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Political and Social Risk Amplification of GMOs

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Science! True daughter of Old Time thou art!
Who alterest all things with thy peering eyes.
Why preyest thou thus upon the poet's heart,
Vulture, whose wings are dull realities?...
Hast thou not dragged Diana from her car?
And driven the Hamadryad from the wood
To seek a shelter in some happier star?
Hast thou not torn the Naiad from her flood,
The Elfin from the green grass, and from me
The summer dream beneath the tamarind tree?

Edgar Allen Poe

INTRODUCTION

Like the summer dream beneath the tree, our views on food, nature and risk have been profoundly influenced by the peering eyes of science, that universal acid that challenges and erodes human values and social norms. We see that genetic engineering provides heretofore unknown benefits—tomatoes enhanced with human growth hormones, rice that has vitamin fortification—and we intuit the need for technological progress. And yet, we fear that such progress, such unconstrained manipulation of 'nature', brings with it unforeseen and unknowable consequences (Winner, 1986). This ambivalence lies at the heart of the debate over genetically modified organisms (GMOs).

Permeating throughout the GMO debate, the ideal of science as a 'candle in the dark' (to quote the late astronomer and science populariser Carl Sagan) has been repeatedly forwarded as the one true way of knowing and managing the concurrent and competing risks of anticipated challenges versus unintended consequences, e.g. feeding the world population with GM rice while risking indigenous gene contamination. In this view, science is a rational process that ferrets out various weak alternatives, subjecting them to the cold light of reason which in turn eliminates through experimentation the least desirable and most uncertain variables. This view notwithstanding, some factions in society do not interpret science acting as a beacon of light and truth, nor as the rational process of disinterested reason juxtaposed against a world filled with mythology, falsities and subjectivity. Rather, increasing portions of westernised societies interpret the science of genetic modification as irresponsible and fraught with 'random uncertainties, discontinuities and relativism' (Lawler, 1988, p 258). Science, the vulture of Poe's ode whose dull wings represent the dull realities which are often the conclusions of scientific inquiry, has often been seen as unravelling which often form the basis of the ideas of nature, faith and God (Douglas and Wildavsky, 1982; Toumey, 1992). QA1

The premise of this chapter is that the ambivalence regarding GMOs stems not merely from lack of information regarding the benefits and costs of technology or the confused musings of the

Handbook of Plant Biotechnology
Edited by Paul Christou and Harry Klee

ignorant; instead, we argue that risk is socially constructed and politically amplified—that is, biotechnological risk is as much a social phenomenon as a scientific one, and political factions amplify both the benefits and costs of the technology in response to deeply seated epistemologies. In essence, we provide an overview of the literature on risk, and forward an interpretation of the GMO debate that posits that the various factions—biotechnology companies, non-governmental opponents (NGOs) and indeed farmers—are using differing assessment techniques that, through reasonable rational processes, lead them to differing conclusions.

CONTEXT

Genetic modification involves 'the insertion of genes from other organisms (within or between species) into host cells to select desirable qualities' (Goodyear-Smith, 2001, p 371). One such product is Golden Rice™, a fortified GMO rice stock. Creating Golden Rice™ involves inserting genes into the rice genome which code for β-carotene, a precursor for the synthesis of vitamin A in the body (Schiermeier, 2001). This is important because vitamin A deficiencies can cause blindness and other illnesses. The creators of the rice believed that the food grain enhanced with β-carotene would be an efficient way of distributing vitamin A in underdeveloped countries. However, research has suggested that dietary fats are needed to absorb vitamin A because of its lipid solubility. Hence, diets deficient in dietary fat would not retain the benefits of the genetically enhanced rice (Schnapp and Schiermeier, 2001), and, in principle, the very people whom Golden Rice™ was intended to benefit—malnourished citizens of underdeveloped countries—may not be able to metabolise the vitamin A because of low-fat diets. Thus, the promises of biotechnology are not as clean and decisive as biotechnologists would like. Instead, the uncertainty of genetically engineered crops is exacerbated by the inconclusive benefits of the specific product.

QA2

Critics of GE food claim that it is an expensive technology that farmers in developing nations would not be able to easily afford. The patenting laws allow biotech companies to benefit from patenting indigenous knowledge often without the consent of farmers who have utilised that knowledge for centuries, and that the science supporting these products is new, relatively untested, and therefore uncertain (McHughen, 2000). They also utilise circularly logical and thinly veiled conspiracy theories, whereby crop uniformity reduces genetic diversity, making crops more vulnerable to pests, thus resulting in the need for pesticides, which in turn are produced by the same companies that create and promote GE crops (Moses, 1999).

Which perspective is correct? Is the fear of opponents borne out by the potential catastrophic consequences wrought by Frankenstein crops released to run amok in an unsuspecting natural world? McGloughlin (2001) states that biotech crops and foods have been carefully and extensively tested over the past 15 years both in the laboratory and in a controlled natural environment under the oversight of the National Institutes of Health (NIH), the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA). Indeed, she argues that data from the International Field Test Sources indicate that the USDA analysed over 6500 areas containing genetically modified crops in order to assess biotech crop performance and suitability for release in the environment. Additionally, some 25 000 field tests have been done on more than 60 crops in 45 countries, including most of the 15 countries of the European Union. She reported that there has not been a single report of any unexpected or unusual outcomes from these field tests, which led some experts to believe that GE crops present no immediate danger to the environment (McGloughlin, 2001).

Conversely, field tests were evaluated by the Union of Concerned Scientists (UCS), which is an NGO, that is, a self-acknowledged proponent of the precautionary principle. The UCS found that the data collected by the USDA in small-scale tests had little value for commercial risk assessment. It claimed that many reports fail to mention, much less measure, environmental risk. Hence, incongruence exits between McGloughlin and the UCS concerning the interpretation of the same data (Mann, 1999). Indeed, public opinion concerning biotechnology differs from culture to culture, between different sociodemographic groups, religious affiliations and education levels. It even differs among

'experts' who propose various competing visions of the role and acceptability of GMOs. Obviously, the scientists from the UCS are making what they feel are rational choices; so too are the scientists from the USDA. How can the same phenomena—genetically manipulated foods—engender such disparate interpretations? The answer lies in the realm of risk assessment, where different people and groups use different criteria to identify and evaluate risks (Margolis, 1993).

RISK AS A SOCIAL/POLITICAL PHENOMENON

Perhaps one lesson that can be drawn from the differing levels and bases of support for biotechnology is that the risks associated with GMOs are not merely scientific, but are filtered through various social mechanisms that evaluate, interpret and prioritise them (Giddens, 1990; Perrow, 1999). It almost goes without saying that a substantial discrepancy exists between the risks the public and experts alternatively associate with GMOs. Similarly, discrepancies exist even among experts. Importantly, not only are these risks viewed differently but an adequate encompassing definition is elusive. Nevertheless, all risk definitions make a distinction between the reality and possibility of risk (Renn, 1992). From a social science perspective, this means that this incongruence should be explained as an active component of everyone's risk assessment. In this context, all risk assessments involve three elements: possibility of occurrence, undesirable outcomes and state of reality (Renn, 1998). Taking this uniformity of risk further, Kasperson and Stallen (1991) define risk as an objective threat or harm to people that is filtered through, and interpreted by, cultural and social experiences.

Currently, the view of many scientific organisations is that genetically modified foods will both improve human and environmental health. However, widespread public opinion does not share this view (Cantley *et al.*, 1999; Goldberg, 2000). This difference in perception is due to the public's concern with additional dimensions of risk, such as the voluntariness of the risk (whether or not they will be given the choice to consume GMOs), and trust in authorities responsible for managing the risk both for themselves and for future generations. For example, trust in food regulatory agencies plummeted as a result of the BSE outbreak. And yet in spite of these events, Margolis (1996) argues that the public's additional risk assessment criteria are, in part, an *effect* rather than a *cause* of this expert–public discrepancy. This means that various exoteric public stakeholders respond differently to various social, psychological and political forces than scientific elites. Interestingly, several psychosocial forces influence stakeholder perception of risk (Table 5.1), where fluxes in variables manifest differing public support for GMOs (Kasperson and Stallen, 1991).

Further elaboration is provided by Margolis (1993, 1996), who forwards three theories regarding expert–public risk conflicts. Firstly, different ideas exist between experts and the public regarding 'power and responsibility, about human obligations to other humans and to nature, and hence, about what ends public policy is going to serve' (Margolis, 1996, p 21). For these reasons, rather than simply deriving from differing perceptions of risk, conflicts arise partly from differences between experts and non-experts regarding ideology and its manifestation in public policy. Secondly, survey data indicate that the public simply does not trust institutions that regulate risk. Thirdly, Margolis argues that experts and the public simply differ in what they see to be a risk, e.g. experts and the public have *rivalling rationalities* through which they interpret risk (Margolis, 1996). Rivalling rationalities implies that even though views are different, they are not different in a way that necessarily makes one wrong whenever the other is right. The underlying principle is clearly a subjectivist, poststructuralist interpretation, and holds that different motivations and experiences shape each individual's own world-view, the risks that exist in it, and that each perspective is equally valid (Margolis, 1996).

It is given that different rationalities lead to different criteria for assessing risk, and those differing criteria manifest themselves in various, sometimes conflicting, acceptability levels. However, this argument begs the question of what are the competing rationalities, and how do they interpret reality. Social scientists have elucidated various theories of how risk is evaluated, informed and constructed (Table 5.2). One such epistemology involves probabilistic criteria that attempt to predict the potential safety failures of

Table 5.1 Factors contributing to public risk perception

Factors	Conditions associated with increased public concern	Conditions associated with decreased public concern
Catastrophic potential	Fatalities and injuries grouped in time and space	Fatalities scattered and random
Familiarity	Unfamiliar	Familiar
Understanding	Mechanisms or process not understood	Mechanisms or process understood
Uncertainty	Risks scientifically unknown or uncertain	Risks known to science
Controllability (personal)	Uncontrollable	Controllable
Voluntariness of exposure	Involuntary	Voluntary
Effects on children	Children specifically at risk	Children not specifically at risk
Effects manifestation	Delayed effects	Immediate effects
Effects on future generations	Risk to future generations	No risk to future generations
Victim identity	Identifiable victims	Statistical victims
Dread	Effects dreaded	Effects not dreaded
Trust in institutions	Lack of trust in responsible institutions	Trust in responsible institutions
Media attention	Much media attention	Little media attention
Accident history	Major and sometimes minor accidents	No major or minor accidents
Equity	Inequitable distribution of risk and benefits	Equitable distribution of risks and benefits
Benefits	Unclear benefits	Clear benefits
Reversibility	Effects irreversible	Effects reversible
Personal stake	Individual personally at risk	Individual not personally at risk
Origin	Caused by human actions or failures	Caused by acts of nature or God

Source: Margolis (1996, p 29).

complex technological systems in the absence of sufficient data for the system as a whole (Renn, 1992). In this case, the risk is based on the probability of events whose occurrence can lead to undesired consequences.

Interestingly, when using the probabilistic approach to evaluate potential large accidents of low probability, people must employ a subjective approach since enough data rarely exist to accept that a certain probability has a precise value and that information needed to make estimates of it can only come from observation of the process (Rasmussen, 1981). Probabilistic methods are primarily used to provide a measure of the risk so that it can be regulated, and the outcome is a quantitative measure of the risk of a given activity which can be utilised in making comparisons between possible choices. Some scholars believe that the problems with this method of analysis lie in the interpretation of the results, and argue that techniques for comparing risks of different types need to be more fully developed if widely accepted ways of handling this difficult problem are to be achieved (Rasmussen, 1981).

Another epistemology involves economic evaluations. Economic risk analysis involves a systematic process regarding the consequences that arise from different courses of action (Winner, 1977). This analysis is designed to aid in the decision-making process by weighing the costs and benefits of a risk (Kelman, 1981). The economic concept of risk is based on probabilities, a social definition of undesirable effects based on individual utilities, and the treatment of these effects as real gains or losses to individuals or society. One application of an economic approach to risk is *cost/benefit analysis*. Cost/benefit analysis involves a process whereby specific costs of the risk are compared to its benefits. Critics argue that decisions on socially acceptable risks, which imply the calculation of costs/benefits and are usually confined to elites who forward the cost/benefit model, should be democratised and established through a consensus of society and its representative stakeholder experts (Crouch and Wilson, 1982).

Still another perspective argues that risk is constructed through psychological processes. Known as psychological risk assessment, this method focuses on personal preferences for probabilities and attempts to explain why individuals do not base their risk judgements on expected values.

It expands the realm of subjective judgement about the nature and magnitude of risks. Slovic 1992 writes:

> Risk is inherently subjective; risk does not exist out there, independent of our minds and cultures, waiting to be

Table 5.2 Summary of approaches to risk assessment

Type	Concept
Actuarial	Attempts to predict the likelihood of a risk being dangerous based on available data pertaining to the risk. This perspective relies on two conditions: enough statistical data must be available to make meaningful predictions, and the causal agents that are responsible for negative effects must remain stable over the predicted time period
Toxicological/ Epidemiological	Assesses health and environmental risks. It is similar to the actuarial approach but differs in the method of calculating the possibility of undesirable effects. Researchers attempt to identify and quantify the relationship between a potential risk agent and a physical harm observed in humans or other living organisms
Probabilistic	Attempts to predict the possibility of safety failures of complex technological systems even in the absence of sufficient data for the system as a whole
Economic	Constitutes a coherent logical framework for situations in which decisions are being made by individuals. It is based on probabilities, a social definition of undesirable effects and the treatment of these effects as real gains or losses. This approach provides techniques and instruments to measure and compare utility losses or gains from different decision options, thus enabling decision makers to make more informed choices. It also enhances technical risk analysis by providing a broader definition of undesirable events which include nonphysical aspects of risk. Also, under the assumption that market prices represent social utilities, it provides techniques to measure distinctively different types of benefits and risks with the same unit Lastly, it includes a model for rational decision making provided that the decision makers can reach agreement about the utilities associated with each option
Psychological	Expands the realm of subjective judgement surrounding the nature and magnitude of risk in three ways. First, it focuses on personal preferences as probabilities and attempts to explain why individuals do not base their risk judgements on expected values. Second, more specific studies on the perception of probabilities in decision-making identified several biases in people's ability to draw inferences from probabilistic information. Third, the importance of contextual variables for shaping individual risk estimations and evaluations has been documented in many studies on risk perception
Social	Keeps in mind the notion that all humans do not perceive the world through their own eyes, but rather see the world filtered by social and cultural meanings transmitted via primary influences such as family, friends and fellow workers
Cultural	Assumes that cultural patterns structure the mindset of individuals and social organizations to adopt certain values and reject others; these selected values determine the perception of risks and benefits. There are different types of individuals, including *atomised individuals* who believe that risks are out of their control and safety is a matter of luck, *hermits*, who believe that risks are acceptable as long as they do not involve the coercion of others, *bureaucrats*, who believe that risks are acceptable as long as institutions have the routinised control over them, *entrepreneurs*, who view risks as opportunities that should be accepted in exchange for benefits, and *egalitarians*, who feel risks should be avoided unless they are inevitable to protect the public good

> measured, instead human beings have invented the concept of risk to help them understand and cope with the dangers and uncertainties of life (Slovic, 1992, p 119).

Slovic and others argue that risk-taking behaviour is balanced by pursuing an optimal risk strategy which does not maximise benefits but assures both a satisfactory payoff and the avoidance of major disasters (Simon, 1976; Kahneman and Tversky, 1979; Luce and Weber, 1986). One example is portfolio theory where 'risk investors' select a portfolio of risks where the probability of negative consequences is balanced by the probability of personal benefit. To put it another way, in order to minimise losses, an individual does not 'put all of their [risk] eggs in one basket', but instead manages various risks on a fluid, day-to-day basis, constantly evaluating acceptable risk through both conscious and subconscious processes. Both Lee and Brehmer argue that these deviations from pure individual economic utility are less a product of ignorance or irrationality than an indication of one or several intervening contextual variables, which often make perfect sense when seen in the light of the particular context and the individual decision maker's values (Lee, 1981; Brehmer, 1987).

Also, more specific studies on the perception of probabilities in decision-making identified several biases in people's ability to draw inferences from

probabilistic information. These biases include *availability heuristics*, where events which come to peoples' mind immediately are rated as more probable than events that are less mentally available. In this domain, various media and advertising are particularly effective at reifying images of GMOs through which consumers filter their risk assessments (Beck, 1998). We see this dynamic in the GM debate when genetically modified food is referred to as 'Frankenfood', eliciting images of monstrous characters that represent the negative effects of science's interference with nature.

Another bias is *anchoring effect*, where probabilities are adjusted to the information available or the perceived significance of the information. Similar to availability heuristics, anchoring uses available information and the ability to interpret it as a touchstone for evaluating risk. Whereas the other biases are context dependent, *representativeness* occurs when singular events that are personally experienced, or associated with properties of a highly personal event, are regarded as more typical than information based on frequencies or probabilities. We see this idea express itself when GM opponents discuss 'well-known' accidents such as the StarLink Corn case. Similarly, a related bias involves the *avoidances of cognitive dissonance* where information and images that challenge perceived probabilities will be ignored or downplayed.

Renn (1998) discusses such images of risk in public perception with respect to technological risk, breaking it into four semantic images. The first semantic category of risk is known as a pending danger. Here, risk is seen as a random threat that can trigger a disaster without prior notice and without sufficient time to cope with the hazard involved. The magnitude of the probability is not considered; rather, it is the randomness itself that evokes fear and avoidance responses. In contrast, natural disasters are perceived as regularly occurring and thus predictable or related to a special pattern of occurrence. The image of pending danger is therefore particularly prevalent in the perception of large-scale technologies. Nuclear power plants are a prime example of this semantic category (Renn, 1998). This category applies to transgenic organisms in the same way it applies to nuclear technology, which is often seen as an analogous technological revolution. In this instance, random occurrences of gene transfer and ecosystem impacts have alarmed the public in much the same way that nuclear accidents have in the past: probabilistic, economic/actuarial risk assessments that predict positive gains thus fall on deaf ears.

The second semantic category is known as a slow killer. Here, risk is seen as an invisible threat to one's health or well-being. Knowledge about these risks is based on information from others, rather than on personal experience. These types of risks impose a major demand for trustworthiness in those institutions that provide information and manage the hazard. If trust is lost, the public demands immediate action and assigns blame to these institutions even if risks are relatively small. Typical examples of this risk class are food additives, pesticides and radioactive substances (Renn, 1998). Along with the pending danger category, this category can be used to describe risks posed by genetic modification. Currently, trust in institutions that provide information on genetic modification is at a very low level. This lack of trust contributes to the high sense of risk felt in many European countries.

The next semantic category is referred to as the cost/benefit ratio. In this case, risks are perceived as a balance of gains and losses. This concept of risk comes closest to the technical understanding of risk, that is, the PRA method of risk assessment. However, this image is only used in the public's perceptions of monetary gains and losses. Typical examples are betting and gambling, both of which require sophisticated probabilistic reasoning. People are normally able to perform such probabilistic reasoning but only in the context of gambling, lotteries, financial investment and insurance, e.g. instances with direct, tangible, experiential outcomes. Indeed, data show that people orient their judgement about lotteries more towards the variance of losses and gains than towards the expected value (Renn, 1998).

The final semantic category is known as avocational thrill. In this instance, risks are often actively explored, sought out and even desired (Renn, 1998). These risks include all leisure activities for which personal skills are necessary to master the dangerous situation. The thrill is derived from the enjoyment of having control over one's environment or oneself. Such risks are always voluntary and allow personal control over the degree of riskiness (Renn, 1998).

The major weakness of psychological risk assessment is that it focuses on the individual; people do not exist in vacuum, but rather are embedded in social structures that provide meaning (Giddens, 1991). Renn (1998) demonstrates that the breadth of the dimensions that people utilise in making judgements, as well as the reliance on intuitive heuristics and anecdotal knowledge, make it difficult to aggregate individual risk preferences and find a common denominator for comparing individual risk perceptions. Nevertheless, examination of social structures like religious organisations, NGOs, interest groups, family and other social groupings does indicate commonalities.

Social risk assessment posits that people are embedded in *nomos* building instrumentalities, that is, people exist in social structures that function to define what is real and what is imagined, what danger is and what pleasure is. This argument posits that people do not perceive the world through their own eyes, but rather see the world filtered by social and cultural meanings transmitted via primary influences such as family, friends, fellow workers and other social groups.

When an individual confronts a risk, he asks three basic questions: what is it, what should I think about it and what should I do about it? The answers are provided by social groups that provide and ground individual meaning. Indeed, knowledge of physical consequences, handling of risk information by individuals and social groups, social and cultural meanings of the causes and effects of risk, as well as structural and organisational factors, shape the social experience of risk (Renn, 1992).

Closely related to both the psychological and social theories of risk assessment is the psychometric assessment of risk. Also known as cognitive theory, this perspective relates to how people respond to meta-risks (e.g. floods, hurricanes and earthquakes) as well as how they reason under conditions of uncertain knowledge. Krimsky argues that people, when asked to compare the frequency and likelihood of certain events, judged an event more likely to occur if it was easier for them to imagine or recall; this 'event memory' was influenced by the event's intensity, media reinforcement, or familiarity. They also judged likelihood of risk occurrence by synergistic social processes whereby their opinions were informed and mediated by their social groups (Krimsky and Golding, 1992).

SYNTHESIS: SOCIALLY CONSTRUCTED AND POLITICALLY AMPLIFIED RISK

Social constructivists treat risks as social constructs that are determined by structural forces in society (Gampson and Modigliani, 1989). Issues such as health threats, inequities, fairness, control and others cannot be determined by objective scientific analysis, but rather by the reconstruction of the beliefs and rationalities of the various actors in society (Johnson and Covello, 1987; Bradbury, 1989; Gampson and Modigliani, 1989; Giddens, 1990). The fabric and texture of these constructions reflect both the interests and values of each group or institution in various risk arenas, the shared meaning of terms, cultural artefacts and natural phenomena among groups (Wynne, 1983). Risk policies result from a constant struggle of all participating actors to place their meaning of risk on the public agenda and impose it on others. This assessment of risk is based on group conventions, specific interests of elites and implicit value judgements (Appelbaum, 1977; Dietz *et al.*, 1989).

Socially constructed risk does not separate reality from the perception of reality; the negotiated knowledge of the world is the functional equivalent of the world itself, and the world is only understandable and has meaning to the extent that we grant those qualities. Indeed, definitions of risk, knowledge and responses to information and uncertainty are based ultimately on the attempted maintenance of familiar social identities. Physical risks thus have to be recognised as something which are embedded within and shaped by social relations and the continual negotiation of our social identities (Wynne, 1983).

This constructed reality of risk manifests itself through social and political amplification. That is to say, groups and factions that hold to certain perspectives of risk proselytise nonmembers, attempting to win them to their epistemology. In other words, groups exacerbate and amplify their perception of risks in order to convince potential proselytites and defeat opponents. The political amplification of risk derives from events and hazards that interact with psychological, social,

institutional and cultural processes in ways that can heighten or attenuate perceptions of risk and shape risk behaviour, which in turn generate secondary social or economic consequences (Kasperson, 1992). These secondary effects often generate demands for additional institutional responses and protective actions, or in terms of attenuation, place impediments in the path of needed protective actions.

Risk is both an experience of physical harm and the result of cultural and social processes by which individuals or groups acquire or create interpretations of hazards. With these interpretations, the individual who communicates knowledge to the general public has the ability to amplify the risk. Kasperson (1992) argues that the amplification process starts with either a physical event or reports (either real or imagined) on environmental or technological events, releases, exposures or consequences. Individuals and groups monitor the experimental world, searching for hazardous events related to their agenda of concern, and in doing so they select specific characteristics of these events or aspects of the associated depictions and interpret them according to their perceptions and mental schemes. Put simply, they find what they were looking for. These individuals or groups collect information about risks and communicate with others through behavioural responses that act as *amplification stations*, e.g. they take the information they have discovered and distribute it to others who share their interpretations, thus amplifying the consequences of the risk (Kasperson, 1992).

SUMMARY

Risk is not a simple phenomenon, nor is its assessment limited to actuarial, economic cost/benefit equations. Instead, risk is objective only in that certain events *do* happen, and certain dangers *do* exist, independent of perception. Nevertheless, how we identify these events and dangers as being real, how we interpret them, and how we act towards them are all processes deeply embedded in social and political processes. Thus, our views of risk are mediated and provided through social groups that are trusted, familiar cohorts to whom we turn to gain understanding and meaning. Similarly, in response to familiar events, we use psychosocial filters that help make sense of complex events. This leads us to overestimate the risk of infrequent yet catastrophic, highly publicised events while underestimating the risk of frequent yet obscure events.

Obviously, the evaluation of risk is often contentious and ambiguous: we have argued that there are different types of risk assessment, and agree that the process is far more complex than simple cost/benefit analyses. We likewise agree with the social constructionist view, and view risks as amplified through political processes whereby social groups tend to extend their perception of risk through highly filtered, mediated images and messages that either exaggerate or minimise risks.

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