

## End of Award Report

### Public perceptions of risk, science and governance

#### 1. Background

Where significant scientific and social uncertainty is involved in risk issues the role of science within society has become a major issue of policy analysis and renewed political debate. Recent events such as the European BSE crisis, the September 11<sup>th</sup> terrorist attacks in the United States, the Foot and Mouth and MMR triple vaccine controversies in the UK, as well as emerging concerns about future developments in nanotechnology, demonstrate that risk issues maintain the capacity to engage the media, varied 'publics', and policy makers alike. It is clear that the meanings that different actors place upon risk controversies are framed by a dynamic interaction between, firstly, the political and governmental context of the specific issues involved, and, secondly, the varied standpoints and attitudes adopted by individuals and groups within social settings. As many of the above examples illustrate only too well, one consequence of such a dynamic is that 'perceptions of risk' hold very real political, economic, and health consequences for individuals and society (Pidgeon, Kasperson & Slovic, 2003). In addition, interpretations of the role of science and governance in a modern society provide grounds either for public motivation to adopt, or resist, the behavioural and policy changes that might be necessary to adapt to a variety of contemporary risk phenomena.

An emerging view from academic research, and one which underlies the current research project, is that new models of science governance are required, involving innovative *social and institutional* solutions which reach far beyond attempts to promote better 'communications' about the science of hazards and risk assessment. For example, research broadly within the area of science and technology studies has indicated the inadequacies of the simple *deficit model* of science communication and the 'public understanding of science' (Irwin & Wynne, 1996; Grove White *et al*, 2000). In parallel, risk researchers have noted how one-way 'risk communication' has failed to resolve many risk controversies (Fischhoff, 1995), and that after three decades of fragmentation in the fields of risk perception and its communication (Royal Society, 1992; Pidgeon & Beattie, 1998) the time is right to develop a genuinely new and integrated theoretical approach to risk, science and governance referenced to its appropriate societal and institutional contexts.

In relation to UK risk policy a number of recent reports have highlighted the need for fundamental changes in the relationship between science, risk policy / regulation, and the public (Phillips, Bridgeman & Ferguson-Smith, 2000; Cabinet Office Strategy Unit, 2002). As the House of Lords report on *Science and Society* (2000) succinctly puts it:

*'Scientists and regulators have to understand the public as much as the public need to have confidence in science'*

We would concur that a sensitivity and awareness needs to be developed amongst scientific experts and policy makers of the diverse ways in which multiple 'publics' construct notions of risk, science and governance in ways which are relevant to, and meaningful for, their everyday lives. A first step - although by no means the only step - in making such a connection is to conduct detailed empirical work on how contemporary public attitudes and discourse towards science, governance and risk interact. This need forms the primary motivation for the current research project.

## 2. Objectives

The study was designed to provide theoretical progress and integration in the field of risk perception and representation, facilitating advances in our theoretical understanding of public framings and attitudes towards science and risk issues.

The two major objectives of the research were.

- (i) To conduct a major national (GB) quantitative survey allowing exploration of a number of relationships between public attitudes to science and risk, trust in risk regulation and risk governance, and through this the testing of a range of theoretical propositions.
- (ii) To generate a comparative data-set of perceptions of five core risk cases (genetically modified food, climate change, mobile telecommunications, human genetics, and radioactive waste). These cases were chosen as they all involve topical public policy questions, and have complementary as well as contrasting facets. Each issue contains, amongst others, the following elements:
  - They all relate to scientific knowledge, public trust in science and scientific procedures.
  - They all test governmental competence as well as scientific authority, especially when scientific interpretations clash with wider values such as free choice, democratic accountability and the role of business and civil society in changing patterns of governance.
  - They are all themes where there exist 'surface' surveys of public 'opinion', but where a richer set of contextually referenced, and comparative data, is lacking.

The longer-term objectives of the research are to use the obtained data- and question- sets in the following ways.

- (iii) To provide scientists and policy makers with an understanding of how the public views and characterises science and scientific procedures in settings where risk and policy interact.

- (iv) Triangulate the quantitative survey data with parallel qualitative data regarding the five core risk cases obtained separately under the Leverhulme funded 'Understanding Risk Programme'.
- (v) Making international comparisons where appropriate.
- (vi) Generating further research into subsequent temporal changes in risk attitudes in Britain, through subsequent surveys of one or more of the core cases or issues.

The principal empirical objectives under (i) and (ii) have been met in full. In the event a full sample of 1547 of the general public was asked a set of common questions (see *Methods*), with sub-sets of approximately 300 being asked detailed questions about one each of the core risk issues. Both the full sample and sub-samples were carefully matched to the GB population profile. The only substantial variation to the research, as outlined in the original research proposal to ESRC, was to simplify the 'multi-level' component of the design. Rather than ask respondents detailed questions about two of the risk issues in a combinatorial design, the need to keep the survey to a manageable length dictated asking each respondent about only one issue. Such a design still permits detailed comparative analysis of the risk cases, but sacrifices some ability to develop statistical analysis of covariance simultaneously at 'individual' and 'risk issue' scales (see Langford *et al*, 1999). This design, however, had the advantage of permitting a sample of over 1500, rather than the 1200 originally envisaged. In analytic terms a range of theoretical (objective i) and comparative (objective ii) statistical analyses have been completed (see *Results*), although further analysis of this major data set is ongoing.

We are meeting objective (iii) through ongoing dissemination of the findings amongst the risk policy community (see *Activities* and *Impacts*). Objective (iv) is unique in seeking to develop methodological innovation with the obtained data-set: specifically, a *mixed-methods* approach to comparative risk perceptions research. The risk perception field lacks much needed theoretical and interdisciplinary integration precisely because researchers from the different perspectives (e.g. the psychometric and cultural approaches; see Royal Society, 1992) have restricted themselves to very different methodological approaches and philosophies. Methodological fragmentation is mirrored in the public understanding of science literature too (Horlick-Jones, 1998). Quantitative surveys fail to reflect many of the subtle contextual meanings that people place upon uncertain science or on ethically charged issues. Conversely, it is not clear how solely qualitative findings (say from interviews or focus groups) can be used as direct inputs to the policy-making cycle. Accordingly, multiple and mixed-methods hold a particular place currently for taking forward knowledge of the public understanding of risk and its relevance to public policy. 2 LINES FROM KAREN HERE ON FOCUS GROUPS HOW MANY PEOPLE, HOW MANY GROUPS, TOPICS, PAIRING STRATEGY. As indicated in the original proposal, during we intend to develop a mixed methods comparative analysis from these two substantial data sets during 2003/4. Finally, objectives (v) and (vi) are more open-ended. However we do believe that we have developed an extremely robust baseline data- and questionnaire- set, and have as a result secured follow-on funding from ESRC to compare the 2002 GM food findings obtained here with new

survey data collected at the conclusion of the 2003 'GMNation?' public debate on agricultural biotechnology in the UK. A number of international comparisons with the obtained data-set will also be made (see *Future Research Directions*).

### **3. Methods**

Data for this study were collected between 6 July and 31 July 2002. A quantitative survey was administered in Britain (England, Scotland, and Wales) by the market research company MORI following their standard sampling, interviewing and full quality control procedures. A national quota sample of 1547 people aged 15 years and older was interviewed face-to-face in their own homes. The survey reported here constitutes one of the largest and most substantive surveys of public attitudes to key issues of risk, science, and governance, which has been undertaken anywhere in the world.

The interviews were carried out using fully trained and supervised market research interviewers and took on average about thirty minutes to complete. The total sample comprised of five separate quota samples of about 300 respondents, each of which was given a different version of the questionnaire covering one of the five risk cases. The five quota samples were run in Enumeration Districts (EDs).<sup>1</sup> Table 1 shows the achieved sampling profile for both the full and sub-samples.

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<sup>1</sup> Enumeration districts were randomly selected with a probability proportional to the size of the population in that district. Interviewers approached selected addresses within these EDs until they reached the quotas for gender, age and work status. The quotas were reflective of the actual profile in each ED. A maximum of one interview per address was conducted.

**Table 1. Characteristics of the Survey Samples**

Characteristic		Sample					Total (%) (N= 1547)
		CC (%) (N=321)	MP (%) (N=319)	RW (%) (N=306)	GM (%) (N=296)	GT (%) (N=305)	
<b>Gender</b>	Male	46.7	45.1	49.0	44.9	48.2	46.8
	Female	52.3	54.9	50.3	55.1	51.5	52.8
<b>Age</b>	15-24	14.3	11.3	18.0	15.5	11.8	13.8
	25-34	14.3	13.5	15.0	18.6	15.7	15.4
	35-44	22.1	18.8	18.0	16.9	21.3	19.5
	45-54	11.8	18.5	18.6	16.6	15.7	16.2
	55-64	15.6	17.9	15.3	12.5	15.4	15.4
	65 and older	21.2	19.4	14.7	22.0	19.7	19.7
<b>Social Class</b>	AB	17.4	22.5	22.5	18.9	23.3	20.9
	C1	30.5	32.3	30.1	32.1	33.1	31.6
	C2	19.9	19.1	23.2	13.5	14.1	18.0
	DE	31.1	25.0	23.6	34.8	28.6	28.6
<b>Income <sup>a)</sup></b>	Low	19.5	12.3	15.8	18.5	20.6	17.4
	Average	23.2	25.2	22.0	25.3	22.1	23.7
	High	12.9	26.2	25.6	18.8	27.1	22.0
	Don't know/ Refused	43.6	36.0	36.8	36.8	29.8	36.7
<b>Level of Education</b>	None	30.8	29.0	28.8	33.2	25.7	29.5
	GCSE	21.4	14.0	22.5	19.6	19.7	19.4
	Vocational/ NVQ	11.7	6.5	8.6	8.4	8.0	8.6
	A level	9.4	15.6	9.9	12.2	13.3	12.1
	Bachelor degree	10.7	17.9	14.6	14.3	17.7	15.0
	Postgraduate	4.2	3.9	3.3	3.5	3.7	3.7
	Other/ Don't know	11.7	13.0	12.3	8.7	12.0	11.6
<b>Marital Status</b>	Married	45.2	51.1	51.0	46.6	50.5	48.9
	Cohabiting	7.5	8.5	7.5	8.8	6.2	7.7
	Single	25.9	20.7	24.8	24.3	23.3	23.8
	Widowed	11.2	7.8	8.8	10.1	7.2	9.0
	Divorced	7.5	6.6	4.2	8.1	9.5	7.2
	Separated	2.2	2.5	1.6	2.0	1.3	1.9
<b>Employment Status</b>	Full time	38.6	41.1	42.5	42.5	36.4	40.6
	Part time	11.2	14.4	11.8	8.1	15.4	12.2
	Unemployed	5.9	6.6	7.5	6.4	5.0	6.3
	Homemaker	10.0	4.4	8.8	6.1	8.5	7.6
	Student	5.0	4.7	4.9	6.4	5.9	5.4
	Other	29.3	28.8	24.5	30.5	28.8	27.6
<b>Ethnic Background</b>	White	91.0	94.7	94.7	96.6	91.2	93.6
	Black	1.8	2.8	0.3	1.3	0.6	1.4
	Asian	5.6	0.6	3.6	1.4	5.9	3.4
	Other	1.6	1.9	1.4	0.7	2.3	1.6

**Source: UEA/MORI Risk Survey 2002.** Note: CC: Climate Change; MP: Radiation from Mobile Phones; RW: Radioactive Waste; GM: GM Food; GT: Genetic Testing; a) Low: <£11,500 gross per annum, Average: £11,500 to £30,000, High: ≥ £30,000.

The questionnaire used for the interviews was specifically designed to elicit comparative data on the five risk issues on a wide range of risk-related themes, while avoiding difficulties that often accompany lengthy questionnaires, such as respondent fatigue, which may lead to over-simplistic or stereotyped responding (e.g. box-ticking). The questionnaire was subdivided into three main sections (see Appendix A). The first *general section* was common to all 1547 respondents. This section consisted of questions on the importance of various personal and social issues (to put the five risk cases into context), cultural values, worldview, and the role of scientists and science in society. The second *risk specific section* presented the respondents with a set of *standardised* questions on only one of the five risk issues: Radioactive Waste, Climate Change, GM Food, Radiation from Mobile Telephones and Human Genetic Testing<sup>2</sup>. Each of the five separate quota samples was given one of the five risk versions. Questions in this section were aimed at eliciting spontaneous images associated with the risk issue, as well as measures of affect, perceived risk characteristics (including psychometric characteristics alongside both risks and benefits), attitudes to risk regulation, trust in and attitudes towards involvement of relevant actors, social influence, concern and acceptability of the five risk cases. The questionnaire then concluded with a section in which respondents were asked to provide *background information*, and was again common to all 1547 respondents. This final section included standard socio-demographics such as gender, age, income and level of education, alongside specific questions on social and political exclusion. This section also contained standard questions on information sources, political affiliation, and the area where they live most of the time.

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<sup>2</sup> Since the themes of ‘mobile telecommunications’ and ‘human genetics’ are relatively generic ones, the latter two were the detailed risk issues used for these issues throughout.

## 4. Results

The survey has produced an extremely rich dataset exploring the five target risk cases on a wide range of risk-related themes, many of which hold important lessons for risk policy. The current report highlights a relatively small number of the descriptive findings of the study (see the Technical Report for a more detailed account of these results: Poortinga & Pidgeon, 2003a). However, the basic dataset allows for more detailed statistical analyses focussing on the five risk cases, as well as the relationships between risk judgements and various topics covered by this study. The broad scope of the study means that a very wide range of data has been produced, and through this various specific hypotheses will be systematically tested during 2003 and beyond. As noted above, we also aim to make comparisons with other data sets produced by other researchers, and to track public perceptions of the five risk cases. This may be of special importance for researchers seeking to explore the impacts of new governance initiatives, such as the recently organised public debate on genetically modified food and crops (see also section *Future Research Priorities*)

### 4.1. Risk in Context

The main aim of the present study was to provide detailed *comparative quantitative data and analysis* of the five main risk issues. First, the five risk cases were put into context by comparing them to various personal and social issues (see Appendix B). Although *all* of the issues (including the risk cases) were to some extent important to people, on the scale of 1 to 5, in *relative* terms the risk cases were generally less important than most of the other personal and social issues. Indeed, four of the five risk cases were amongst the least important of the issues. Only Radioactive Waste as a risk case was higher, being in the middle of the overall rankings of importance. Moreover, the most important issues were mainly personal (such as Health, Partner and Family, and Personal Safety). Social issues (like Population Growth, World Poverty, and Human Rights) were ranked of less importance, with Religion the least important. A high negative correlation was found between the average importance ratings and the standard deviations of the various issues. This means that, whereas the highest ranked issues were important to almost all of the people asked, the least important issues, like Religion (and most of the risk cases except Radioactive Waste), were important to only a subset of people. However, although they may be relatively unimportant compared to other personal and social issues, people nevertheless appeared very interested in the risk cases, with a large majority of people indicating that they were fairly or very interested in all five risk cases.

### 4.2. Public Perceptions of the Five Risks Cases

The five risk cases were evaluated on a wide range of risk related themes (see Appendix C). These evaluations paint a fairly consistent picture of people's perceptions of the risk issues as follows:

- As we had expected, given previous survey and other evidence (see e.g. Slovic, 2000; Flynn, 2003), Radioactive Waste is the risk case evaluated most negatively on most items. For example, just under half of the respondents felt that Radioactive Waste was a very bad thing. It was also seen as having the

lowest benefits and the highest risks of all five cases. Concern about Radioactive Waste was the highest of the five risk cases, and it was also seen as the least acceptable risk issue.

- By contrast, Genetic Testing (described as ‘tests to discover whether people have a range of inherited diseases or disorders’) occupied the opposite side of the spectrum, and was in itself quite a distinct risk case. In contrast to the other risk cases, it was generally seen as a good thing, and was the most acceptable risk with relatively lower perceived risks and higher perceived benefits. This went along with lower concern.

Radiation from Mobile Phones, Climate Change, and GM Food were intermediate cases, with the results on these risk cases less clear-cut:

- Although the acceptability of Radiation from Mobile Phones was low and this was generally seen as a bad thing, people did not seem over-concerned about it. Moreover, a sizeable group (41%) indicated that the benefits of the *use* of mobile phones outweigh the risks. The latter is also reflected in judgements of relatively low perceived risks and high perceived benefits.
- Climate Change was generally seen as a fairly bad or very bad thing, with the benefits seen as low and the risks as high: with respect to the latter climate change risks were closer to those of Radioactive Waste than any of the other risk issues. Consequently, concern was high, whilst overall Climate Change was unacceptable to most people. Indeed, 55% of respondents thought the risks of Climate Change slightly or far outweigh the benefits compared to 53% for Radioactive Waste.
- Perhaps surprisingly, Genetically Modified Food was *relatively* more positively evaluated on a number of the measures (certainly when compared to the Climate Change and Radioactive Waste cases), although it is important to note that a substantial minority (44%) still felt that GM Food is a fairly bad or very bad thing. Nevertheless, a substantial minority of people (35%) appeared neutral about GM Food by indicating that GM food is neither a good nor a bad thing. This may indicate that a sizeable majority in 2002 were ambivalent, or genuinely uncertain, about the GM Food issue, a result in line with recent EuroBarometer findings (cf Gaskell, 2003)<sup>3</sup>. Moreover, people appeared to be less concerned about GM food than about the other risk cases, with perceived risks and benefits compared to the other risk cases judged as intermediate. However, across the whole sample more people thought the risks outweigh the benefits than the reverse, and the acceptability of GM Food was moderately low.

### 4.3. Trust

In the field of risk research there is a growing recognition that trust plays an important role in the acceptability and communication of risks (Renn & Levine, 1991;

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<sup>3</sup> Perhaps significantly too, on most of our base measures for the survey (not reported here; see MORI, 2002) the GM Food respondents had much higher rates (generally twice) of ‘don’t know’ or ‘no opinion’ responses compared to the other issues.

Cvetkovich & Löfstedt, 1999) and therefore took a central position in the present study. There were some relative differences in trust in various information sources to tell the truth (see Appendix D). However, the general pattern was similar in the five risk cases.

- On average, consumer and environmental organisations, friends and family, doctors, as well as scientists working for environmental organisations and scientists working for universities were trusted the most in each of the five risk cases<sup>4</sup>.
- The least trusted information sources were the national government and the European Union, together with relevant businesses and industries relevant to each risk issue, as well as scientists working for these industries.

Although there were some major differences in *trust* in various information sources, the differences between them were much smaller when people were asked to indicate how much they agreed that the same organisation or social group *should be involved in making decisions* about the five risk cases. In particular, people's responses to this question were well above the scale midpoint for all groups of people and organisations (the only exception being Genetic Testing, where people felt strongly that insurance companies should not be involved in making decisions). Although most people agreed that the general public should be involved in making policy decisions about the risks, people were less keen to be personally consulted in such decisions.

People were also asked to evaluate governmental policy on each of the five risk cases. One of the specific theoretical hypotheses we wished to explore with the data was the dimensionality of trust judgements. Previous research had highlighted *competence* and *care for the public interest* (Johnson, 1999; Metlay, 1999) as independent dimensions of trust. The questionnaire items in the current study had included a range of measures of these constructs, based upon previous research and in particular those used in Metlay's study of trust in the US Department of Energy. Interestingly, in the current study there were only minor differences in evaluation of the government between the five risk cases. This suggests that people evaluated *government policy as a whole*, rather than specific governmental policy or decisions on each of the five risk cases. Factor analysis revealed government could be described by two underlying and independent dimensions, namely a *general trust* dimension (incorporating *both* competence and care items) and a *scepticism* dimension (see Appendix E). The second dimension found here reflects a new construct, comprising a sceptical view on how risk policies are brought about, that had previously only been identified directly in qualitative studies of risk and trust in institutions (e.g. Irwin, Dale & Smith, 1996). This comprised scales measuring views that the 'government distorts facts in its favour', 'changes policies without good reasons', and is 'thought to be too influenced by industry'. The questionnaire also contained items designed to measure value similarity, or 'social trust' as described in the model of Earl and Cvetkovich (1995; also Cvetkovich *et al*, 2000; Siegrist *et al*, 2000).

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<sup>4</sup> In previous work on public perceptions of the 2001 UK foot and mouth epidemic we have characterised such organisations as 'watchdogs' (Poortinga, et al, in press).

Overall the results (Appendix E) also show that:

- General trust in government was low (and well below the scale mid-point). As a part of this people felt that the government was not responsive to what ordinary people thought, or provided enough information about risks to the public.
- By contrast, scepticism in government handling of the risk cases was relatively high (above the scale mid-point).
- Respondents also indicated they had relatively low social trust (effectively a dissimilarity of social values) in government policy towards the risks.

Confidence in risk regulation was low across the five cases (see Appendix E). Although more people felt that current rules and regulations in the UK are sufficient to control Genetic Testing than to control Climate Change and GM Food, the differences between the risk cases were small. Low confidence in current risk regulation probably contributed to the finding that people felt that there is need for organisations that are separate from government and industry to regulate the five risks.

A major paper presenting the results of these findings on trust has been accepted by *Risk Analysis* (Poortinga and Pidgeon, 2003b). The two trust components that were found in this study show that both general trust and scepticism are significant predictors of trust in risk regulation, and that the models proposed by Metlay (1999) and Johnson (1999) may require some conceptual revision (also Johnson, 2003). However, the fact that general trust and scepticism can coexist with different degrees, raises interesting theoretical questions and new directions for future trust research, but also for risk policy risk policy. Based on these two independent components, a typology of trust can be proposed that ranges from full trust to a deep type of distrust (see Appendix F). The situation in which someone has high general trust in, and is not sceptical about, a certain institution can be said to be one of *trust*. That is, one is likely to accept decisions and communications from this particular organisation. However, a high degree of general trust can also coexist with a relatively high level of scepticism. This situation could best be described as *critical trust*. Critical trust can be conceptualised as a practical form of reliance on a person or institution combined with some healthy scepticism (see also Pidgeon, Walls, Weyman and Horlick-Jones, 2003). One may be willing to rely on information, but one is still somewhat sceptical, and thus may still (constructively) question the correctness of the received information. The situation in which general trust is low, combined with low scepticism is labelled *distrust*. Although distrust would not be a preferred situation, it could be contrasted to a more deep type of distrust: *cynicism*, or a situation in which one not only has no trust in a specific institution, but one is also sceptical about their intentions. In the latter situation one is likely to simply reject everything that comes from a particular organisation. In policy terms it may be the case that decision makers (cf House of Lords, 2000) sometimes confuse 'critical trust' with outright 'distrust' or even rejection. Of course these are not the same thing. Nor do they necessarily demand similar policy responses. For example, instead of focusing on how to increase trust in risk management organisations, it could be more

fruitful to give attention to the interaction between institutional structures, agency behaviour, and qualitative properties of perceptions of trust. That is, what kind of relationship between people and risk management institutions is achievable and desirable? For a functioning society it could well be more suitable to have critical but involved citizens in many situations.

#### **4.4. Science in Society**

Considering that many risks involve or emerge from scientific developments, a section of the survey was focussed on beliefs about scientists and science. Perhaps surprisingly, given the detailed risk-specific and governance findings highlighted above, people overall held positive views on the role of science in society (see Appendix G). In particular.

- Respondents felt that science makes a good contribution to society, replicating similar findings from the OST/Wellcome (1999) survey of public attitudes to science and technology.
- However, a more important finding, not fully reflected in the OST/Wellcome results of 1999 was that people also felt strongly that the funding of science is becoming too commercialised, and that as a result the independence of scientists is increasingly being put at risk. Moreover, people expressed support for more public control over science.

There were no major differences in trust in scientists across the five risk cases (see Appendix D). This suggests that trust in “scientists” is mainly determined by a judgement about the organisation they are working for, possibly based upon knowledge of its agenda, roles and past history. Confirming other research, people trusted scientists working for universities and scientist working for environmental organisations most. People tended to trust scientists working for industry least. On average, people neither trusted nor distrusted scientists working for the government.

### **5. Activities**

The preliminary results of the survey were launched at a meeting at Westminster attended by over 40 peers, MPs and other UK government representatives in January 2003, organised in collaboration with the Parliamentary Office of Science and Technology and the British Psychological Society. Academic papers based on the data generated by this project have been, or will be, presented during 2002/3, as follows:

Society for Risk Analysis, Annual Meeting, New Orleans, December 2002.

ESRC Science in Society Programme / Prospect Magazine, ‘Science and the Economy Who is Paying?’ debate, London, March 2003.

Royal Society for Arts, Manufactures and Commerce, ‘Do New Risks Need New Thinking?’ seminar, April 2003.

Parliamentary Office of Science and Technology, ‘Science and Society Three Years On’ seminar, Westminster, May 2003.

Society for Risk Analysis, World Congress on Risk, Brussels, July 2003.

International Trust and Risk Management Conference, University of Zurich, September 2003.  
ESRC Science in Society Programme, Annual Meeting, November 2003.  
Society for Risk Analysis, Annual Meeting, Baltimore, December 2003.

This report gives an overview of the main findings of the study. Three written outputs have been completed at the time of writing.

Poortinga, W., & Pidgeon, N.F. (2003a). *Public perceptions of risk, science and governance. Main findings of a British survey on five risk cases*. Technical Report. Centre for Environmental Risk, School of Environmental Sciences. University of East Anglia.

Poortinga, W., & Pidgeon, N.F. (2003b). Exploring the dimensionality of trust in risk regulation. *Risk Analysis*, 23(5), 961-972.

Pidgeon, N.F., Poortinga, W. and Walls, J. (2003) Critical trust: reliance and scepticism in risk managing institutions. Prepared for Zurich Trust and Risk Management Conference, 17-20<sup>th</sup> September.

Further papers are due for completion in 2003 are as follows, and others will flow as our analysis of this considerable data set deepens.

Pidgeon, N.F. and Poortinga, W. (in preparation) Responses to risks of four attitudinal groups. For submission to *Risk Analysis*.

Pidgeon, N.F. and Poortinga, W. (in preparation) Risk perception, trust and the commercialisation of science. For submission to *Public Understanding of Science*.

## **6. Interest**

The study has already attracted considerable interest from the wider policy community. Alongside the Westminster meeting, presentations and seminars on aspects of the findings have, to date, been given to business (Mobile Telecommunications Industry Forum, British Petroleum Chief Scientist briefings), the general public (Inspire Science Café workshop) and government departments (Food Standards Agency Board briefing, Cabinet Office Better Regulation Unit seminar). The report of the preliminary results (Poortinga & Pidgeon, 2003a) has been distributed widely in both electronic (via the Centre website) and paper form to individuals in academia, government, the NGO community and business.

## **7. Future Research Priorities**

The present survey was funded by a 'small grant' in the round one of the ESRC Science in Society Programme. One objective of this small grant scheme was to

build capacity for future larger projects. We take it as a mark of success of the initial survey that a follow-up national survey, once more jointly funded by ESRC/Leverhulme Trust, is currently being used as one part of our evaluation of "GM Nation? The Public Debate"<sup>5</sup>. Our 2002 data provides a suitable GB baseline with which to examine possible shifts in lay sensibilities, awareness and knowledge of risk issues in relation to GM food/crops. The new survey will collect data on attitudes to GM Food and its regulation during July/August 2003, comparing these with the findings obtained from the present survey in 2002. Given the high public profile of GM Nation we expect this new comparative exercise to have significant policy interest at the very highest levels.

Several international collaborations have been established. First, with University of Kuopio (Finland), who are replicating our complete survey for several of the risk cases during 2003 (output will be a joint paper submitted to a special issue of *Risk Analysis* on cross-cultural comparisons and risk perception in 2005). Also with Decision Research, Oregon, who have conducted a parallel study on images of climate change (output will be joint papers to an International Workshop on Dangerous Climate Change funded by the Tyndall Climate Change Centre, July 2004).

As noted above the survey data reported here will be utilised in a triangulation exercise with a major qualitative data set collected with Leverhulme support on the five risk issues.

## 8. References

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Fischhoff, B. (1995) Risk perception and communication unplugged: twenty years of process. *Risk Analysis*, 15(2), 137-145.

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<sup>5</sup> GM Nation is a UK wide dialogue process, organised during 2003 to involve the public in the important decision of whether or not GM foods and crops should be grown commercially in Britain, a unique experiment in the governance of technological innovation and risk (see [www.gmnation.org.uk](http://www.gmnation.org.uk)). The Leverhulme Understanding Risk programme team were appointed as official independent evaluators of this dialogue at the end of 2002.

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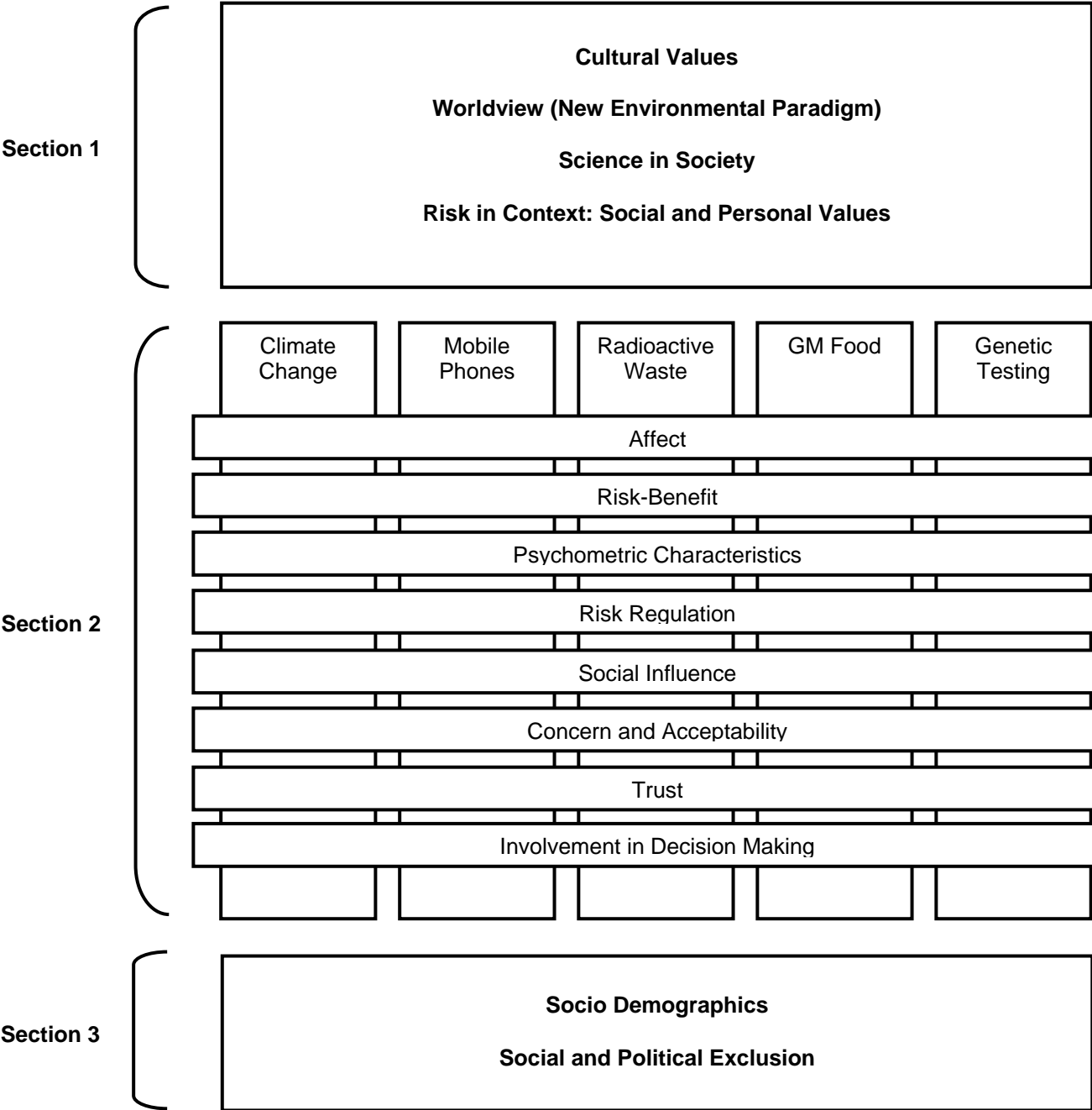
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**Appendix A Schematic layout of the questionnaire**



**Appendix B. Risk in Context: The importance of various personal (P) and social (S) issues (%)**

	1	2	3	4	5	Mean	SD
Your health (P)	0.2	0.3	1.9	10.3	86.4	4.84	0.47
Partner and family (P)	0.5	0.6	3.7	9.8	85.1	4.79	0.58
Law and order (S)	0.3	0.5	3.9	18.9	76.2	4.71	0.59
Personal safety (P)	0.1	0.2	4.4	20.5	74.6	4.70	0.57
Education (S)	0.8	1.3	5.2	16.1	75.6	4.66	0.71
Being independent (P)	0.4	0.4	5.7	23.1	69.4	4.62	0.65
Your privacy (P)	0.4	0.7	7.6	23.5	67.7	4.58	0.69
Having a comfortable life (P)	0.4	0.7	7.1	31.1	59.6	4.50	0.70
Personal finance (P)	0.5	1.0	8.1	33.1	57.0	4.46	0.73
Social relations/Friends (P)	0.4	0.6	7.5	37.5	53.5	4.44	0.70
Environmental protection (S)	0.8	1.1	9.5	31.5	56.4	4.43	0.77
Terrorism (S)	1.3	2.2	11.3	24.2	60.1	4.41	0.87
<b>RADIOACTIVE WASTE</b>	1.6	4.9	16.7	22.5	53.6	4.22	1.00
The economy (S)	1.9	2.8	14.4	33.6	46.0	4.21	0.92
Animal welfare (S)	2.5	3.5	16.7	30.2	46.2	4.15	0.99
Excitement/Fun (P)	1.5	3.5	18.2	35.1	40.4	4.11	0.93
World poverty (S)	2.5	3.9	18.6	34.6	39.8	4.06	0.98
Tackling human rights (S)	2.2	3.6	19.3	37.4	36.1	4.03	0.95
Work (P)	7.7	3.0	14.2	31.4	41.8	3.99	1.18
<b>CLIMATE CHANGE</b>	4.4	6.2	21.2	35.5	30.8	3.84	1.08
Population growth (S)	3.7	5.5	31.9	31.8	25.5	3.71	1.03
<b>GENETIC TESTING</b>	5.6	9.2	27.5	27.2	26.6	3.62	1.15
<b>RADIATION FROM MOBILE PHONES</b>	9.1	7.5	36.4	24.5	19.4	3.39	1.17
<b>GM FOOD</b>	10.1	12.2	33.4	20.3	20.3	3.29	1.23
Religion (P)	18.3	11.0	32.9	20.1	17.4	3.07	1.32

Source: UEA/MORI Risk Survey 2002; Person Weighed Data Set (N= 1547) for social and personal values (entries in lower case); sample sizes for the individual risk cases (entries in upper case) were: climate change (321), radiation from mobile phones (319), radioactive waste (306), GM food (296), and genetic testing (305). The scale ranged from 1="Not at all important", to 5="Very important"; Percentages sum to 100 when the category "Don't know" is included; SD=Standard Deviation.

### Appendix C. Public perceptions of the five risk cases

	Climate Change	Mobile Phones	Rad. Waste	GM Food	Genetic Testing	<i>p</i>
General evaluation <sup>a</sup>	2.29 (0.97)	2.14 (0.88)	1.80 (0.98)	2.52 (1.03)	3.55 (1.11)	
Concern <sup>b</sup>	3.73a (1.14)	3.14a (1.26)	3.92b (1.10)	3.14a (1.31)	3.41a (1.27)	<.001
Acceptability <sup>c</sup>	2.53b (1.11)	2.57b (1.07)	2.23a (1.07)	2.64b (1.17)	3.38c (1.15)	<.001
Combined Benefits <sup>d</sup>	3.43b (1.63)	4.51c (1.65)	2.27a (1.58)	3.19b (1.44)	4.46c (1.52)	<.001
Combined Risks <sup>d</sup>	4.94c (1.38)	4.03a (1.36)	5.27c (1.54)	4.42b (1.45)	4.12ab (1.32)	<.001

Source: UEA/MORI Risk Survey 2002. a) The response categories varied from 1: "very bad thing", to 5: "very good thing; b) The scale ranged from 1="Not at all concerned" to 5: "Very concerned"; c) The response categories were 1="Very unacceptable", 2="Fairly unacceptable", 3="Neither acceptable nor unacceptable", 4="Fairly acceptable", 5="Very acceptable"; d) The scale ranged from 1: "Not at all" to 7: "Very high", and 4: "Some" as the middle; Standard deviations are given in brackets. Means with different subscripts are significantly different from each other.

#### Appendix D. Trust in sources to tell the truth

	Climate Change	Mobile Phones	Rad. Waste	GM Food	Genetic Testing	p
Consumer rights organisations	3.67a (0.94)	3.91b (0.94)	3.80ab (0.96)	3.81ab (1.01)	3.87ab (1.00)	<.05
Friends and family	4.12bc (0.86)	3.75a (0.96)	3.96ab (1.03)	3.93ab (0.94)	4.23c (0.87)	<.001
Environmental organisations	4.03ab (0.88)	3.84ab (0.87)	4.01ab (0.95)	3.83a (0.98)	4.06b (0.87)	<.01
Scientists working for Government	3.06 (1.12)	3.17 (1.09)	3.19 (1.17)	2.99 (1.15)	3.24 (1.34)	n.s.
Local authorities	3.10ab (1.02)	3.08ab (0.94)	3.30b (1.06)	2.90a (1.02)	3.12ab (1.12)	<.001
People from your local community	3.44ab (0.90)	3.42a (0.84)	3.67c (0.89)	3.40a (0.85)	3.63bc (0.92)	<.001
Scientists working for industry	2.73 (1.21)	2.75 (1.12)	2.86 (1.26)	2.89 (1.17)	2.98 (1.24)	n.s.
The national government	2.66a (1.20)	2.87ab (1.12)	2.83ab (1.20)	2.74a (1.20)	3.09b (1.36)	<.001
The European Union (EU)	2.78a (1.17)	2.98ab (1.09)	2.91ab (1.19)	2.82ab (1.23)	3.07b (1.30)	<.05
Scientists working for environmental groups	3.82 (1.04)	3.78 (0.86)	3.85 (1.04)	3.73 (0.95)	3.97 (0.90)	n.s.
Scientists working for Universities	3.87a (0.97)	3.92ab (0.86)	3.86a (0.95)	3.83a (0.84)	4.11b (0.85)	<.01
Doctors	3.97a (0.98)	4.12ab (0.82)	4.07ab (0.87)	3.95a (0.91)	4.23b (0.91)	<.01
Car companies	2.39 (1.13)					
Oil companies	2.34 (1.13)					
Mobile Phone manufacturers		2.39 (1.12)				
Network companies		2.43 (1.12)				
Ministry of defence			3.03 (1.20)			
Nuclear industry			2.69 (1.24)			
Food manufacturers				2.62 (1.18)		
Biotechnology industry				2.83 (1.16)		
Pharmaceutical industry					3.01 (1.24)	
Insurance companies					2.43 (1.21)	

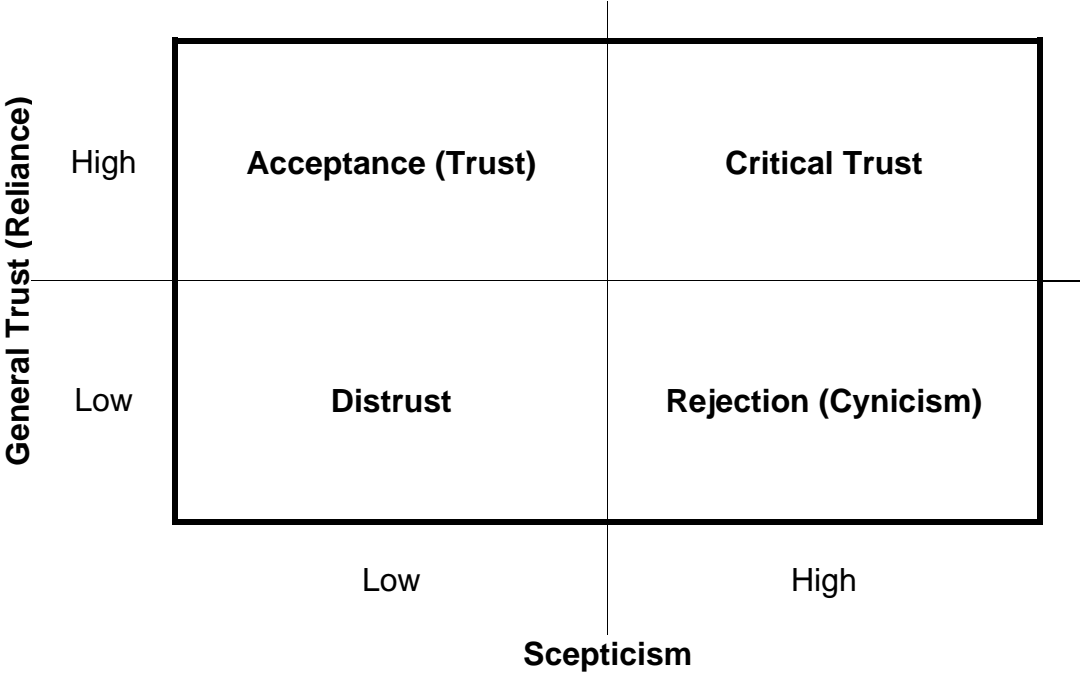
Source: UEA/MORI Risk Survey 2002. The scale ranged from 1: "distrust a lot" to 5: "trust a lot"; Standard deviations are given in brackets. Means with different subscripts are significantly different from each other.

## Appendix E. Evaluation of Government and trust in risk regulation

	Climate Change	Mobile Phones	Rad. Waste	GM Food	Genetic Testing	<i>p</i>
<b>Evaluation of Government</b>						
General Trust	2.53 (.73)	2.60 (.70)	2.60 (.69)	2.47 (.85)	2.62 (.86)	n.s.
Scepticism	3.66 (.72)	3.49 (.73)	3.56 (.74)	3.65 (.79)	3.50 (.84)	<.05
Value Similarity	2.42ab (.85)	2.56b (.79)	2.47ab (.79)	2.27a (.93)	2.45ab (.93)	<.05
<b>Trust in risk regulation</b>						
I feel that current rules and regulations in the UK are sufficient to control	2.59a (1.08)	2.79ab (0.81)	2.67ab (0.98)	2.61a (1.10)	2.91b (1.09)	<.001
I feel confident that the British government adequately regulates	2.56 (1.10)	2.61 (0.97)	2.74 (1.00)	2.57 (1.04)	2.73 (1.18)	n.s.

Source: UEA/MORI Risk Survey 2002. The scale ranged from 1: "strongly disagree" to 5: "strongly agree"; Standard deviations are given in brackets. Means with different subscripts are significantly different from each other.

Appendix F. A typology of trust



## Appendix G. Statements on Science in Society

	1	2	3	4	5	Mean (SD)
<b>Scientific optimism</b>						
1. On the whole, science will make our lives easier	1.5	6.7	17.6	57.2	14.8	3.79 (0.83)
2. Science makes a good contribution to society	0.6	2.1	14.8	60.6	19.8	3.99 (0.71)
3. Science does more harm than good	10.8	43.0	30.5	10.0	2.3	2.49 (0.91)
4. We put too much trust in science	3.9	24.9	29.1	32.8	6.6	3.14 (1.00)
5. We need science to make further progress in knowledge	0.2	2.7	8.7	57.4	28.4	4.14 (0.70)
6. We need scientists in today's society	0.4	1.4	7.2	49.1	40.3	4.30 (0.70)
<b>Independence</b>						
7. The independence of scientists is often put at risk by the interest of their funders	0.8	4.9	27.0	45.6	14.1	3.73 (0.81)
8. The funding of science is becoming too commercialised	1.4	8.5	29.8	41.4	12.8	3.59 (0.89)
<b>Controllability</b>						
9. Scientists often try new things without thinking about the consequences	3.3	15.7	25.9	37.9	13.5	3.44 (1.03)
10. Science seems to be out of control	8.2	34.1	30.7	19.5	4.4	2.77 (1.01)
11. There is so much conflicting information about science, that it is difficult to know what to believe	1.2	7.0	20.3	51.2	17.7	3.79 (0.86)
<b>Public influence</b>						
12. I would like more influence over the type of scientific research that is done	2.9	15.6	34.2	34.7	9.7	3.34 (0.96)
13. Scientists should listen more to what ordinary people think	1.7	9.5	19.1	49.9	16.8	3.73 (0.92)

Source: UEA/MORI Risk Survey 2002; Person Weighed Data Set (N= 1547); 1="Strongly disagree", 2="Tend to disagree", 3="Neither agree nor disagree", 4="Tend to agree", 5="Strongly agree"; Percentages sum to 100 when the category "Don't know" is included; SD=Standard Deviation.

