Social Contexts and Responses to Risk Network (SCARR)

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This review covers recent developments from the mid-1990s onwards. For more detailed analysis and reviews of earlier periods, see Weyman and Kelly, 1999; Rohrmann, 1999, Schütz et al, 2000 and Pidgeon et al, 1992. It is organised around the issues and problems to which most attention appears to be currently directed.

Six themes emerge: a long-standing interest in an approach which distinguishes ***objective risks from subjective perceptions***, often drawing on established approaches which stress cognitive biases and the role of mental models in subjective understanding, and sometimes equating expert judgement with the objective and lay perceptions with the subjective level. The well-established ***psychometric tradition***, of continuing importance, has tended to pursue such assumptions in two ways. First, it focuses on the measurement of lay perceptions of risk, typically with the implication that an objective perspective exists to serve as a criterion. Secondly, the main practical developments have taken place through research which examines the success with which expert understanding of risk is reflected in the acceptance or rejection of particular policies. The ***Social Amplification of Risk Framework*** (SARF) originated in the psychometric tradition, but also draws on a range of other literatures in its attempts to resolve issues that have been identified as problematic. It is an ambitious attempt to integrate a range of existing approaches within an overall framework for understanding risk perception and communication. The fourth theme is ***culture***, a conceptual framework traditionally seen as more important in sociological and social anthropological literature, and now increasingly contributing to psychological understanding, both as a basis for the risk attitudes expressed by individuals, and as influencing the shared risk understanding of social groups. This has led to interest in qualitative methodologies, including unstructured interviewing that explores people's own understanding of the issues, focus groups which examine these issues interactively, discourse analysis as a way of examining culture expressed through language and narrative approaches to explore how people link together cultural and cognitive factors in their accounts of particular issues. Interest in culture is sometimes linked to the study of neighbourhood and community as the basis for shared identities and values which can play an important role in communication about risk and exert influence on the credibility of risk messages.

All the different approaches concur in stressing the importance of ***trust*** in relation to risk communication and understanding, and draw on literatures outside psychology in their analysis. Trust is understood to be complex and multi-faceted, and many questions within this topic are still to be

3

addressed. Finally, ***affect*** is now recognised as highly significant in risk understanding and responses, and is again an area of controversy.

I. Objective versus Subjective; Expert and Lay

Psychological and sociological approaches to risk are often distinguished on the basis of realist and subjectivist accounts (Boyne, 2003, p.43). In the former, risk objects are real, and the intellectual problem is to understand how they come to represented in peoples' perceptions. In the latter, risk is socially constructed, focussing attention on the different factors which lead to risk constructions in different social contexts.

Heuristics and Cognitive Bias

An important contribution to the approach which assumes that risks exist in a objective sense, but are then perceived and analysed by human actors, is the work of Tversky and Kahnemann (1973, 1974). They identified a number of heuristics, or 'rules of thumb', which people often use in thinking about uncertainty and related issues. The assumption of such heuristics provides a convenient explanation of people's competence in risk judgements in the context of their occasional errors. Three heuristics are of particular importance: *availability* (people estimate the frequency or likelihood of events by the ease with which instances of these events are brought to mind), *representativeness* (the probability or likelihood of an event is estimated according to the similarity to the class of event of which it is seen as an example) and *anchoring* and *adjustment* (in a first step, judgements are anchored on an initial value, which is then adjusted according to present circumstances – see Kahneman, Slovic and Tversky, 1982).

The heuristics that people use produce useful results under most circumstances and economise on the mental effort required to assess each occurrence of risk, but can also generate biases. This work is widely used, for example in accounts of the ways in which the presentation of gambles influences choices (Slovic, Fischoff and Lichtenstein, 2000) and is often presented as an aspect of 'bounded rationality (Simon, 1959 – see Slovic, 2000, pp16-17). It has a wide-ranging influence across social science, for example in the public choice literature (Pierson, 1994, ch 2).

The development of work on cognition has been influenced particularly by evidence that other factors contribute to risk perceptions and by issues arising from its application, such as the fact that expert and lay perceptions of risk often diverge despite the communication of information validated by experts.

Mental Modelling

Mental modelling approaches seek to examine how people construct accounts of reality by manipulating internal representations of them. Such models are useful in understanding the world, but as Fischoff et al (for example, 1997) point out, if they contain misunderstandings, they may lead to errors. This approach lends itself to the view that distinguishes between expertise and ignorance, and the concern with improving communication to rectify the latter by ensuring that lay models correspond more closely with those of experts. For example: 'whatever the goal of communication, its designers need to address the mental models that recipients bring to it, that is, the pattern of knowledge, overly general understandings, and outright misconceptions that can frustrate learning' (Atman et al, 1994, quoted in Weyman and Kelly, 1999, p.26). Thus the approach may draw on such sources as the work on cognition mentioned above in understanding the source of what are seen as errors.

Models may typically be elicited through qualitative interviews and then compared with expert understandings in order to identify discrepancies (Weyman and Kelly, 1999 p 26). Quantitative studies can then be designed to explore the extent of these discrepancies and their relationship to knowledge and other factors. The approach draws on decision-making research on heuristics and biases and findings from psychometry, but differs in the use of qualitative methods to elicit lay understandings of risk, including both beliefs that correspond to those of experts, and beliefs that differ.

The potential of the approach was commended by the 1992 Royal Society report as 'highly promising' (Pidgeon et al, 1992, p.121). A considerable amount of work has been carried out on lay models of specific risks (reviewed in Weyman and Kelly, 1999, p. 12), much of it indicating that lay people have simpler and more intuitive mental models than experts, often influenced by cognitive biases which appear to result from the use of simplifying heuristics. More recently, a number of writers have questioned the critique implicit in much of the work (and expressed in the Atman quotation above and by MacGregor and Fleming, 1996) of the value of lay mental models. One strand in critique concerns the extent to which expert knowledge can be seen as unified and consistent and as having an objective status, in contrast to the presumed subjective nature of lay perceptions. Another raises the issue of the validity of lay knowledge of risk issues in the context in which most people encounter them, and effectively claims an equal status for lay understanding with that of experts while acknowledging differences in perspective. A third raises the issue of trust in expert accounts and how the extent to which experts are trusted contributes to acceptance of the authority of expertise

(Weyman and Kelly, 1999, p. 26, see the discussions of SARF and the trust theme below).

II. The Psychometric Paradigm

Tversky and Kahneman's work was based mainly on an experimental method. Psychometric approaches, which focus on expressed preferences and associated factors, rather than preferences revealed through behaviour (such as choices between different risky gambles - Starr, 1969, see Schütz et al, 2000), have been a strong theme in research on risk perception. Slovic defines the psychometric paradigm as assuming that 'risk is subjectively defined by the individual, who may be influenced by a wide array of psychological, social and institutional factors' (2000, xxiii). The problem is then to measure these factors. In the principal methodology through which it is realised, the paradigm asserts that this can be done through analysis of the responses to questionnaire surveys. The Decision Research Group at the University of Oregon have been influential in developing this approach (see Slovic 2000, introduction, Weyman and Kelly, 1999, p. 7; Pidgeon et al, 1992, p. 102).

Factor analyses of data generated by such surveys on risk attitudes has identified two or three main risk criteria which are seen to affect the lay public's risk perceptions. These are 'perceived dread' (the most important dimension, linked to the hazard's catastrophic potential and level of involuntariness in exposure – sometimes labelled 'control'), 'unknown risk' (the extent to which the hazard is known and familiar to the perceiver), and, in some cases, 'number of individuals exposed' (number of casualties should the event occur - Slovic 2000, p. 98; Schütz et al, 2000, p.3). Schütz and colleagues suggest (2000, p.6) that 'it would make more sense to assume that dread is not a determinant of perceived risk, but a different measure of perceived risk, which focuses more on the affective dimension in risk perception'. Thus dread would be a consequence (as is perceived risk) of the various risk characteristics (see also Gregory and Mendelsohn, 1993). Rohrmann (1999, pp. 135-7) argues that this approach condenses information which is 'based on average ratings…ignoring individual differences…[and is] influenced by knowledge, values and feelings'. Thus they 'have restricted external validity. Before findings are generalised, the cultural context (and respective constraints) of the investigation needs to be explicated.'

The psychometric approach has been criticised on a number of counts, in relation to method, the size, representativeness and structure of samples used and the reliance on structured questionnaires which predefined the issues (see Weyman and Kelly, 1999, pp. 8-9). This has led to larger

samples and introduction of qualitative as well as quantitative methods. In addition there are issues of the comparability between studies (emphasized by Rohrmann, who stresses the role of cultural factors, which he argues are least well accommodated in existing work, leading him to argue for more explicitly cross-cultural studies to investigate this area - 1999, p.145).

Over time the basic psychometric model has been extended through attention to social and cultural and finally affective factors. In the work of Slovic these are approached through their influence on individual perceptions as measured through the questionnaire, and are summed up in terms of world-view, gender and trust (2000, pp xxiii, ch 25). They appear as extra explanatory factors (or 'add-ons') to the basic model. Thus lay judgements of risk are seen as multi-dimensional, but a strong distinction between the subjective popular level (influenced by cognitive bias, culture, and social and affective factors) and the objective expert level, is maintained. However, both culture, understood as framing the way in which risks are understood, rather than as simply the basis for the risk attitudes measured in quantitative work, and affect, understood as interacting with cognition, rather than as something extra, may be approached in ways that do not fit within this framework.

III. The Social Amplification (Attenuation) of Risk Framework

This ambitious approach seeks 'to construct a framework which unifies understanding of risk perception and communication' (Pidgeon et al, 2003, p.2) through a direct approach to the problem revealed in previous work of the mismatch between lay and expert approaches to risk. Risk messages are understood as signals emitted by social events and 'subject to predictable transformations as they filter through various social and individual amplification stations' (Pidgeon et al, 2003, p.15). The basic model identifies two stages: first the perception of risks is influenced by a range of social processes, including the operation of the channels through which information is disseminated (or not), the role of social institutions in modifying signals, individual factors (for example, the use of the cognitive heuristics identified by Tversky and Kahneman), and social and institutional behaviour, such as protest actions, or political processes within parliament or public enquiries; secondly, 'risk messages' then 'ripple out' through a widening range of social groupings from the individual to society as a whole. There is provision for feedback between the various first-stage processes and it is in the operation of these processes and the interaction between them, that amplification or attenuation of risk signals occurs. The established theories dealing with

risk institutions, social systems, individual cognition and so on provide understanding of the various individual processes. Thus the approach links together existing work and provides a framework within which accounts of the processes which influence the way risk events are perceived and impact on society, and in particular the way in which expert judgements fail to carry consistent conviction with the public, can be understood. Parallels can be drawn between the SARF and work in other disciplines, such as the sociological analysis of the diffusion of 'moral panics' as a process of 'deviance amplification' in the understanding of the mods and rockers seaside riots (Cohen, 2002 – see Murdock et al, 2003).

It should be noted that while the signal/receiver framework implies an objective/subjective distinction, SARF does not necessarily imply that expert views fall on the objective side of the division, and that it is the lay views which are the subjective representations, affected by the various processes of social amplification or attenuation. It is compatible with the logic of the model to see both expert and lay views as generated by amplification/attenuation processes and as thus on the subjective level in relation to the same source, or indeed to understand the process whereby a particular initial risk signal is generated as itself a social construction, so that risk signals do not necessarily give direct access to the risk source, and the objective basis is at one remove. '..The proponents of the framework do not wish to imply that such a single true baseline always and unproblematically exists..' (cf. Pidgeon, 1999, p.149, quoted in Rosa, 2003, p.50). In practice, however, the approach is typically applied on the assumption that the risk event provides an objective basis, and the interest is in lay views as the outcome of modifications working on perceptions of and communications from that prior source, and rests on a distinction between objective ontological realism and a secondary level of subjective understanding (see Kasperson, 1992, quoted in Rosa, 2003, p.49).

The authors comment that existing research on risk signalling, communications and the mass media, organisational processes, imagery and stigma, contributes to the framework (pp.16-30). However, the role of trust and the operation of ripple effects (which are of most importance in relation to public policy) are less well understood, and this is where more research is needed (pp.31-6). Interest in stigmatisation processes was developed relatively early, drawing on the work of Goffman (1963). This initially focused on economic impacts, but more recently has been developed to include the argument that 'the social, psychological, and cultural impacts are often at least as significant and merit greater attention from policymakers and researchers', Gregory and Satterfield, 2002, (p.

347).   These authors use qualitative and discourse analysis methods to find evidence of how such factors operate. As can be seen, the SARF approach is eclectic and interacts with other social sciences, especially sociology, in its interest in social institutions and processes, and increasingly with political science in the emerging awareness of how political factors facilitate or obstruct the impact of risk perceptions on policy (see Gowda, 2003).

The main criticisms of the framework concern its ontology and its account of social processes. It has also been criticised on the grounds that it is not a theory and doesn't generate testable hypotheses (Wåhlberg, 2001). This may miss the point, since the approach claims to offer an overall framework within which work from a range of disciplinary backgrounds and middle-range theories of human cognition and communication, attitude change, the influence of mass media and so on operate, rather than a tightly-defined theory. SARF implicitly adopts the realist conception of risk that underlies all work that makes a strong objective/subjective distinction and 'lies at the core of the SARF foundation' (Rosa, 2003, p.62). This is challenged by those who adopt a more cultural approach and see risks as socially constructed at all levels. The main criticisms of the account of social processes concern the role of feedback, particularly in relation to the media and the implicit account of power in society. Thus Murdock and colleagues, drawing on the work of Bourdieu, point out that media reporting is not simply a one-way process, and the complex interactions between individuals and the media in relation to risk events cannot simply be captured in the account offered in stage one of social amplification, drawing on an electronic engineering metaphor of signals and feedbacks (Murdock et al, 2003, p.158, see also Petts et al, 2001, ch.6).

They add a fifth capital, 'communicative capital' to the four analysed by Bourdieu (1990 - economic, social, informational and symbolic) and argue that the various players within any 'social field' (for example mediated risk communication in general, within which are nested the various aspects of risk – GM foods, MMR vaccination, pension fund insecurity – which are prominent at a particular point in time –see Murdock et al, 2003, figure 7.1, p.161) have different stocks of communicative capital. The key differences from SARF are, first, that the most important issue is not the amount of coverage given to a particular issue or a viewpoint on it, but rather whose interpretation, whose 'framing of reality' is believed. The struggle is then about legitimacy rather than newspaper or television coverage. Secondly the theory of power implicit in SARF is seen as focusing on the capacity to achieve compliance and paying little attention to the structural power

9

which enables some groups to control agendas, and prevent particular issues, or particular framings of them, being recognised in public debate. This perspective goes on to argue that such structural power is not fixed, but that it is possible to achieve shifts through effective political communication or public relations, so that the field of mediated communication is subject to shifts in framing.

The lay public are not simply passive recipients of media messages, but are sophisticated in the way they respond to the output of the mass media – see Kitzinger and colleagues (2004). Coverage of risk events may be interpreted by media users in the context of previous coverage and of assumptions about the role of particular actors built up over time, so that associations of expertise, impartiality, commitment and so on can attach to particular groups involved in episodes like the BSE crisis, and influence responses to media messages. 'Texts are always 'read' within a social context and people draw on a mixture of personal experience and their understandings of the wider issues (… Kitzinger, 1999). These understandings in turn are continually tested and often modified through everyday conversation and argument (see Murdock et al 2003 – Kitzinger et al, 2004)' In addition, the public can exert an influence in two ways. First they are the source of both media circulation and advertising revenue and of democratic legitimacy through their viewing and purchases and opinion and votes. Thus their endorsement of a particular framing cannot be taken for granted, but has to be continually and actively consulted and reproduced. Secondly 'members of the public are often the principal actors in the dramas and debates played out in the public representation of risks' (p.164), especially in the tabloid media. Thus such individuals have access to communicative capital and enter as players on the field.

For both these reasons, the metaphor of the 'transmission ripple' as a one-way process in stage two of SARF is seen as inappropriate. The argument goes on to suggest that an account of message transmission that does not pay attention to the differential structural power of different groups in society is likely to overlook the role of media power in the process. This approach sees the implicit SARF metaphor of the production, modification and transmission of risk signals as misleading and as likely to disregard structural power, the part played by the public in the active interpretation of media messages and their capacity to become involved in the construction of what the media communicates. Studies by Horlick-Jones, Sime and Pidgeon, 2003; Walker et al, 1998, Howell et al, 2002, reinforce the argument.

One motive for the construction of the SARF framework is the desire to render risk discussion in public policy more democratic, by giving an

account of why lay people often hold views that differ from those of experts and governments. This critique indicates that the issue about extending democratic influence are perhaps more complex than the framework suggests. Other work points out that the relationship between risk perception and policy is in any case more complex, since reforms depend on the availability of political opportunities and of reform proposals that fit with the popular values analysed by political scientists (Kingdon, 1984; Schmidt, 2002) as well as the amplification of attitudes (Gowda, ch 13). For the SCARR network, the issue of popular construction of risk and the possibility of developing approaches to examine the narratives of those involved, both expert and lay, is of great interest.

IV. Cultural Approaches

Culture is typically understood as the symbolic and learned social processes which generate and sustain shared norms and values between members of a social group (e.g. Abercrombie et al, 1984, p.59). Clearly such processes will be relevant to the understanding of risk, to the extent that the evaluation of particular institutions or issues as risky or not is involved. This may be approached in two ways: culture may be analysed in terms of its influence in distorting individual perceptions of risk understood as in some sense objective, or in terms of its capacity to constitute the perception of risks through a process of social construction, depending on the extent to which a 'subjective/objective' division is maintained. The social anthropology of Douglas and others sees risk as culturally constructed (Douglas and Wildavsky, 1982), and goes on to argue that particular approaches to risk are appropriate to particular social groups within different kinds of society.

The most well-known of these approaches is contained in Douglas' grid/group framework, an ambitious attempt to categorise societies into four basic forms: hierarchical, egalitarian, fatalistic and individualistic, depending on whether social roles are laid down or chosen, and the strength of commitment to group as opposed to individual interest (for a clear summary, see Boyne, pp. 50-5). Cultural approaches drawing on Douglas' work are influential in sociology (see for example, Tulloch and Lupton, 2003, pp.6-7; Burgess, 2004, ch. 1). Bourdieu's influential conception of *habitus* as the unconscious structures of rules which individuals acquire through their social life and which regulate their behaviour and social practice has some similarities as a basic social form (Bourdieu, 1990, p.53).

In contrast to this, the approach of Slovic and others starts out from a clear objective/subjective distinction, focused in the question of how the

misunderstandings of the lay public are to be explained. The answer develops from a psychometry of risk attitudes and orientations to progressively include aspects of the cultural factors in addition.

The two traditions of work on culture have generated different approaches to risk. An important influence on psychometric work was provided by Dake who investigated general attitudes understood as 'orienting dispositions' through the factor analysis of questionnaire responses, and identified overall perceptions such as egalitarianism, individualism or fatalism as exerting influence on risk perceptions (1991, 1992). Slovic and colleagues develop this work to include worldviews and also social differences (most importantly gender and to some extent race) and finally issues of trust in their research (see discussion in Slovic, 2000, ch. 25). A number of recent studies, based on structured surveys of risk perceptions, stress the importance of gender. Thus, Johnson (2002) shows that concern about air pollution is linked to both ethnicity and gender. Gustafson (1999) argues that gender differences are little examined but are real and consistent and are to be explained by gendered social ideologies and practices. Byrnes et al (1999) also identify gender differences, but argue that these are diminishing over time. Finucane and colleagues (2000) take the issue further by identifying gender and ethnic differences, with non-white males concerned and ethnic minority women most concerned – they hypothesize that this reflects differences in power and privilege. Cvetkovich and Earle (1997) expand the cultural component by arguing that risk management approaches reflect cultural dispositions to be open to new solutions (which they understand as 'cosmpolitanism'). The implication is that any approach to the management of risk problems must address cultural issues, because these will determine how different groups respond to them.

The approach by Douglas contradicts psychometric approaches since it operates at the level of the social group in its account of factors which influence attitudes to risk. This has led to attempts to disentangle the relative influence of cultural and psychometric variables. Sjöberg (2000) analyses survey data to support the argument that attitudes associated with risk sensitivity (specific fears in relation to the particular risk) explain by far the largest part of risk perception, while the heuristics and other variables stressed by psychometry (dread and customary risk) explain roughly half as much, and culture even less. Marris et al (1999) also use a structured questionnaire approach and conclude that psychometric variables provide superior explanations to those based on cultural variables.

These arguments are contested by Tansey and colleagues (2004) and Rippl (2002) who both claim that cultural approaches cannot be

successfully captured through the kind of structured questionnaire approach used in the above studies. Tansey et al argue that cultural approaches can be located on a spectrum that runs from the view that human reactions are essentially 'unconsciously scripted by external social structures' to the view that individuals are entirely autonomous. Sjöberg's position is located towards the latter end while most cultural analysts regard both extremes as problematic. Thus, he argues, Sjöberg's method fails to engage with much cultural analysis, because it does not recognise that this approach sees individual responses as themselves influenced (but not determined) by social structures. The questionnaire answers that add up to evidence of dread discussed earlier, for example, may themselves be influenced by cultural factors.

Rippl conducts a questionnaire survey with a sample of students to show that a number of hypotheses based on Dake's cultural theory (for example, that holding a hierarchical worldview would preclude an egalitarian approach in the framework of cultural positions as 'orienting dispositions' he develops) are not confirmed. She draws on Douglas' work to argue that this is due to the complexity of cultural concepts. In particular the distinctions developed by Douglas are not simple alternatives but the outcome of the interaction of more basic characteristics of society ('grid' and 'group') – in this case both hierarchy and egalitarianism contain commitment to the collectivity on the group level. An approach which takes this into account resolves the problem of contradiction. She argues that a merit of cultural theory is that it rests on more basic theoretical concepts (fundamental characteristics of society) than much of the psychometric tradition (which is essentially empirically based), and this gives it more explanatory power (p. 162).

The emphasis on culture has led on to interest in the development of alternative methods. Saranghi et al stress the importance of analysis of discourse (defined as 'language and interaction in context-specific environments' (2003, p.116) as a way of tackling the processes whereby individuals construct meaning. Such social meanings of course include norms and values. Arguments that link culture and identity, often through a sense of place, are important in the arguments developed by Pidgeon, Henwood, Simmons and Moore in their background paper at the last SCARR meeting (2004). This leads to work which rests on the idea that risk ideas are constructed through a process that draws on cognition and values during discussion, rather than simply read off from prior decisions. Research is not simply an 'archaeology' of excavation, through the study of heuristic bias, mental processes, cultural attitudes and so on, of the basis of risk attitudes, but also an architecture of constructing through mental models and cognitive processes an

understanding of the particular issues raised (Payne et al, 1999). The discursive nature of risk that this approach implies has much in common with the cultural issues raised in discussion of media issues in Kitzinger, Murdock and Jones' background paper at the last SCARR meeting (2004).

A relevant approach pays attention to community and its role in influencing perceptions of risk. Horlick-Jones, Sime and Pidgeon argue, drawing on a study of responses to environmental risks in the two communities of Milford Haven and Bexley, that it is inappropriate to treat lay audiences as passive and as simply responding to interpretations which are generated externally – through the mass media or other agencies which convey signals rippling outwards through society. Lay audiences are engage in the active interrogation of risk messages and develop their own understandings of risk issues (2003, pp283-5). In such work, the local resources provided by the shared values of a community enable people to discuss risks and respond, so a further cultural mediation of risk perception exists. This contrasts with an alternative approach to the significance of community relationships as providing a source for risk attitudes, which sees communities as social networks through which risk messages travel, as in the 'contagion' theory of risk presented by Scherer and Clio (2003).

Another study examines the significance of woods and trees to local people by combining quantitative and qualitative methods, which allow those studied to discuss the attributes of woods and trees, and the value they attach to them, grounded in the local context of particular trees with which they were acquainted (Henwood and Pidgeon, 2001). Local meanings again provide a basis for understanding how people respond to risks that might not be immediately evident from an individualistic structured questionnaire survey.

This raises the issue of how such meanings are to be studied from a constructionist perspective. Pidgeon and colleagues (2004) argue for the use of narrative approaches which allow researchers to analyse the processes whereby accounts of risk are constructed during the course of everyday life activities and discussions. This has the advantages that it enables the processes whereby risks are understood and the issues that are significant to different groups to be examined, and that it is possible to approach expert discourses on exactly the same basis as those generated by the lay public (see the work of Bickerstaff and Walker, 2001, 2003; Burgess and Limb, 1988; and Satterfield and Gregory, 1998).

V. Trust

Trust has emerged as an area of major significance in understanding risk perceptions and responses. It serves as a zone of convergence between psychological and socio-cultural approaches to risk (Weyman and Kelly, 1999, p.28-9). Poortinga and Pidgeon (2004, p.3) point out that in general growing complexity in society places increasingly pressure on social co-ordination mechanisms and thus on trust, linking the argument back to Durkheim's classic discussion of the social division of labour. From a psychological perspective, issues of trust have emerged on the agenda for two main reasons: first the concern about mismatch between expert and lay views in risk communication provoked interest in the issue from a risk communication perspective (see MacGregor and Fleming, 1996). Naively, if the public trusted the experts, they would take what they said more seriously. Secondly, the recognition that cultural and other factors played a part in risk perceptions also placed emphasis on the significance of trust, since trust is often seen as culturally determined or at least culturally influenced. Thus trust is one of the 'add-ons' to the basic psychometric model identified in Slovic (2000, pp.xxxiv-v) and is there categorised among cultural factors. Interest in trust becomes part of the expansion of interest in social factors in influencing responses to risk.

Trust has been understood as nourished in two different ways in the literature: technical competence and underlying values (see McCallum, Covello and Peters, 1997). The former approach stress the characteristics of the source of information about trust, for example, Renn and Levine, (1991, quoted in Pidgeon 2003, p.32) stress competence, objectivity, fairness, consistency and faith as essential to trust. The latter argues that congruence in basic values is of more importance (e.g. Siegrist, Cvetovitch and Roth, 2000). Thus both cognitive and cultural factors are involved in trust. Poortingo and Pidgeon (2003) extend the framework for analysing factors underlying trust in an examination of trust in five risk domains using measures that identify confidence in political and implementation processes as well as competence and values. They identify two components in trust, one concerned with the general trust issues of competence, fairness and openness of institutions, the other (which they term scepticism) with implementation processes. While there is a basic similarity across all five areas in this patterns, values play an additional role only in some cases. They interpret this to indicate that in many cases the value dimension in trust is bound up with judgements about institutions and process. The work adds to the dimensions of trust mentioned earlier a concern with processes of policy implementation. The discussion suggests that a healthy degree of scepticism may be appropriate in a well-functioning democracy, in an argument that reflects

15

some aspects of Almond and Verba's analysis of the 'civic culture', which included both a commitment to democratic institutions but at the same time a willingness to actively judge the success of actors within those institutions through an electoral process (1963, ch. 1).

Some other studies argue that domain under consideration plays a greater role in influencing trust. For example, Weyman and Kelly, 2999, p.30 and Petts (1998) identify the risk issue being analysed as related to the degree of trust, whereas Poortongo and Pidgeon (2003) identify a surprising similarity in levels of trust across domains. There appear to be strong cross-national differences, seen in the literature as culturally-based (e.g. Viklund, 2003). Indeed Rohrmann (2000, p.145) sees cross-cultural studies based on national differences as an important area for future developments in risk research. Cross-national differences in trust might reflect responses to the kind of differences in institutional structure and constitutional frameworks analysed by political scientists (e.g. Lijphart, 1999). The issue of institutional difference as a basis for differences in trust does not seem to have been explored in a comparative perspective by psychologists.

There is some disagreement about the significance of trust in relation to understanding of risk. For example Viklund's study (2003) finds that trust exerts an influence on risk perceptions in four west European countries (France, Spain, Sweden and the UK) but that the significance of trust is rather more limited (explaining only one-fifth of the differences) than might otherwise be assumed. One possible explanation of this is that the role played by trust seems to be strongly influenced by other beliefs. For example, Sjöberg (2001) shows, in a study of experts, lay people and policy-makers across a range of domains, that, while trust is less significant than the 'unknown effects' factor identified in the psychometric tradition, it is a much more significant issue for the former group than the last two, because experts believe that the level of knowledge about relevant issues is much higher. From Sjöberg's perspective, this places more emphasis on the extent to which the issues are adequately communicated. However, it could be argued that this is the outcome of an approach to trust which focuses on the competence and integrity of those trusted (see the discussion above), and that the attitudes of lay people and policy-makers could be understood as a more generalised lack of trust in expertise, reflected in the view that even experts know rather less than is often claimed about the issues under consideration.

Poortinga and Pidgeon (2004, p. 3-4) review evidence to show that 'trust in institutions is closely related to the perceptions and acceptability of various risks'. Drawing on work by Eiser et al (2002) on new food technologies, they argue that the relationship can be conceptualised in

two ways. The causal theory of trust argues that trust in institutions or experts influences judgements of risk which in turn influence the acceptability of a particular risk. The associationist view argues that acceptability functions as a more general and fundamental attitude towards an issue and provides the basis for both trust and risk judgements. They go on to suggest that, from the second perspective, acceptability may be understood as affective. This argument is reinforced by analysis of empirical evidence in relation to food technology by Eiser, Miles and Frewer and in relation GM food by Poortinga and Pidgeon. The implication of this work fits with the conclusions of work on the media and perceptions of risk discussed earlier: risk judgements appear to reflect broader public stances on highly politicised issues. The way in which people interpret evidence on such issues and form judgments about the acceptability of risk is likely to be influenced by these broader views. From the point of view of building trust it is likely to be two-way communication which takes into account these broader factors and responds to concerns, rather than the simple transmission of evidence that is likely to be most helpful.

Work by political scientists, sociologists and psychologists (Putnam, 2000; Fukuyama, 1996; Gambetta, 1998; Le Grand, 2003, p. 29; Coleman, 1986; Axelrod, 1981 etc., see Pidgeon et al, 2003, pp 31-2) demonstrates that trust is much easier to destroy than to build, and, once undermined, is even more difficult to restore. For example, Petts, examining trust in waste management information in a UK setting, concludes that 'the extent to which expectations of the performance of different waste management information sources is supported by experience has a significant impact on trust', (1998, p. 307). Some work on trust takes a simple and direct approach to the relationship between the parties, reminiscence of some application of the mental models approach – for example Jungerman et al, 1996, p. 261, quoted in Weyman and Kelly, 1999, p.29 – 'the authorities should 'try to improve the credibility of those information sources in which the public has presently little trust…and …should organise the provision of information in accordance with the target recipients' specific information preferences and interests'.

The Health and Safety Executive (Weyman and Kelly, 1999, p.34) and Royal Society reports (Pidgeon et al, 1992), Slovic's recent study (200, p. xxxv) and the SARF approach (Pidgeon et al, 2003, p. 33) all concur on the importance of trust, and on the need for more research in this area. Key unresolved debates cover a considerable number of areas: the complexity and in particular the number of dimensions involved in trust (relating to sources of information about risk, processes by which risk policies are enacted, the relationship between the basic values of the trusted and the truster and the domains of risk in question); the

17

importance of trust in risk perception; the relationship between trust, risk judgement and the acceptability of a risk; the role of cultural differences and of affect; and the extent to which the problem concerns the factors which influence how a message from a particular source is received rather than the interaction between the risk assumptions of lay people (derived from cultural and other sources) and those of experts.

VI. Affect

Issues of affect have attracted considerable attention in recent years. Zajonc had argued as early as 1980 that affect precedes perception. 'We do not just see 'a house'. We see a 'handsome house', 'an ugly house' or 'a pretentious house'' (p. 154 quoted in Slovic p. 404). He argues that affect also contributes to judgement, so that the attractiveness or otherwise of the object under consideration may influence our behaviour and that rationalisation of the judgement then follows. The arguments developed by Loewenstein (2001) and Loewenstein and Lerner (2003) have some similarities. They point out that 'conventional theories of decision-making only include expected emotions. This approach has been enriched by recent efforts to elucidate the nature and determinants of the emotions that decision-makers are assumed to anticipate experiencing (and thus take into account…). However, it neglects to take account of the important influence of immediate emotions …. [which] … can influence decisions indirectly, by altering the decision maker's perceptions of probabilities or outcomes or by altering the quality and quantity of processing of decision-relevant cues. They can also affect behaviour directly. As the intensity of immediate emotions intensifies, they progressively take control of decision making and over-ride rational decision making' (2003, p. 636).

Building on earlier work (Loewenstein et al, 2001) which showed that emotional reactions to a risky situation often diverge from cognitive assessments, but are more significant in behaviour, they review research on the impact of immediate emotion which indicate that, at relatively low levels of intensity, emotions operate in an 'advisory' role: feelings are explored via introspection and thus contribute to choice and their role tends to be limited to particular areas of life, where rationality is less established as appropriate. The example given is the choice of which movie to see, rather than which statistical procedure to use (p. 627). At higher levels, emotions may tend to supplant more cognitive processes, but here the specific emotions involved make a difference. Some emotions (such as anger or fear) carry specific 'action tendencies'. This leads to the hypothesis that such emotions have value because they trigger appropriate responses while saving cognitive processing time. This may explain the substantial role Sjöberg attributes to 'specific fear',

explaining 30 to 40 per cent of the variance in risk perceptions, nearly twice as much as cognitive heuristics and the factors typically identified by psychometry (2000).

Slovic pursues a similar argument, analysing affect as a heuristic that relates to experience and functions in parallel with world-view as a heuristic functioning in relation to knowledge in influencing action (see Slovic 2000, ch 25, esp. p, 405) Similarly, Finucane et al (ch 26) interpret evidence on the inverse relationship between risk and benefit judgements as showing that 'representations of objects and events in peoples' minds are tagged to varying degrees with affect, and this affect pool is consulted to make quick evaluations…judgements of risk and benefit are guided and linked by affect' (p.427). Poortinga and Pidgeon (2004) argue that this approach 'resonates well' with the associationist view of trust, since the relationship between trust and acceptability could be understood in terms of an analogous influence of affect as a guide to decisions. An account of risk as analysis and risk as feeling is presented in Slovic et al (2002) which seeks to identify heuristic biases in relation to affect analogous to those discussed in relation to cognition: 'psychopathological numbing', when individuals appear to respond to small scale and immediate events as more significant that larger and more distant ones (the difference between one person's suffering in one's street and a city's suffering 10,000 miles away); the over-weighting of 'visceral factors', including drive states, such as hunger, emotions and pain. The central argument is that affect heuristics are convenient and valuable, since they prioritise the immediate issues which directly concern our interests, and prioritise a rapid response to the requirements of survival. However, they can mislead, for example through the over-weighting of cravings for damaging experiences such as smoking.

Other writers see both affect and cognition as playing a role in responses to risk, but analyse their relationship as interaction rather than accumulation. Forgas argues that 'affect has a particularly important influence on peoples' attitudes and judgements' and that this is an area in which 'the traditional attempt to separate affect, cognition and conation is most problematic' (2003, pp. 596-7). He develops an 'attitude infusion model' (pp 611-3). This argues that people have available a number of methods of processing social information, of which recourse to affect is one. They use the least effortful and simplest strategy capable of producing a response. Affect infusion is most likely when dealing with open-ended constructive rather than closed or alternatively highly motivated tasks, where a particular objective matters very greatly to the decision-maker. An example of the first might be answering a survey question which matters little, so that 'how do I feel about it?' is a

convenient way to generate a response, but not to plan a strategy for a job interview, where the cognitive effort of working out the answers that will create the desired impression is worthwhile. However the approach also suggests that affect infusion will occur in complex effortful tasks involving new situations that matter and require the use of memory and a response to novel circumstances, where cognitive approaches may have limitations – such as making a problematic request to someone in authority, whose orientation to the request cannot be pre-judged. The argument concludes that the relationship between affect and cognition is interactive rather than alternative and stresses 'the close interaction between affective states and different information-processing strategies as the key to understanding affective influences on attitudes, judgements, social cognition and interpersonal behaviour' (p. 613).

Another approach which recognises the importance of affect in relation to cognition is that of Rundmo (2002). Using data from a large-sample questionnaire survey, Rundmo distinguishes a number of factors influencing risk perception including cultural factors such as sex, education, type of risk and affect, in terms of the emotional loading of the imagery surrounding the risk. In some ways this finding parallels those presented by Slovic, but the argument goes on to identify two dimensions of risk: worry which relates to cognitive judgement, and mood which does not. Thus, affect is more closely linked to cognition, in part generated by and in part preceding risk judgement, rather than being seen as an alternative source of risk behaviour.   The work pursued by Parkinson (2004) in the SCARR network extends the notion of affect as interactive, through the idea that appraisal of the riskiness of situations is negotiated with others: 'risks are actively framed within relationships and interactions in a consideration not only of what the possibilities mean for me but also what they mean for you and what you think they mean for me and so on. Much of this negotiation is conducted at a nonverbal level with me tracking your developing affective stance on an impending outcome.' (2004, p.3).

Affect is a major new area of interest in the psychology of risk. All the work reviewed indicates that it plays very different roles in relation to different risks and that it corresponds in different ways to risk behaviour in different areas. The work discussed here indicates a divergence between those who present the relationship between affect and cognition in risk judgements as alternative and those who see it as in some way interactive. This is an area where research is rapidly developing.

Positive Risks

The idea that risk in some contexts may be valued for itself (for example, in extreme sports and also in risky behaviour in personal and sexual relationships), rather than accepted cognitively as outweighed by possible advantage, or obscured by heuristic bias or affect, has received limited attention.   In principle the traditional 'consequence x likelihood' approach to risk (Wilson and Crouch, 1982, see Rosa, 2003, p. 55) could apply to positively valued as well as negatively valued risks. However, it may be that the 'being in a state of uncertainty' or 'successfully resolving uncertainty' is what is valued in some activities (Tulloch and Lupton, pp. 32-6), so that it is control rather than risk that is valued. Secondly, the work on 'risk as feeling' discussed above indicates that positive feelings may influence risk decisions (see for example Loewenstein et al 2001). 'Affect does serve as an input into decision-making…but also exerts direct effects that circumvent decision-making altogether' (Loewenstein and Lerner, 2003, p.636). However, this does not so far seem to have been developed into an account of how affective factors may function as motives for risky behaviour.

Issues Arising

Psychological work on risk is substantial and wide-ranging. Perhaps the most striking direction in recent years is the increasing attention paid to non-cognitive approaches, originating in interest in cultural factors and in interest in affect. Parallel to this process is an erosion of traditional objective/subjective distinctions which imply the reality of stable sources of risk experience and then seek to identify less stable and coherent subjective perceptions of them, which are always subject to revision and correction, and the growing importance of a constructivism, which sees judgements as produced through the process of discussing and analysing risk. The weakening of the dominance of this approach is partly due to the interest in cultural perspectives, which can suggest that all accounts of risk, including those given by accredited experts, are influenced by factors to do with individual's social location and circumstances. This opens a rich new vein of enquiry, examining the role of culture in relation to risk. A second factor undermining realism is the increased stress on the proactivity of those who receive risk messages, principally focused on the lay public. The distinction between those who give out information, theoretical understanding and appropriate value-judgements and those whose role is to passively receive such messages has been undermined by work, particularly from the study of the media and from community studies, indicating that people are proactive in constructing understandings of risk from their own perspective.

These developments lead on to new approaches to risk alongside the long-established psychometric and cognitive traditions. There is substantial interest in a range of qualitative procedures intended to examine understanding of risk from individual's own perspectives, and in using these in tandem with quantitative methods for triangulation. Some attention is paid to the extent to which political processes influence the way risk is understood, and conversely in how far risk discourse offers a way of tackling issues of political power. Thirdly, the study of framing offers a way of examining the basis of the narratives of risk that different social groups generate in various contexts.

A number of issues are unresolved in this. First, despite some philosophical analysis, the ontological issues of realism and subjectivity do not appear to be entirely reconciled, despite the adoption of a position which implies, on the one hand, the reality of an objective basis to risk and, on the other, the culturally mediated construction of risk judgements. Secondly, a large number of references to the importance of trust are made in the literature, but the status of trust and the processes that generate, sustain and undermine it are not yet fully explored. Thirdly, while psychological analysis interacts with political issues, there is little integration with political science literature. Fourthly, research on affect indicates the complexity of the processes involved, but many issues are as yet unresolved.

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