happened to be the case that you whimsically chose coffee this morning, the possibility that you could have chosen tea is modally closer than say if you really disliked tea and you choosing tea would have also required significant changes to your overall tastes and constitution.

In the same way, for the road where near misses often occur, it is counterfactually close that a real accident could occur—as not much would have to happen in order for an accident to occur. We can see this in explanations such as: 'if she hadn't swerved at the last second, she would have crashed', or, 'if I had taken my eyes off the road for half a second, that could have gone really badly'. These are counterfactual explanations, as they are statements about what easily could have been. But also note that they are risk assessments as well. By stating that something unwanted could have easily happened, we are also stating that there was a high chance of an unwanted event, even though at no point do we invoke probability. So counterfactual explanations act both as an explanation of why there is a risk, and as assessments of the risk itself.

How does this understanding of risk provide insight into cases of historical disasters? A key component of the counterfactual explanation view of risk is the role that the imagination and our perceptions of the world play in accurately assessing the risks involved. After all, if we fail to imagine how that near brush with death could have easily gone much worse, then it looks like we are failing to accurately assess the risk involved in what just happened and, importantly, will fail to adjust our behaviour. Conversely, we might be a bit too prone to over-imagine what might happen to us, meaning that we may assess the risks too highly. Either way, what the imaginative role in the counterfactual explanation view does make clear is that if we want to understand how other people, in the past or the present, assessed and felt about the risks around them, it is important to try to understand their worldview as much as possible, in particular the kind of things they imagined could happen to them, and the kinds of things they could not have imagined could easily happen to them.

IN THE SHADOW OF DISASTER: THE INTERACTION OF FEAR AND RISK

When we think about how people anticipate and experience natural disasters, a number of areas from the above analysis of fear and risk begin to interact. Natural disasters (as opposed to say, semi-regular inclement weather) become disastrous to the degree

that they are extreme, unpredictable, unprecedented, or even unimaginable. Such events are fitting objects of fear. In this section, we will look at two ways in which fear regarding disasters of this kind impacts on how individuals may imagine and understand the risk of these disasters, drawing on natural disasters in medieval Catalonia (Spain) and the Danube River region.

First, research in the empirical philosophy and cognitive science of fear consistently demonstrates that experiencing fear makes negative, painful or harmful outcomes appear more likely to occur (Johnson and Tversky 1983; Mayer *et al* 1992). We have a psychological tendency to focus our attention on negative rather than positive events (Svendsen 2007, 54–59), and this manifests in making negative events in the future appear more salient to us and—crucially, given the counterfactual view of risk above—appear closer to us. The thing is, we are already not very good at calculating odds, statistics and probabilities generally (compared to other cognitive tasks, like using our imagination). Furthermore, as research by Johnson and Tversky (1983) on fear and risk demonstrates, when we are experiencing fear, our abilities to assess the likelihood of a negative risk event occurring becomes even worse. Fear also tends to lead us to regard information about high-risk events as more reliable than information about low-risk events (Svendsen 2007, 55). When we think about and imagine sweeping, calamitous and highly deadly disasters outside of our control and predictability, two things might happen: we might over-evaluate their possibility of occurring; or we might focus on entirely the wrong source or scope of the immediate danger, as our ability to think creatively about the disaster (to imagine the possible ways it could impact us, and therefore what precautionary or mitigation strategies to invoke) has become constricted by fear.

The local reactions to the May 1448 earthquake in Catalonia, the last of the medieval destructive earthquakes in the region, offer an intriguing example of the former interaction of fear and risk evaluation. Following the earthquake, residents of Santa María de Mataró ‘spontaneously and almost immediately’ turned to the bishop of Barcelona to obtain a licence to collect alms to repair the Mataró parish church, and, later, appealed to Queen María using the earthquake and the damage it had caused, not only to the parish church but to three additional churches (in the nearby villages of Sant Andreu and Sant Vicenç de Llanerres, and the hermitage of Sant Miquel de Mata), as an argument for both significant funds and changes to policy which would confer them greater municipal autonomy (Salicrú i Lluch 1995, 510–511). The privilege was granted. The account communicated by the inhabitants of Mataró was of a devastating disaster with knock-on risks for future damage.

Nevertheless, the measures expended for the township were uncharacteristically advantageous, especially given that the damage to the neighbouring villages and hermitage was far less tragic than in Mataró. That the town was able to secure this benefit could be explained by the fear inspired by the earthquake damage making the risk of a future tragedy appear closer than it might otherwise be evaluated. As Salicrú i Lluch (1995, 509–510) notes, two factors came into play during this earthquake that resulted in a high death toll and severe damage: firstly, it occurred in the middle of the night, when there would have been less time to realise what was happening and escape safely; and second, reports from the royal bailiff and bishopric (Català 1990; Salicrú i Lluch 1993) demonstrate that many of the dwellings, castles and monasteries in the area were already in a precarious state of repair. The high level of damage did not

necessarily correlate, then, with a higher intensity earthquake. Furthermore, the benefits obtained by the privileges granted covered wide-ranging negative events, including possible attacks by pirates on land or sea. If fear elicited by disastrous results makes one judge similarly negative events to be more likely in the future (even if they are not), and if information about high-risk events is judged as more reliable than other evidence (even when it is not), we can see the success of Mataró's petition understood as more than simply clever or opportunistic. Their success drew on the interaction of fear and a risk evaluation that made more negative future predictions appear more likely, and more fundable—which in this case worked for the benefit of the township.

A second way in which fear regarding disasters can impact the understanding of their risk concerns the role of the imagination. If we can see, as in the above, that fear impacts our understanding of risk as calculated as a matter of *probabilities*, we can ask now how it might impact our understanding of risk that includes counterfactual *possibilities*. If what is involved in this account of risk is imagining, creatively, the kinds of things that could possibly happen in the event of an unpredictable or unprecedentedly powerful natural disaster, we need to now think about how creativity responds to fear. What we have seen is that fear tends to focus our attention on immediate, local concerns and threats, at the expense of attention to associated, broader concerns—including unlikely, unprecedented ones. Understanding how fear can limit our imagination in these ways may be constructive, then, in ensuring a space for creative deliberation about natural disasters: their variety of sources, even the unexpected or unlikely ones; their possible impacts, including those outside our immediate circles of concern; and their future mitigation, strategies for which may involve listening to a wider variety of voices and sources.

Describing the Danube 'millennium flood' of 1501, Rohr (2005, 72) notes that it is important to consider what he calls the 'mentalities' of the people involved in order to interpret their perception of such disasters. 'Mentalities', he writes, 'are horizons of experience and the sum of all the factors determining the possibilities (and also the impossibilities) of thinking and acting in a given situation or in parts of that society' (Rohr 2005, 72).⁵ If fear in response to a disaster is not treated or processed appropriately, it could lead to a limiting of those horizons and therefore a weakness in determining such possibilities and impossibilities. An example of this might be in choosing to stay in the home, even once its usual and immediate means of egress have been blocked, rather than imagining alternative escapes through more unconventional or unfamiliar means. However, in the wake of the great flood, right across the area we see something novel—for the first time, people began to mark the water level, with sometimes elaborate and even poetic devices, as in this example from Linz:

*SVM NOTA QVANTA FVIT VNDARVM CONSPICE MOLES
PALVSTRIS VATES CVIVS AVIS FVERAT
QVE TANTO SEDIT MESTISSIMA TEMPORE TECTIS
DILVIVM QVANTO TEMPORE TRISTE FVIT*

*Look, I am the sign, how much the flood has been,
whose witness has been a bird from the swamp,
which sat just in this very sad time on the roofs,
when the sorrowful flood happened.*

(Rohr 2005, 75–76)

The creation of these memory markers as part of the ‘mental management’ of the floods offers a fascinating use of public artistry to respond to a disaster. The flood of 1501 was by far the largest of the Danube River and its catchment area during the second millennium—unprecedented in living memory and as statistically unlikely as a swamp bird perching on the rooftops. By marking the flood level it kept the possibility of such a flood a live possibility in people’s minds, which, as Rohr notes, could have positive benefits not only for future planning, but for coping with the disaster—to recall, for example, that it had been worse in the past and the building still stands.

For the historian or archaeologist interpreting local responses to disasters, this understanding of fear’s impact on imagination and risk could account for what appear to be short-sighted, unprepared, nostalgic or even irrational local strategies. As Gerrard and Petley (2013, 1071) demonstrate in their analysis of environmental risk management in the Middle Ages, the disasters these populations experienced were ‘social constructions’ based on their understanding of what constitutes a risk and how to calculate it, just as it is today (Davis *et al* 2005; Dibben 2008, 289).

What may have occurred in historical cases of unsuccessful risk management was—again, as in our time—a focus on precedents and probabilities, at the expense of considering nearby possibilities.

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NOTES

- 1 This is perhaps an ancient inheritance from the Greek *pathos* (‘that which happens to a person or thing’, as Liddell and Scott 1940, have it), but see Solomon 2003.
- 2 Though see Nietzsche’s Zarathustra: ‘one should hold fast to one’s heart; for if one lets it go, how soon one loses one’s head, too!’ (1891).
- 3 We will not discuss fear of fictional objects any further—not because they are too frightening, but because the rich literature on the topic deserves much more space than we are able to offer in summary. On the central questions within this literature, see, still, Carroll 1990. Given the ingredients of myth, superstition and narrative in medieval responses to disaster—on which see, *e.g.*, Rohr 2007, and Patch 1918; as well as (in relation to environmental hazards generally) Gerrard and Petley 2013, and (and in relation to Mount Etna specifically) Chester *et al* 2000; 2008, who challenge the perception that these kinds of narratives are somehow pre-rational and so unlike our contemporary response to disaster—philosophic debate on ‘the paradox of fiction’ would benefit significantly from further interdisciplinary research on narratives in disaster discourse.
- 4 See Isen 1999 for a thorough discussion of these topics.
- 5 Rohr remarks on the lack of records showing ‘desperation, anger, fear or similar emotions’ (81) in the accounts of the flood of 1501—the inscription in this flood marker may offer two references to sorrow.

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