

Everyday Strategies for Managing Risk and Uncertainty

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Abstract

Within interdisciplinary risk research strategies for managing risk and uncertainty based on cognitive rationality are seen as more effective than non-rational strategies, such as hope, belief or avoidance. However this dichotomy between rational and irrational strategies neglects a whole range of everyday approaches to risk that are neither completely rational nor irrational as they may involve the use of prior knowledge and experience. These *in between* strategies include the use of emotion, trust and intuition to make decisions and they can be seen as complementing and overcoming some of the limitations of instrumental and calculative forms of risk and uncertainty management and therefore in combination they facilitate more effective control over the future.

In late modern societies individuals' decision-making has become increasingly important and problematic because the rising complexity and volatility of decision-making situations. Individuals have to make important or 'fateful' decisions in an almost reflex-like manner, without enough time or knowledge available. Such decision-making requires increased trust, for example in the experts with appropriate knowledge and skills. The important aspect of trust is less its implicit or unconscious aspect but the underlying experience based knowledge. Similar to intuition trust refers to tacit knowledge and pre-conscious awareness of reality. Intuition seems close to the kind of embodied (or even innate) knowledge high risk takers use. Trust and intuition both involve feelings and emotion. Positive affect is associated with trust while intuition can be expressed in emotional terms, e.g. when individuals use the sense that 'it feels right to me' as a basis for action. While experts may prescribe cognitive-rational strategies as the most effective response to risk, if they do not acknowledge and recognise the importance and capacity of non-rational and in-between approaches then it is likely that individuals will disregard expert advice or absorb and transform it within their own experiences about and responses to risk. The potential benefits of strategies combining different elements and approaches will be lost.

Introduction

In interdisciplinary risk research and societal practice there are ongoing controversies about the management of risk and uncertainty. Many of these controversies follow the distinction between objective knowledge on the one hand and belief and ideology on the other or rational and non-rational strategies to manage risk and uncertainty (see table 1). This distinction was criticized in the lay-expert debate in the 1980s (Wynne 1982, 1989; Pidgeon et al. 1992).). In this debate, experts were seen as having access to superior scientific knowledge while lay people relied on 'folk wisdom', everyday myths, beliefs and ideologies. However, as Wynne (1989) observed, even experts also rely on a specific 'belief system' or *epistemic culture* (Knorr-Cetina 1999) and such 'knowledge' has limitations (Wynne 1992). Therefore it is not self-evident that expert knowledge is superior to lay knowledge. Despite such observations the dichotomy

between the ideal types of rational knowledge and non-rational knowledge persists and represents a continuation of the expert/non-expert distinction

In this paper I will start with a critique of the orthodox approach to knowledge and rationality. Since Weber’s original analysis of the centrality of rationality to modern institutions such as bureaucracies, there has been skepticism that contemporary societies can and should be rationally manageable, and increased awareness of the negative side-effects of unconfined rationalization. In several areas of research these doubts have gained ground. In decision-making research as well as in sociology the limits of rationality and calculative control have become a central issue. I will argue here that even apparently irrational responses to uncertainty such as ‘belief’ can have positive functions in the everyday management of risk and uncertainty.

I will then outline recent insights from risk research in economics, psychology and sociology that identify strategies *in between* the rational and non-rational, such as *trust, intuition* and *emotion*. In the last part of the paper I will argue that the most effective way of responding to risk is to acknowledge the reality of human decision-making especially the strategies *in between* the rational and irrational and these should be acknowledged and built in as a resource to manage unpreventable risks and uncertainties of the world.

Current Orthodoxy in Interdisciplinary Risk Research

The distinction between true and subjectively distorted knowledge or between real and perceived risks seems to be one of the basic distinctions every society relies upon (Krohn & Krücken 1993: 12). This distinction indicates a world in which actions are either rational and based upon empirically proven knowledge (table 1, left column) or irrational, being based on feelings or beliefs that cannot be justified by experience or scientific knowledge (table 1, right column).

Table 1: Orthodox contradiction of rational and non-rational strategies

Managing ...	rational strategies such as ...	non-rational strategies such as ...
risk and uncertainty by ...	weighing of pros and cons, calculation	belief, hope, faith
possible negative outcomes by ...	provision, insurance	avoidance

It is a central aspect of modernity that the world (and its uncertainties) can be controlled in principle by positive knowledge (table 1, left side). As Max Weber puts it in *Science as Vocation* (1948: 139):

“The increasing rationalization ... means ... the knowledge or belief that ... one can, in principle, master all things by calculation”.

Interestingly, Weber does not define rationalization as an increased use of knowledge but as a change in how individuals interpret the world and produce and manage knowledge. He noted that such a change would shift from a value-oriented organizations based on traditional and charismatic authority to mainly goal-oriented organizations based on legal authority. He argued that this change would push mankind into a “polar night of icy darkness” (1965) in which individuals would be caught in “a shell as hard as steel” of rule based rational control neglecting other aspects of human existence (1948).

Even when the non-rational component of decision-making is acknowledged, that does not mean that the priority for rationality is abandoned. For example, the famous economist John Maynard Keynes stated in his work a *General Theory of Employment, Interest and Market*:

“We are merely reminding ourselves that human decisions affecting the future, whether personal or political or economic, cannot depend on strict mathematical expectation, since the basis for making such calculation does not exist; and that it is our innate urge to activity [animal spirits] which makes the wheels go round, our rational selves choosing between the alternatives as best we are able, calculating where we can, but often falling back for our motive on whim or sentiment or chance.” (Keynes 1936: 161-163)

For Keynes the tension between rational calculation and the incalculable future is managed by the nature of mankind and our *animal spirits*. Keynes had an ambivalent view of uncertainty. He saw in the lack of rational control an undesired but unpreventable effect of economic decision-making since the indeterminacy of the future is the prerequisite for all autonomous and innovative rational activities; as Bernstein (1997: 229) puts it: “uncertainty makes us free”.

This freedom to act is accompanied by the need to prepare for the undesired effects of risk-taking. The development of the statistical probabilistic skills to calculate the future contributed to the ‘modern’ response to uncertainty through insurance. Initially insurance developed in Britain in the late 17th and early 18th centuries to meet the needs of mercantile capitalists to share the uncertainties of maritime trading. The growth and increasing wealth of the middle classes in the 19th century resulted in the expansion of insurance to protect against house fire and premature death (Evers & Novotny 1987: 36ff.). By the late 19th century the insurance principle reached the working class. The established system of mutual help and support against the hardships of proletarian life, the friendly societies, were weakened and increasingly supplanted by the introduction of collective social insurance and with it state responsibility for the protection of vulnerable citizens.

However, the cold technological logic of insurance focuses primarily on the financial implications of future harms based on the knowledge of similar past events. Therefore, individuals in managing the uncertainties of everyday life cannot rely on insurance alone. They need to use other forms of protection and solidarity (family, friendship etc.) to respond to the unforeseeable harms of the future and therefore individuals have to balance competing risks and strategies for responding to them within limited resources. In the context of limited resources and uncertain futures, it may be rational not to over-anticipate and focus on immediate risks rather than uncertain dangers of

the more distant future (Vickerstaff et al. 2008). The extent to which an individual invests in personal protection through insurance or other measures or relies on group solidarity relates more to personal preference and experience than instrumental rationality. From a personal perspective it is difficult to 'rationally' justify protective measures such as insurance as they are based on an artificially constructed population. As Alaszewski and Brown note in their discussion of the modern use of scientific knowledge alongside increasing personal uncertainty, epidemiologists can tell smokers that half of them will be killed by the habit but they cannot tell an individual smoker which half he or she is in (2007: 3). Individuals can exploit this uncertainty to argue that they are in the 'safe half' because of special personal characteristics such as being a 'careful person', having 'good genes' or 'living a balanced life' (See for example Ruston and Clayton's (2002) analysis of the ways in which women who are being treated for heart disease deny they are 'at risk'). Furthermore, as Natalier and Willis (2008) note in their analysis of why some Australians purchase health insurance, there is actually little evidence that their decisions are based on calculative rationality. Indeed most of those who purchase health insurance seem to have little awareness of or interest in the actual cost and potential benefits of health insurance, rather the decision to purchase is actually grounded in social solidarity and trust.

Debates in (social) science, politics and the public arena often refer to the need for rational consumer decisions or sound science and the threat of a 'culture of fear' which would prevent necessary economic decisions or (scientific) developments. From this perspective the world is divided in ideal types of rationality and irrationality (compare table 1). Such a dichotomy disregards the benefits of non-rational strategies which enable individuals to act even when faced with overwhelming negative odds of a positive outcome. Beliefs, faith and hope enable individuals to act in situations which appear too hopeless or impossible to comprehend. Individuals engaged in high risk and dangerous activities such as fighter pilots tend to believe in their own special characteristics, luck or skill so that they can continue against the odds (Lyng 2005, 2008). This need for a positive attitude underlies the book written by Herbert Achternbusch, a Munich artist, in 1986: "Atlantic swimmers. You don't have a chance, but take it"¹.

The Importance of 'In Between' Strategies

When the analysis shifts from ideal types such as 'rational' or 'irrational' decision-making to empirically grounded accounts, then it is possible to identify a third group of strategies which individuals use to manage uncertainty. This group can be called 'in between' as they are neither fully rational nor non-rational. They might have some of the features of rational strategies, e.g. may rely on the use of knowledge albeit not scientific knowledge, and some of the features of non-rational strategies, i.e. are influenced by personal context, feelings or beliefs. Such strategies include the use of trust, intuition or emotion.

¹ Original: 'Die Atlantikschwimmer. Du hast keine Chance, aber nutze sie'.

Table 2: Strategies *in between*

Managing ...	rational strategies such as ...	strategies <i>in between</i> such as ...	non-rational strategies such as ...
risk and uncertainty by ...	weighing of pros and cons, calculation	trust, intuition, emotion	belief, hope, faith
possible negative outcomes by ...	provision, insurance		avoidance

Trust

By the late 1960s, Luhmann (1979, 1988) was emphasising the importance of trust and the ways in which it was used to manage uncertainty by reducing the complexity of decision-making situations. He argued that trust was not a fully rational construct (e.g. Coleman 1990). If trust was an entire rational issue, as suggested by many economists, then the concept would be dispensable. Instead, Luhmann argued that trust is only needed when it is not fully ‘rational’ to give trust, and when individuals would regret their decision if their trust was betrayed. Trust is often based on some knowledge but this might be situationally specific - for example, personal experience of an individual can be the basis of trust in that individual, but individuals only need trust when knowledge is limited, i.e. they cannot be sure of the outcome.

Beck and Beck-Gernsheim (2001), and Lash (2001) argue that individuals’ decision-making has become increasingly important and problematic in late modern society because the rising complexity and volatility of decision-making situations. Individuals have to make important or ‘fateful’ decisions in an almost reflex-like manner, without enough time or knowledge available. Such decision-making requires increased trust, for example in the experts with appropriate knowledge and skills (Seligman 2000; Mishra 1996). However at the same time there is awareness of the limitations of ‘unconditional trust’ and suggestions that individuals need to actively produce and negotiate, and scrutinize the sources of trust rather than these being pre-established by social positions, and gender roles or custom and practice. Such a shift can be seen as a move from ‘unconditional trust’ towards *active trust* (Giddens 1994: 14) or *reflexive trust* (Bonss & Zinn 2005: 196).

There is empirical evidence to support these theoretical discussions. This evidence indicates trust is a multi-layered concept, primarily consisting of a cognitive element grounded on rational and instrumental judgements, and an affective dimension developed in social relationships accompanied by affective bonds, including empathy and identification with others (Lewis & Weigert 1985; Calnan & Rowe 2006). Though some researchers argue that emotions provide the key element in the management of uncertainty (Barbalet 2002, 2008), the strength of trust in managing uncertainty appears to lie in its combination of experience-based knowledge with intuition and emotions.

Since experts are a major source of trust, (Taylor-Gooby 2000, 2006), studies of the ways in which individuals judge the trustworthiness of experts provide important information on the nature of trust. Lay people have no direct access to all information available to experts and decision makers they have to find out about their trustfulness in more general terms (Wynne 1996a,b). This includes for example whether relevant information is concealed. Lay people refer to their experiences when they judge whether they can trust and also use other sources such as body language and behaviour to evaluate whether a decision-maker can be trusted. As a result, overly obvious attempts to appear trustful may cause even more distrust.

Given the pre-rational, intuitive and reflexive knowledge embedded in trust, the argument that trust is characterised by a *leap of faith* (Möllering 2006: 109-10) which bridges a knowledge gap with hope or belief may actually be reproducing the orthodox distinction between rationality and non-rationality in another guise. As research shows, both trust and distrust draw heavily on experience-based knowledge (Wynne 1996a, b) the key characteristic of trust is not its combination of rationality and belief but rather its use of pre-rational knowledge and intuition placing trust *in between* rationality and non-rationality, neither fully rational nor irrational.

Intuition

Intuition refers to tacit knowledge and pre-conscious awareness of reality (Reber 1995). Intuition seems close to the kind of embodied (or even innate) knowledge described by the edgework approach (Lyng 2005, 2008). People who expose themselves to high risks or who are 'working on the edge' such as BASE jumpers, sky divers, fire fighters and fighter pilots all seem to have an ability to grasp and respond to dangerous situations quite effectively, when they have almost no time available to reflect on alternatives. They seem to refer to a pre-rational or even pre-social source to cope with uncertainty.

The nature and use of intuition can perhaps be seen most clearly in studies of expert decision-making. Klein (1998) argues that intuition is experience-based and an essential part of professional judgement. Benner (2001), in her study of professional decision-making, makes the point that through continual practice professionals develop an ability to respond rapidly and effectively to complex situation without conscious deliberation. They acquire an intuitive grasp of situations and the necessary responses. Thus intuition is a valuable resource for experienced worker and forms the basis of their expert judgement. Klein shows that professionals develop complex skills to recognize patterns or deviations from patterns on the basis of cumulating experiences. One of his examples refers to the practice of nurses of a neonatal intensive care unit of a large hospital (1998: 39-40). These nurses developed experience-based intuitive skills caring for newly born infants who were premature or otherwise at risk. One of the difficult decisions these nurses had to make was to judge when a baby was developing a septic condition which becomes almost immediately life threatening. These nurses could look at a neonate and tell the physician when it was time to start the antibiotics (Crandall & Getchell-Reiter 1993). The nurse found it difficult to identify the signs and symptoms that enabled them to identify the early onset of sepsis but in most cases their initial judgement was subsequently confirmed by tests.

Behavioural economists such as Gigerenzer developed a different argument. In *Gut Feelings* (2007) he argues that intuition has developed as a response to the limited

capacity of the human mind. To cope with the overload of information humans developed short-cuts or heuristics to identify salient information. Such heuristics work quite well in specific social environments and are a quicker and more cost-effective, albeit less reliable, way of processing information than the systematic review of evidence which underpins cognitive rationality. Gigerenzer (2007) showed using the concept of *recognition heuristic* that limited knowledge can prove more effective than cognitive rationality. His research identified that, when stock market experts forecast specific share prices on the stock market they tend to get lost in the mass of information available to them. In contrast, the most of the lay people Gigerenzer interviewed based their judgement on recognition heuristics and made positive judgements about shares of companies which were familiar to them and negative about the ones of firms they have never heard about. As a group they were actually more successful in predicting the performance of shares than the more sophisticated experts relying on complex information and judgements (Gigerenzer 2007: 27-30; Borges et al. 2001). Therefore it would be wrong to dismiss heuristics and intuition as undesirable deviations from optimal judgements (Tversky & Kahneman 1974).

Both aspects of intuition, the pre-rational assessment of knowledge as well as the use of heuristics are ways of managing uncertainty and in many circumstances are more successful than rational strategies (Klein 1998: 285ff.; Gigerenzer 2007: 173ff.). Both strategies may become increasingly important if individuals have to live with growing fluidity, volatility and uncertainty. Both aspects can be linked to emotions as a resource for managing uncertainty and it is to this resource I turn next.

Emotion

Trust and intuition both involve feelings and emotion. Positive affect is associated with trust while intuition can be expressed in emotional terms, e.g. when individuals use the sense that 'it feels right to me' as a basis for action (Parker & Stanworth, 2005: 321). Both trust and intuition are fundamentally linked to affect and emotions but their contribution to risk research is controversial (Zinn 2006). Traditionally, emotions have been seen as a inferior alternative to cognitive rationality associated with inferior decision-making and outcomes, for example when fear of possible catastrophe results in risk avoidance (Rohrmann & Renn 2000). Emotions tend to be seen as both too personal and unstable to form the basis for stable social institutions (e.g. Luhmann 1989, 1995).

Current research in neuroscience, cognitive psychology, behavioural economics and sociology indicates that emotions may provide an effective basis for making decisions about risk and managing uncertainty. Damasio (1996) argued, on the basis of research on brain injured people, that their inability to make decisions can be explained by the disjunction between parts of their brain which process emotion and cognition which prevents them valuing and hence evaluating alternatives. He concludes that emotions are centrally involved, even in rational decisions. Psychological (Loewenstein et al. 2001) as well as sociological (Zinn 2004) research indicates that on a comparatively modest level emotions can be used as a kind of advisor in decision-making. Further research supports the notion of affect as an orienting mechanism (Alhakami & Slovic 1994; Finuncane et al. 2000; Slovic 1999: 694f.). Since the brain tends to respond more quickly to emotions than other forms of information, affect can be seen as a mechanism that provides a rapid evaluation prior to slower rational evaluation of alternatives and thus risk and benefit judgements are derived at least partly from it. The advantage of emotional judgements is their speed which makes them useful in

high risk and overly-complex situations, where cognitive reflections cannot or can only partly inform decision making.

Recent work on emotions in finance, for example by Pixley (2004), supports the view that decision-making is much more influenced by emotions than is usually assumed. Thus Pareto's doubts about Weber's claim that rationality would tend to replace all other bases of decision-making has found some recent support. Pareto (1916, 1935) claimed that most activities are non-rational, motivated by a mixture of socio-psychological and biological sources (residuals) and that rational explanations (derivations) are post hoc justification of decisions rather than their initial drivers.

Sociologists have analysed the ways in which emotions are mediated by individuals' socio-cultural environment. Thus stable institutions with stable rules and routines act as a source of positive emotions and basis of trust while unstable institutions cause anxieties, fears and distrust (Gehlen 1980, 1988; Giddens 1990: 98, 102, 133; Douglas & Wildavsky 1982). Since emotions are linked to a variety of socio-cultural values - trust and intuition are not just influenced by the available knowledge but also by the ways in which they are embedded in the culture and social relations.

Recent cultural theorizing has emphasised the undetermined character of culture. So called 'aesthetic' or 'reflexive' judgements (Lash 2000) are not subsumed in an objective rule of risk calculus or production but are rather an expression of searching for such a rule. They are inherently subjective and are linked to individuals' experiences during the course of their life. As Wynne (1996a, b) has shown, everyday people's emotional responses, for example to political decision-making and professional expertise, is a product of their experiences of past risk management especially failures and these experiences structure what individuals expect from such experts for the future and the extent to which they are willing to trust them.

'Reflexive' judgements are linked not only to a stock taking of bad experiences, fear and risk avoidance but also to the attractiveness and allure of risk taking (Lupton & Tulloch 2002). The attractiveness of risk and the 'highs' that individuals experience through successfully meeting and overcoming dangers are a key feature of the high risk activities such as mountain climbing or parachute diving. Living on the edge or 'edgework' (Lyng 2005, 2008) can be seen as a personal and cultural preference that acts as a major dynamic of change and innovation in modern society, for example through risk taking entrepreneurs (Douglas 1966) and is important to every-day living in fluid conditions of late modernity.

Conclusion

I have argued that current risk controversies are often grounded in the orthodox dichotomy between rational and non-rational approaches to the management of risk and uncertainty and therefore underestimate the importance of *in between* strategies which are neither fully rational nor irrational. In everyday life there is rarely enough time and knowledge available for fully rational decision-making. Therefore strategies such as trust, intuition and emotions are of central importance to individuals' risk-balancing activities. These strategies refer to a kind of tacit and pre-rational knowledge instead of explicit scientific proof. However such strategies are effective not only in dealing with too little knowledge but can also help with the overload of knowledge when heightened complexity prevents or distorts 'rational' decision making. These strategies are sensitive to a number of different factors which influence decision-making and might even cause unjustified confidence or fears. But trust,

intuition and emotion are good strategies to enable decision-making where instrumental rationality is of little help.

It is important to note that 'in-between' strategies for managing every-day uncertainty are not simplified ways of using cognitive rationality, i.e. heuristics or intuition are not just short-cuts that produce a satisfactory rather than an optimal response to uncertainty. *In-between* strategies actually work in a different way using a different logic. Rational risk judgements can be seen as determinant judgements as they are based on the use of general rules that both define the nature of risk as a measurable objective phenomenon and prescribe the rational calculations that should be applied to these measurements, e.g. statistical analysis. Such risk analysis operates independently of social context. In contrast trust, intuition, and heuristics are indeterminate judgements as they are embedded in specific social relations. They are influenced by thought and reflection but also draw on feelings and personal preference or taste. Lash argues that such judgements "are estimations based in feelings – take place not through the understanding, but through the imagination and more immediately through sensation." (2000: 53). Thus most individuals do not interpret risk as an objective category but live with risk using their culture, available symbols and their sense of aesthetics to make judgements about what risks to take. The underpinning logic is not one of cause and effect but one of analogy, a situation or event is like a previously experienced situation and therefore the decisions, actions and feelings from the previous situation are pertinent to the current situation. Of course there are differences between situations and different possible analogies thus the response to a new situation involves innovation and creativity. Lash describes how this logic shapes individual's response to risk as "subjectivity proceeds via analogy with the configurations in his/her horizon, encountering objects or events in his/her environment, and through judgement, synthesizing or producing or constructing yet further configurations, yet further meanings." (Lash 2000: 55).

These results are of practical significance. Trust as a necessary source and a prerequisite to taking risks calls for the establishment of trustful resources which enable people to take risks. Such resources can include personal confidence based on past experience or social networks to balance the uncertainties of everyday life. What is needed is 'insurance' against failure. The lack of such resources would lead to a lack of confidence, distrust and avoidance. For example, when there is no secure pension system established there might be good reason not to rely on a private pension company which could go bankrupt and to live in the present instead (Vickerstaff et al. 2008). Recent reforms of the British National Health Service (NHS) have focussed on the introduction of formal instruments of evidence based medicine and report systems to establish a learning and high quality health service. But where uncertainties do not allow the application of routines, there is still a need to manage unexpected non-routine cases otherwise, for example by professional's tacit knowledge (Alaszewski 2002; Lam 2000) and trust in colleagues.

Intuition is a central source for decision-making in all professions where decisions have to be made under uncertainty. Intuition complements rational considerations to reduce and manage uncertainty. Formalised rational strategies are not enough to manage the uncertain decision making situations of everyday life (Klein 1998, Gigerenzer 2007). For example, Gigerenzer showed that in stock markets experts may actually know too much and that as a result their judgements may be inferior to those of lay people who rely on simpler more robust methods of making judgements. He

therefore argues that simple and quick heuristics provide a way of responding rapidly to complex decision making situations.

Emotions are involved in both trust and intuition, and even have an independent significance in the management of risk and uncertainty. They are linked to the subconscious and are sensitive to patterns of experiences. Often gut feelings catch our attention and prevent major harm. They are particularly helpful in managing unforeseen incidents and exceptional cases where routines and formal rules are questioned. Even though they might sometimes mislead, they are an immediate resource to guide action. They are always involved in rational considerations as well and might intervene as a kind of alarm bell to indicate when rational considerations or routines might go wrong and exceptional action is necessary.

Current debates about the lack of rationality or unreasonable fears in public responses to risk as well as complaints about a lack of trust into decision makers tend to neglect that underlying conditions of uncertainty there are no 'right solutions' in principle. Many Americans might have been driven by their fears when they decided in the aftermath of the suicide attack of September 11 to travel long distances by car and not by plane. In terms of the overall deaths this was not a rational decision as Gigerenzer's analysis (2006) showed. As a result of the increased number of people doing long distance driving the increase in the fatal road accident exceeded the death toll of the original terrorists attack. However this judgement is based on hindsight, the knowledge that there were no further terrorist attacks in the USA. Had there been such attacks then the decisions to drive rather than fly would have been wise and foresighted.

While experts may prescribe cognitive-rational strategies as the most effective response to risk, if they do not acknowledge and recognise the importance of non-rational and *in-between* approaches then it is likely that individuals will disregard their advice or absorb and transform it within their own beliefs about and responses to risk and the potential benefits of strategies combining different elements and approaches will be lost.

References

- Alaszewski, A. (2002) The impact of the Bristol Royal Infirmary disaster and inquiry on public services in the UK. *Journal of Interprofessional Care* **16**, 4, 371-378.
- Alaszewski, A. and Brown, P. (2007) Risk, uncertainty and knowledge, *Health, Risk and Society* **9**, 1-10.
- Alhakami, A.S. & Slovic, P. (1994). A Psychological Study of the Inverse Relationship Between Perceived Risk and Perceived Benefit. *Risk Analysis*, **14**, 1085-1096.
- Barbalet, J, (2002). *Emotions and Sociology*. Oxford: Blackwell Publishing.
- Barbalet, J. (2008). A Characterization of Trust, and its Consequences. *Theory and Society (forthcoming)*.
- Beck, U. & Beck-Gernsheim, E. (2001): *Individualization*. London: Sage.
- Benner, P. (2001) *From Novice to Expert: Excellence and Power in Clinical Nursing Practice*, Prentice Hall.
- Bennett, C. (2007). Responding to multiple, qualitatively different hazards: exploring how perceptions of risk mediate response and influence priorities for action.

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Bonß, W. & Zinn, J. (2005). Erwartbarkeit, Glück und Vertrauen - Zum Wandel biographischer Sicherheitskonstruktionen in der Moderne, *Soziale Welt* **56**, 2/3, 79-98.

Borges, B., Goldstein, D.G., Ortmann, A., Gigerenzer, G. (2001). Can Ignorance Beat the Stock Market? In G. Gigerenzer, P. M. Todd and et al. (Ed.), *Simple Heuristics That Make Us Smart* (pp. 59-72). Oxford: Oxford University Press.

Calnan, M. & Rowe, R. (2006). Researching trust relations in health care: Conceptual and methodological challenges - an introduction. *Journal of Health Organisation and Management*, **20**, 349-358.

Castel, R. (1991). From dangerousness to risk. In G. Burchell, C. Gordon and P. Miller (Ed.), *The Foucault Effect. Studies in Governmentality* (pp. 281-298). London: Harvester/Wheatsheaf.

Coleman, J.S. (1990). *Foundations of social theory*. Cambridge, Mass: Belknap Press of Harvard University Press.

Damasio, A. (1996). *Descartes' Error: Emotion, Reason and the Human Brain*. : Macmillan Press Ltd.

Douglas, M. 1966, *Purity and danger: an analysis of concepts of pollution and taboo*, Praeger, New York.

Douglas, M. & Wildavsky, A.B. (1982). *Risk and culture: an essay on the selection of technical and environmental dangers*. Berkeley: University of California Press.

Ewald, F. (1986). *L'Etat providence*. Paris: B. Grasset.

Finucane, M.L., Alhakami, A., Slovic, P. and Johnson, S.M. (2000). The Affect Heuristic in Judgments of Risks and Benefits. *Journal of Behavioral Decision-making*, **13**, 1-17.

Gehlen, A. (1980). *Man in the age of technology*. New York: Columbia University Press.

Gehlen, A. (1988). *Man, his nature and place in the world*. New York: Columbia University Press.

Giddens, A. (1990). *The consequences of modernity*. Cambridge: Polity in association with Blackwell.

Giddens, A. (1994). *Beyond left and right: the future of radical politics*, Stanford University Press, Stanford, Calif.

Gigerenzer, G. (2007). *Gut feelings*. New York: Viking.

Gigerenzer, G. (2006). Out of the Frying Pan into the Fire: Behavioral Reactions to Terrorist Attacks, *Risk Analysis* **26**, 2, 347-351.

Hardin, R. (2004). *Distrust*. Russel Sage Foundation

Knorr-Cetina, K.D. (1999). *Epistemic cultures: how the sciences make knowledge*. Harvard University Press, Cambridge, Mass.; London.

Krohn, W. & Krücken, G. (1993). *Riskante Technologien: Reflexion und Regulation*. Frankfurt a. M.: Suhrkamp.

- Lam, A. (2000) Tacit knowledge, organizational learning and societal institutions—an integrated framework. *Organization Studies* **21**, 487 – 513
- Lash, S. (2000). Risk culture. In B. Adam, U. Beck, J. Van Loon (Ed.), *The Risk Society and Beyond. Critical Issues for Social Theory* (pp. 47-62). London: Sage.
- Lash, S. (2001). Non-linear Individualization. In: Beck, U. & Beck-Gernsheim, E. (2001): *Individualization*. London: Sage.
- Lewis, J.D. & Weigert, A. 1985, 'Trust as a Social Reality', *Social Forces* **63**, 4, 967-985.
- Loewenstein, G.F., Weber, E.U., Hsee, C.K., Welch, N. (2001). Risks as feelings. *Psychological Bulletin* **127**, 267-86.
- Luhmann, N. (1979). *Trust and Power*. Chichester; New York; Brisbane; Toronto: John Wiley & Sons.
- Luhmann, N. (1988). Familiarity, Confidence, Trust: Problems and Alternatives'. In D. Gambetta (Ed.), *Trust: Making and Breaking of Cooperative Relations* (pp. 94-107). Oxford: Blackwell.
- Luhmann, N. (1989). *Ecological communication*. Cambridge, UK: Polity Press.
- Lupton, D. & Tulloch, J. 2002, 'Life would be pretty dull without risk': voluntary risk-taking and its pleasures', *Health, Risk & Society*, vol. 4, no. 2, pp. 113-124.
- Lyng, S. (2005). *Edgework. The Sociology of Risk-Taking*. New York; London: Routledge.
- Lyng, S. (2008). Edgework, Risk, and Uncertainty. In J. Zinn (Ed.), (pp. 106-137). Malden, MA; Oxford, UK; Carlton, Victoria, Australia: Blackwell.
- Mishra, A. (1996). 'Organisational responses to crisis' in *Trust in Organisations*, R. Kramer & T. Tyler eds. Sage, Thousand Oaks.
- Misztal, B.A. (1996). *Trust in Modern Societies*, Polity Press, Cambridge.
- Moellering, G. (2006). *Trust: reason, routine, reflexivity*. Elsevier: London
- Natalier K. and Karen Willis, K. (2008) Taking responsibility or averting risk? A socio-cultural approach to risk and trust in private health insurance decisions, *Health, Risk and Society* **10**, forthcoming
- Pareto, V. 1935: *The Mind and Society The Mind and Society: A Treatise on General Sociology*. Four Vols., New York: Harcourt and Brace.
- Pareto, V. 1916: *Trattato di Sociologia generale*. Four Vols., Florence: Barbèra
- Parker, J. and Stanworth, H. (2005) 'Go for it!' Towards a critical realist approach to voluntary risk-taking' *Health, Risk and Society* **7**, 319-336.
- Pidgeon, N., Hood, C., Jones, D., Turner, B., Gibson, R. (1992). Risk Perception. In The Royal Society (Ed.), *Risk: Analysis, Perception and Management. Report of a Royal Society Study Group* (pp. 89-134). London.
- Pixley, J. 2004, *Emotions in finance: distrust and uncertainty in global markets / Jocelyn Pixley*, , Cambridge University Press, Cambridge, U.K., New York, NY, USA.
- Reber, A. 1995, *Implicit Learning and Tacit Knowledge: An Essay on the Cognitive*

Unconscious, Oxford University Press, New York.

Rose, N. (1998). Governing risky individuals: The role of psychiatry in new regimes of control. *Psychiatry, Psychology and Law* **5**, 177-95.

Ruston, A. and Clayton, J. (2002) Coronary heart disease: women's assessment of risk—a qualitative study, *Health, Risk and Society*, **4**, pp. 125-137.

Seligman, H. (2000). *The Problem of Trust*, Princeton University Press.

Slovic, P. (1999). Trust, Emotion, Sex, Politics, and Science: Surveying the Risk-Assessment Battlefield. *Risk Analysis* **19**, 689-701.

Taylor-Gooby, P. (2006). The Efficiency/Trust Dilemma in Public Policy Reform (SCARR WP9)

Taylor-Gooby, P. (2000). *Risk, Trust, and Welfare*, St. Martin's Press, New York.

Tversky, A. and Kahneman, D. (1974). Judgement under uncertainty: Heuristics and Biases. *Science* **185**, 1127-1131.

Vickerstaff, S., Loretto, W., Billings, J., Brown, P., Mitton, L., Parkin, T. & White, P. 2008: Encouraging Labour Market Activity among 60-64 Years Olds. Research Report: Department of Work and Pensions.

Weber, M. (1948). Science as a Vocation. In H. M. C. W. Gerth (Ed.), *Weber, Max: Essays in Sociology* (pp. 129-156). London: Routledge & Kegan Paul LTD.

Weber, M. (1965). *Politics as a vocation*, Fortress Pr., Philadelphia.

Weir, L. (1996). Recent Developments in the Government of Pregnancy. *Economy and Society* **25**, 372-392.

Wynne, B. (1982). Institutional Mythologies and Dual Societies in the Management of Risk. In H. C. Kunreuther & E. V. Ley (Ed.), *The Risk Analysis Controversy. An Institutional Perspective* (pp. 127-143). Berlin; Heidelberg; New York: Springer.

Wynne, B. (1989). Frameworks of Rationality in Risk Management: Towards the Testing of Naive Sociology. In J. Brown (Ed.), *Environmental Threats: Perception, Analysis and Management* (pp. 33-47). London; New York: Belhaven Press.

Wynne, B. (1992). Risk and social learning: reification to engagement. In S. Krimsky & D. Golding (Ed.), *Social theories of risk* New York: Praeger.

Wynne, B. (1996a). May the sheep safely graze? A reflexive view of the expert-lay knowledge divide. In S. Lash, B. Szerszynski & B. Wynne (Ed.), *Risk, Environment & Modernity* (pp. 44-83). London; Thousand Oaks; New Delhi: Sage.

Wynne, B. (1996b). Misunderstood misunderstandings: social identities and public uptake of science. In A. Irwin and B. Wynne (Ed.), *Misunderstanding science? The public reconstruction of science and technology* (pp. 19-46). Cambridge: Cambridge University Press.

Zinn, J.O. (2004). Health, Risk and Uncertainty in the Life Course: A Typology of Biographical Certainty Constructions. *Social Theory & Health* **2**, 199-221.

Zinn, J.O. (2006, January). Risk, Affect and Emotion [32 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research [On-line Journal]*, **7**(1), Art. 29. Available at: <http://www.qualitative-research.net/fqs-texte/1-06/06-1-29-e.htm> [Date of Access: November 15, 2006].