



# Trust in Cooperative Risk Management

Uncertainty and Scepticism in the Public Mind

Edited by

Michael Siegrist, Timothy C. Earle & Heinz Gutscher

# Trust in Cooperative Risk Management

## Uncertainty and Scepticism in the Public Mind

*Edited by*

*Michael Siegrist, Timothy C. Earle and Heinz Gutscher*

**EARTHSCAN**

London • Sterling, VA

First published by Earthscan in the UK and USA in 2007

Copyright © Michael Siegrist, Timothy C. Earle and Heinz Gutscher, 2007

**All rights reserved**

ISBN-13: 978-1-84407-424-2

Typeset by MapSet Ltd, Gateshead, UK  
Printed and bound in the UK by TJ International  
Cover design by Yvonne Booth

For a full list of publications please contact:

**Earthscan**

8–12 Camden High Street  
London, NW1 0JH, UK  
Tel: +44 (0)20 7387 8558  
Fax: +44 (0)20 7387 8998  
Email: [earthinfo@earthscan.co.uk](mailto:earthinfo@earthscan.co.uk)  
Web: [www.earthscan.co.uk](http://www.earthscan.co.uk)

22883 Quicksilver Drive, Sterling, VA 20166-2012, USA

Earthscan is an imprint of James and James (Science Publishers) Ltd and publishes in association with the International Institute for Environment and Development

A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data

Trust in cooperative risk management : uncertainty and scepticism in the public mind  
/ edited by Michael Siegrist, Timothy C. Earle and Heinz Gutscher.  
p. cm.

ISBN-13: 978-1-84407-424-2 (hardback)

ISBN-10: 1-84407-424-2 (hardback)

1. Risk management. 2. Trust. I. Siegrist, Michael. II. Earle, Timothy C. III. Gutscher, Heinz.

HD61.T78 2007

658.15'5—dc22

2006100480

The paper used for this book is FSC-certified and totally chlorine-free. FSC (the Forest Stewardship Council) is an international network to promote responsible management of the world's forests.



**Mixed Sources**

Product group from well-managed  
forests and other controlled sources  
[www.fsc.org](http://www.fsc.org) Cert no. SGS-COC-2482  
© 1996 Forest Stewardship Council

# List of Contributors

**Emily Atkinson** Georgia Institute of Technology, US  
**Nicolao Bonini** University of Trento, Italy  
**Ann Bostrom** Georgia Institute of Technology, US  
**George Cvetkovich** Western Washington University, US  
**Peter de Vries** Universiteit van Twente, The Netherlands  
**Timothy C. Earle** Western Washington University, US  
**J. Richard Eiser** University of Sheffield, UK  
**Lynn Frewer** Wageningen University, The Netherlands  
**Michele Graffeo** University of Trento, Italy  
**Heinz Gutscher** University of Zurich, Switzerland  
**Michael A. Hogg** Claremont Graduate University, US  
**Branden B. Johnson** New Jersey Department of Environmental Protection, US  
**Carmen Keller** University of Zurich, Switzerland  
**Luigi Lombardo** University of Trento, Italy  
**Anneloes Meijnders** Eindhoven University of Technology, The Netherlands  
**Cees Midden** Eindhoven University of Technology, The Netherlands  
**Nick Pidgeon** Cardiff University, UK  
**Wouter Poortinga** University of East Anglia, UK  
**Rino Rumiati** University of Trento, Italy  
**Brian Salter** University of East Anglia, UK  
**Lucia Savadori** University of Trento, Italy  
**Michael Siegrist** University of Zurich, Switzerland

**Katya Tentori** University of Trento, Italy

**Eric M. Uslaner** University of Maryland, US

**John Walls** University of East Anglia, UK

**Mathew P. White** University of Plymouth, UK

**Patricia L. Winter** US Forest Service, US

## Preface

Most researchers agree that trust is an important factor in risk management. It affects judgements of risk and benefit, and, directly or indirectly, it affects technology acceptance and other forms of cooperation. There is little agreement among researchers, however, on how trust in risk management should be studied. Progress in this area is dependent upon trust researchers exploring their differences and identifying the common ground that they share. The results of such an exploration would contribute significantly to the development of the tools that risk managers need to communicate information about performance effectively.

In order to facilitate a dialogue among researchers studying trust within the domain of risk management, we organized the Zurich Conference on Trust and Risk Management. This conference stands in the tradition established by the Bellingham International Social Trust conference. Papers presented at prior meetings of the Bellingham International Social Trust group were published in book form in *Social Trust and the Management of Risk* by George Cvetkovich and Ragnar E. Löfstedt (Earthscan, 1999).

Leading researchers in the field of trust and risk management were invited to participate in the Zurich trust meeting. The conference was structured as an active workshop. Each participant was requested to prepare a paper on trust and its implications for risk management, and to distribute the paper to the other participants prior to the meeting. At the workshop, each paper was briefly introduced by a discussant. Open discussion by all participants followed. Upon completion of the workshop, participants revised their papers based on the comments and suggestions they received. This book, which consists of the revised versions of the workshop papers, is one major result of the Zurich meeting.

Chapter 1 by Earle, Siegrist and Gutscher is an introduction to the great variety of trust studies, including those within the field of risk management. The authors describe their dual-mode model of cooperation based on trust and confidence (the TCC model). This model integrates most of the existing literature of trust and trust-related concepts. Earle and colleagues argue that the distinction between trust (based on morality information) and confidence (based on performance information) is crucial to a better understanding of the antecedents of

cooperation. With regard to risk perception, the TCC model shows how trust dominates knowledge of performance. This model has clear consequences for risk communication efforts: without a solid foundation of trust, communicating information indicating good past performance may be of little value.

Chapters 2 and 3 discuss the foundations of trust. Both Hogg and Uslander demonstrate that researchers and practitioners in risk management can benefit from trust research developed in other disciplines. Social identity and the group-related dimension of trust are the key issues discussed in Chapter 2. The author sketches out a social identity analysis of the social psychology of group and inter-group trust and risk management. This chapter provides an important basis for a better understanding of trust. In Chapter 3, Uslander presents data that suggest that a more trusting environment produces less conflict in the firm and between firms. Trust also promotes diversity and better relations among different groups. Trust makes it easier to work in a globalized economy, and countries with greater levels of trust have higher rates of economic growth. Based on a wide variety of trust-related literature and survey evidence, the author elaborates two fundamental types of trust: moralistic trust and strategic trust. The moral dimension is based upon values, while the strategic one depends upon experience. Moralistic trust rests on an optimistic view of the world and one's ability to control it; strategic trust reflects expectations about how people will behave. While moralistic trust is quite stable over time, strategic trust is fragile. The author analyses the influence of these two dimensions on, among other issues, business life, corruption, neighbourhood safety and the legal system.

In Chapter 4, White and Eiser introduce a new approach to understanding trust in the context of risk management by extending a theory of decision-making under conditions of uncertainty (the Signal Detection Theory). It is claimed that members of the public act as intuitive detection theorists when deciding whether to trust a specific source of risk-related information. Support for the approach is provided by the findings of a survey investigating issues of risk perception and trust in relation to the potential effects of mobile phone technology. Chapter 4 provides interesting aspects of the dimensions of trust and proposes new insights into trust processes.

In Chapter 5, Pidgeon, Poortinga and Walls propose a model of critical trust. Critical trust can be conceptualized as a practical form of reliance on a person or institution combined with a degree of scepticism. This concept is based on the assumption that what is frequently called 'trust' or 'distrust' exists along a continuum, ranging from uncritical emotional acceptance to downright rejection. In order to illustrate the conceptual theme, the authors draw upon three separate empirical studies and discuss the implications of their findings for theories of trust, and for risk communication and management practice, more generally.

Frewer and Salter examine the historical context surrounding risk analysis and public trust in Chapter 6, as well as the importance of citizen/consumer trust. The authors discuss whether the functional separation of the different components of risk analysis (that is, risk assessment and risk management) results in distrust. They demonstrate that there is evidence that the continued separation is likely to increase public distrust in risk analysis in the future. Finally, it is argued that a more integrated risk analysis framework may be needed if citizen/consumer confidence in the risk analysis process is to be developed and maintained.

When a food accident occurs, the best way of re-establishing product demand to its original level is to restore consumer trust. How to rebuild consumer trust in the context of a food crisis is the subject of the contribution by Savadori and colleagues in Chapter 7. In a first step, the authors discuss how consumers respond to a food crisis. Next, they empirically examine the relative influence of trust and attitude on consumption intentions in the context of a hypothetical dioxin food scare. Results show that shared values were the best predictors of consumption in the event of a scare – even more important than having positive attitudes.

Universal vaccination is widely considered to be one of the top public health successes of the last century. Some observers, however, fear that the public is becoming increasingly averse to the risks of vaccine. Recent focus on smallpox as a potential weapon for bioterrorism has increased the importance of understanding how people think about vaccination. Chapter 8 by Bostrom and Atkinson analyses the role of trust and risk perception in smallpox vaccination. In an empirical study, the authors examine trust in sources of information about smallpox vaccine or disease, behavioural intentions, and mental models of both smallpox disease and vaccination. The results support recent findings on the importance for trust of prior attitudes, as well as the importance of trust when knowledge is lacking, and the tendency of those who respect expertise to trust experts more.

In Chapter 9, Cvetkovich and Winter examined people's perceptions of the cooperative risk management of US national forests. The authors offer some substantiated suggestions on how to overcome a recognized lack of consensus on definitions of key concepts regarding social reliance and trust. After having defined the key terms, the authors discuss the nature of trust and its underlying social psychological processes. Finally, the circumstances determining the importance of trust to judgements about cooperative risk management are identified.

Risk analysts have increasingly focused on sources of trust in institutional risk management because trust seems critical to how people perceive hazards, and risk managers want their messages about risk magnitudes and risk management actions to be credible. The contribution by Johnson in Chapter 10 illustrates some conceptual and methodological issues on sources of trust with data from a survey of local officials on wetland management. These data provoke questions, worth more



systematic investigation, about the role of 'familiarity' and various trust-target attributes in trust judgements, and about how these attributes might vary across types of judges and trust targets.

Trust plays an important role, not only in interactions with other persons, but also in relations with computer-based systems. Confidence is the subject of Chapter 11 by de Vries, Midden and Meijnders. When interacting with systems, such as decision aids, people may have similar experiences, as when interacting with human counterparts. Users, too, may lack information concerning a system's behaviour and the outcomes that it provides. As with interpersonal trust, the authors point out, meaningful interaction requires sufficient levels of trust to enable reductions of uncertainty regarding a particular system and its capabilities. Two experiments examining the effects of recommendations and process feedback are described, with results showing that system trust does not necessarily rely on objectified information, or solely on past behaviour, but may also be based on simple cues and, possibly, on inferred agency, intentions or values, analogous to trust in a social context.

Chapter 12 by Siegrist, Gutscher and Keller describes three case studies focused on trust and confidence in crisis communication. In a crisis, the authors argue, most people do not have the knowledge they need to make informed decisions. People need trust in order to reduce the complexity they are faced with. The disposal of an oil platform, a food crisis in Europe, and the successful handling of a listeriosis crisis in the US are described and analysed within the TCC framework introduced in Chapter 1. The TCC model can be used to explain why some crisis management strategies fail and others succeed.

*Michael Siegrist, University of Zurich*

*Heinz Gutscher, University of Zurich*

*Timothy C. Earle, Western Washington University, US*

*October 2006*

## Acknowledgements

The Zurich Conference on Trust and Risk Management and this book would not have been possible without the financial support and intellectual input of many. The meeting was hosted by the Swiss Re Centre for Global Dialogue, Rüschlikon, Switzerland. We thank Fritz Gutbrodt and his team for making the meeting an unforgettable experience for all participants. The Swiss National Science Foundation (10CO11-101545) and the University of Zurich provided further financial resources for organizing the conference. Hans Kastenholtz provided important editorial guidance for the entire book. The following people participated in the conference and provided valuable contributions towards the improvement of the chapters in this book: Ann Bostrom; Wernher Brucks; George Cvetkovich; J. Richard Eiser; Lynn Frewer; Hans Geiger; Michael A. Hogg; Branden B. Johnson; Roger E. Kasperson; Carmen Keller; Cees Midden; Robert O'Connor; Nick Pidgeon; Wouter Poortinga; Lucia Savadori; Eric Uslaner; and Mathew P. White.

# List of Acronyms and Abbreviations

AMA	American Medical Association
ANES	American National Election Studies
ANOVA	analysis of variance
BPEO	best practicable environmental option
BSE	bovine spongiform encephalopathy
CDC	Centers for Disease Control and Prevention
CEO	chief executive officer
CFA	confirmatory factor analyses
CO <sub>2</sub>	carbon dioxide
COO	chief operating officer
COS	carbonyl sulphide
DEFRA	UK Department for Environment, Food and Rural Affairs
DEP	Department of Environmental Protection
DOE	US Department of Energy
EC	environmental commission
EFSA	European Food Safety Authority
EL	elected
EMF	electromagnetic field
EPA	US Environmental Protection Agency
ESRC	Economic and Social Research Council
EU	European Union
FAO	UN Food and Agriculture Organization
FDA	US Food and Drug Administration
FSA	UK Food Standards Agency
GM	genetically modified
GT	general trust
HSE	UK Health and Safety Executive
HSM	heuristic systematic model
ICPSR	Inter-University Consortium for Political and Social Research
IDT	intuitive detection theorist
IEGMP	Independent Expert Group on Mobile Phones (UK)
IOM	Institute of Medicine

kg	kilogram
MORI	Market and Opinion Research International
MSI	mass sociogenic illness
MSI	Medical School Inspection
n	total population sample size
NJDEP	New Jersey Department of Environmental Protection
NRC	Nuclear Regulatory Commission
NZZ	<i>Neue Zürcher Zeitung</i>
PB	planning board
PCA	principal components analysis
PCB	polychlorinated biphenyl
SARF	Social Amplification of Risk Framework
SBMWA	Stony Brook–Millstone Watershed Association
SD	standard deviation
SDT	signal detection theorist/theory
STAR	Science to Achieve Results programme
SVS	salient values similarity
TCC	trust, confidence and cooperation
UEA	University of East Anglia
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
US	United States
USDA	US Department of Agriculture
VIS	vaccine information statement
WHO	World Health Organization
Y2K	year 2000
ZB	zoning board

# Contents

<i>List of Figures and Tables</i>	<i>vii</i>
<i>List of Contributors</i>	<i>ix</i>
<i>Preface</i>	<i>xi</i>
<i>Acknowledgements</i>	<i>xv</i>
<i>List of Acronyms and Abbreviations</i>	<i>xvii</i>
<b>1 Trust, Risk Perception and the TCC Model of Cooperation</b>	<b>1</b>
<i>Timothy C. Earle, Michael Siegrist and Heinz Gutscher</i>	
<b>2 Social Identity and the Group Context of Trust: Managing Risk and Building Trust through Belonging</b>	<b>51</b>
<i>Michael A. Hogg</i>	
<b>3 Trust and Risk: Implications for Management</b>	<b>73</b>
<i>Eric M. Uslaner</i>	
<b>4 A Social Judgement Analysis of Trust: People as Intuitive Detection Theorists</b>	<b>95</b>
<i>Mathew P. White and J. Richard Eiser</i>	
<b>5 Scepticism, Reliance and Risk Managing Institutions: 'Towards a Conceptual Model of 'Critical Trust'</b>	<b>117</b>
<i>Nick Pidgeon, Wouter Poortinga and John Walls</i>	
<b>6 Societal Trust in Risk Analysis: Implications for the Interface of Risk Assessment and Risk Management</b>	<b>143</b>
<i>Lynn Frewer and Brian Salter</i>	
<b>7 Rebuilding Consumer Trust in the Context of a Food Crisis</b>	<b>159</b>
<i>Lucia Savadori, Michele Graffeo, Nicolao Bonini, Luigi Lombardi, Katya Tentori and Rino Rumiati</i>	

8	<b>Trust and Risk in Smallpox Vaccination</b> <i>Ann Bostrom and Emily Atkinson</i>	173
9	<b>The What, How and When of Social Reliance and Cooperative Risk Management</b> <i>George Cvetkovich and Patricia L. Winter</i>	187
10	<b>Getting Out of the Swamp: Towards Understanding Sources of Local Officials' Trust in Wetlands Management</b> <i>Branden B. Johnson</i>	211
11	<b>Antecedents of System Trust: Cues and Process Feedback</b> <i>Peter de Vries, Cees Midden and Anneloes Meijnders</i>	241
12	<b>Trust and Confidence in Crisis Communication: Three Case Studies</b> <i>Michael Siegrist, Heinz Gutscher and Carmen Keller</i>	267

# List of Figures and Tables

## FIGURES

1.1	The trust, confidence and cooperation (TCC) model	8
1.2	Model of the relationship between risk perception and trust	27
4.1	The aggregate relationship between trust and perceived discrimination ability	107
4.2	The aggregate relationship between trust and perceived response bias	108
4.3	Trust as a function of source type and perceived risk of mobile phones	110
5.1	Critical trust	128
5.2	Trust in various information sources and agreement about involvement in decision-making about genetically modified (GM) food	135
7.1	Final path model (salmon) with standardized regression weights	166
7.2	Final path model (chicken) with standardized regression weights	167
8.1	Beliefs regarding the likelihood of side effects from smallpox vaccination in the Blendon et al (2003) study compared to this study	177
8.2	Search for information about smallpox, and beliefs regarding the incidence of smallpox in the US and in the world during the past five years	178
8.3	Hypothetical vaccination decisions before and immediately after mental models questions	181
9.1	Model of salient value similarities, trust and evaluations	194
11.1	Route planner interface	253
11.2	Effects of consensus and process feedback in before and after interaction measurements	254
11.3	Effects of consensus and process feedback on staked credits	255
11.4	Effects of consensus and process feedback in before and after interaction measurements	258

11.5	Effects of consensus and process feedback on staked credits	260
12.1	The core parts of the dual-mode model of trust and confidence	269

## TABLES

1.1	Empirical studies of the relation between risk perception and trust	36
3.1	Dimensions of trust	76
4.1	The four possible outcomes of a simple binary detection task	99
4.2	Perceived discrimination ability, response bias and trust in various sources	105
5.1	Average trust ratings of focus group participants	124
5.2	Items and factor loadings after varimax rotation	129
5.3	'To what extent do you trust the following organizations and people to tell the truth about GM food?'	131
5.4	Factor loadings after varimax rotation	132
5.5	'How much do you agree or disagree that the following should be involved in making decisions about genetically modified food?'	133
8.1	Beliefs about the effectiveness of smallpox vaccine	177
8.2	Hypothetical questions to those in favour of vaccination	182
8.3	Hypothetical questions to those against vaccination	183
9.1	Characteristics of implicit and explicit modes of information processing	189
9.2	Four identified patterns of trust	196
9.3	Regression analyses of evaluations (effectiveness and approval) of management practices for total samples, states and genders	196
10.1	Trust criteria ratings of importance	223
10.2	Principal axis factoring	227
10.3	Multiple regression analyses of trust judgements on criteria and knowledge variables (betas)	230



# 1 Trust, Risk Perception and the TCC Model of Cooperation<sup>1</sup>

*Timothy C. Earle, Michael Siegrist and Heinz Gutscher*

Within the broad field of environmental and technological risk management, one of the first researchers to examine the nature of trust and the significance of the relation between trust and risk perception was the founder of risk perception research, Paul Slovic. Drawing on work by others (for example, Bella et al, 1988; Pijawka and Mushkatel, 1991/1992; Renn and Levine, 1991; Kasperson et al, 1992) and by himself and his collaborators (Slovic et al, 1991; Flynn et al, 1992), Slovic pointed out that high public concern about a risk issue (for example, nuclear power) is associated with distrust of the managers responsible for that issue; low public concern (as in the case, for example, of medical uses of radiation) is associated with trust in risk managers (Slovic, 1993). In general, trust in risk management is negatively related to risk perception. This is an important observation because it opens a possible pathway to affecting public risk perception and improving risk management: if we understood trust, and if we could affect levels of trust, then we might also be able to affect levels of risk perception and, ultimately, risk acceptance/rejection.

Developing some means of affecting public risk perception and risk acceptance – means that would be compatible with our participatory form of democracy – became important to risk managers when early risk perception research showed that public thinking about risks differed from, and was often unaffected by, assessments of risk by technical experts (Slovic, 2000). The field of risk communication research was developed during the 1980s to devise ways of bridging the public–expert risk judgement gap. In the 1990s, Slovic argued that risk communication had not yet lived up to its promise (Slovic, 1993). The primary reason cited by Slovic for this failure was lack of attention to the key role of trust in risk communication. Given a context of trust, he observed, risk communication seemed easy. But, lacking trust, risk communication seemed impossible. Slovic concluded that ‘trust is more fundamental to conflict resolution than is risk communication’ (Slovic, 1993, p677). Today, more than a decade later,