Society for Risk Analysis – Europe

UK chapter reactivated: The Future of Risk Analysis

Book of Abstracts

Keynote

Professor Nicholas Pidgeon

Nick is a social scientist who holds a Chair in environmental psychology and risk at Cardiff University. In his early career he investigated the human and organisational causes of large-scale accidents using Disaster Incubation Theory. Latterly he has worked on the human dimensions to and public engagement with science communication of climate change and new energy technology risks - both their causes and public responses. A Fellow of SRA since 2013 he is also currently a member of the UK Department for Transport Science Advisory Council. He was awarded an MBE in 2014 for services to climate change and energy security awareness and became a Fellow of the British Academy in 2023.

Engaging Citizens with 21st Century Risks

21st century risks - climate change, emerging technologies such as AI or synthetic biology, infectious diseases - present society with novel uncertainties and risks which can at times defeat our traditional expert-led forms of science-policy decision-making. Alongside this there have been calls for many years to include citizen voices in deliberating fundamental issues of science, environment and risk. This presentation explores how risk research and risk researchers can approach engagement as a mode of citizen-shaped risk governance - with its varied philosophies, methods and pitfalls. Using case studies the talk illustrates some of the methodological parameters and issues in designing such activities.

Roundtable

The Future of Risk Analysis

Compared to twenty years ago, there seems to be less risk research being funded in Europe today. A reason might be the lack of replacement of retired senior risk professors with new talents. As a result, countries that had been at the forefront of risk research such as Sweden and to a certain extent the Netherlands had arguably lost their competitive edge. At the same time, there is a concern that several regulations coming out of Europe are not rooted in risk science. Is there a future for risk analysis in Europe? Is risk research in decline, or could it be that risk science is hidden in other types of research? In this round table, panellists will discuss their concerns about whether risk analysis has a future in Europe or not, by covering a wide range of risks and disciplines across Europe and internationally.

Chair: Ragnar Löfstedt, King's College London

Panel members:

Nick Pidgeon, University of Cardiff

Katherine McComas, Cornell University

Frederic Bouder, University of Stavanger

Sarah Duckett, King's College London

Sessions

Climate risks and the public

What should a well-adapted England look like? Findings from a Sciencewise public dialogue on climate risks and adaptation

Rachel Harcourt[1], Suraje Dessai[1], Andrea Taylor[1], Rachel Brisley[2], Ioanna Fotiadis[2], Chloe Juliette[2], Michelle Mackie[2], Kate Mesher[2], Sophie Pizzol[2]

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Abstract

The UK is already experiencing a warming climate and periods of extreme weather, such as heavy flooding and heatwaves. While there has been some public debate on ways to slow and stop climate change, such as the 2020 UK Climate Assembly, there has so far been much less discussion regarding climate change risks and adaptation. Nevertheless, understanding public perceptions of adaptation is important to deliver evidence-based policy and practice which is well aligned with public preferences and therefore more likely to be supported. In early 2022, Defra and Sciencewise commissioned the first public dialogue on climate change risks, impacts and adaptation in the UK which was subsequently delivered by Ipsos and the University of Leeds. 112 participants from four regions, Inner London, Greater Manchester, Hull and the East Riding, and Dartmoor and Exmoor, took part in eighteen hours of guided deliberation. The workshops included expert videos, expert question and answer sessions, group tasks and small-group discussions.

The participants were shocked at the range, seriousness and immediacy of climate risks to the UK. They expressed anger at not being better informed and strongly felt that this information should be made more widely available. Participants thought that those most at risk, either due to personal circumstances or exposure to climate hazards, should be most protected, followed by basic human needs in terms of food supplies, health, transport and utilities infrastructure. They felt the UK was not yet well prepared for a changing climate and wanted to see much greater action. They developed a positive vision of the future in which England is adaptable and well-prepared, where everyone is well-informed, and where net zero and adaptation measures are carried out in tandem and given equal importance. This research provides a uniquely detailed and nuanced insight into public perceptions of climate risks and impacts, as well as adaptation. One of the most significant outputs of this research is that it provides a strong social mandate for accelerated and more ambitious adaptive action in England. That this was a common theme across all regional cohorts suggests it might also be the case for the other three UK nations. However, this research also reveals the extent to which people don't see adaptation as just risk management but rather as a much broader question of social equity and justice.

Predictors of climate anxiety and climate policy support in a British public

Nick Smith

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Abstract

The current study investigates the existence of climate anxiety amongst a British public. Given the threat presented to human wellbeing from a changing climate, this study adds to a growing research body that seeks to understand and improve efforts to help deal with the mental health challenge climate change is increasingly presenting the public. Using an online sample, 913 participants were asked to complete various survey measures including climate anxiety, storm fear, existential thinking, compassion, worldviews, risk perceptions, policy support and various demographics. Participants were also asked to provide top of the mind image associations with climate change. Results revealed that although prevalence of climate anxiety is low, the strongest predictors of this construct included age, storm fear, risk perception and existential thinking with younger participants, those who are fearful of severe weather, those who perceive climate change as a serious threat and those who engage in existential thinking behaviours reporting higher levels of climate anxiety. Additionally, 'alarm' based image associations were the most frequent top of the mind thoughts participants associated with climate change with phrases including 'destruction of our planet', 'emergency' and 'existential climate disaster' being provided. Climate anxiety was also a strong predictor in a regression analysis of climate policy support alongside risk perception and worldviews. Results will be discussed in relation to similar studies investigating climate anxiety and implications and directions for future research will be provided for addressing this growing problem amongst the population.

Organisational perceptions of adapting to a changing climate

Denyse S. Dookie[1], Declan Conway[1], Suraje Dessai[2], Evan Oliner[3]

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Abstract

Organisations, in the private, public and third sectors, are critical stakeholders and actors in the governance of climate change adaptation. Understanding organisational perceptions of preparedness, risk and response to climate change is important for effective climate adaptation-focused actions and policy design. Our study focuses on two research questions: what factors influence adaptation actions by organisations, and what do organisations mean by the term 'adaptation'? To address these, we developed and analysed a national survey of UK-based organisations' (n = 2,429) perceptions of adapting to a changing climate, administered in spring 2021. Our findings confirm that awareness matters: respondents who reported that their organisation had high levels of concern about climate change risk or threat, and which had greater integration of adaptation within processes, are more likely to take adaptation action. In addition, we find a positive relationship between the occurrence and type of extreme event experienced and increased adaptation action by organisations. However, when asked about specific adaptation measures taken by organisations, examples of mitigation are more frequently mentioned compared to adaptation-type actions. Whether this may signal confusion or conflation of adaptation and mitigation by organisations requires further study. These findings offer critical insights into the perceptions of organisations as pivotal leaders of enacting responses to climate change. A renewed focus on organisational experiences, awareness, attitudes and capacity regarding

adaptation can assist in better understanding how organisations can facilitate improved climate-resilient decision-making.

Public perceptions of climate justice related to climate action and policy support around the world.

Charles Ogunbode[1], Rouven Doran[2], Arin Ayanian[3], Joonha Park[4], Akira Utsugi[4], Karlijn van den Broek[5,6], Jihane Ghorayeb[7], Sibele Di Aquino[8], Samuel Lins[9], John Aruta[10], Marc Reyes[11], Andreas Zick[3], Susan Clayton[12]

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Abstract

Indigenous peoples, children, women, low-income communities, and racialised minorities face the greatest risks from climate change around the world. Consequently, societal responses to climate change must recognise the unequal distribution of causal responsibility, vulnerability to impacts, and coping capacities across different groups. Against this backdrop, climate justice has become a prominent narrative used by activists and campaign groups seeking to mobilise the public for climate action. However, it is unclear what the term means to diverse audiences and how beliefs about climate justice relate to climate action and policy support. In this talk, I will present a novel psychometric instrument, the Climate Justice Beliefs Index (CJBI), and findings from a global survey of 5,627 adults aged 18+ in 11 countries spanning the Global North and South. Most participants (66.2%) in the survey had never heard of climate justice. Nonetheless, endorsement of climate justice beliefs was widespread (e.g., acknowledging the disproportionate impact of climate change on poor people, and the underpinning roles of capitalism and colonialism in the climate crisis). Climate justice beliefs were also associated with various indices of climate action and policy support. These associations tended to be stronger in countries with high greenhouse gas emissions, where social inequality is also more politically salient. The talk will conclude with reflections on how knowledge of public opinion regarding climate justice can be of value for promoting climate action and climate policy engagement.

Foundational issues in risk

Trends in risk research: A bibliometric analysis

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Abstract

In the over 40 years since the founding of the Society for Risk Analysis, the risk topics, environments and populations examined by risk researchers have changed greatly (Balog-Wayet al., 2020; see Goerlandt & Li, 2022). Understanding these changes in foci are important both in understanding what risk research has examined, but in extricating potential future avenues of opportunity and reflecting on why certain topics of risk research have received more or less research attention. This study presents results from a bibliometric analysis of journal article keywords from two key journals: Risk Analysis and Journal of Risk Research. Here, we present trends in risk research in five-year blocks, aiming to show how

the field has grown and developed. In addition, we show how foci of published articles change over time, particularly examining key topics and concepts or theories commonly-known to those highly engaged with the Society for Risk Analysis. The findings help to show where the Risk discipline has emerged from, and where it may go to next topic-wise and conceptually. This is with the aim of aiding those planning future research strategies by examining what has come before and the history that has led to the current makeup of the community, allowing experienced members to reflect on the accomplishment and change they have seen within the community, and informing the Society for Risk Analysis in how to grow this community of risk researchers further.

Prioritising Risk Education in Secondary Schools: Perspectives, Practicalities, and Progress

Sarah Duckett

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Abstract

As society grapples with increasingly complex risks, the imperative for effective risk education in secondary schools becomes paramount. While the literature advocates for integrating risk education into curricula, there exists a significant gap in defining its scope, content, and pedagogical strategies. This study addresses this gap through a multi-phased research approach.

This research comprises of four phases. Phase 1 involves interviews with risk experts to delineate key areas of risk pertinent to secondary school education. Phase 2 engages teacher educators to assess the current status of risk education in English secondary schools and evaluate recommendations from Phase 1. Phase 3 delves into the perspectives of secondary school teachers regarding their understanding and implementation of risk education.

This research is crucial as despite longstanding calls for increased risk education, progress has been hindered by vague recommendations and lack of consensus on implementation. By synthesising insights from risk experts, teacher educators, and teachers, this study aims to provide clarity and operational guidance for effective risk education in secondary schools. The findings promise to inform policy, curriculum design, and professional development initiatives, facilitating a more comprehensive and impactful approach to risk education.

(Re) establishing risk science in European policy: Opportunities and challenges

Frederic Bouder

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Abstract

After US agencies, and sometime in competition with them, European regulators have been one of the main global purveyors of concepts, frameworks and policies directed towards the assessment and management of risk. In the 1990s, specific agencies such as FSA, EFSA EMA and many others were established with the explicit mandate to assess, manage and/or communicate risk. Holistic frameworks such as the IRGC risk governance framework were also developed to guide decision-makers. Specific mechanisms – such as the European Parliament risk group were also instituted to assist policy making. Where are we today? We observe worrying sings that Europe may- in many ways- be going backwards. These signs include, among others, the weakening of scientific advisory mechanisms to the EU, member state as well as inter-agency divergence in crucial areas of risk regulation, the decline of risk as a key concept as opposed to hazard and precaution. Finally, the negative impact of Brexit is felt in terms of scientific and regulatory co-operation, de-facto shutting the door on UK-EU risk dialogue. This talk will present an analysis of

where we came from, where we may be heading as well as some concrete recommendations to strengthen the role of risk science at the European level to the benefit of both the EU and UK science.

Shifting the focus towards a Net Zero carbon future: the role of risk research

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Abstract

The transition to Net Zero brings with it a fundamental shift in the way energy systems operate, with electricity set to become the primary energy vector.

As systems get decarbonised, electricity generation is increasingly located at the grid edges, which is mostly a consequence of the increasing shares of distributed wind, solar, and other renewables.

The obvious advantages to the growth of renewable energy are not without a certain cost, which is normally reflected by the increased complexity associated with system operation and balancing of demand and supply.

The challenges in operating the energy systems are only set to increase, as the electrification of heat, transport and industrial processes drives total demand up.

Faced with a scenario where the use of dispatchable fossil-fuelled power plants is not a feasible strategy for dealing with demand and supply balancing challenges, there is an increasingly strong push for making demand adapt to better align with supply, and not the other way around. That is, increasing demand flexibility.

Demand flexibility is seen as a critical component of most decarbonisation strategies. This is with good reason, as a more flexible demand load will allow for making the most of existing generation, transmission, storage and distribution infrastructure.

It is all too possible, however, that we run the risk of seeing flexibility as a panacea that will solve all the problems associated with the transition to Net Zero.

Flexibility is likely to have a very positive impact on a number of areas such as peak demand reduction, improved renewable energy balancing and usage, deferring and reducing investments in network infrastructure reinforcements, leveraging smart systems and battery storage, as well as reducing overall generation and operation costs, and consumer bills.

There is, however, considerable uncertainty as for the extent to which demand flexibility technologies and strategies will deliver the intended benefits.

The need for understanding the risks associated the introduction of flexible technologies, novel energy pricing regimes, and the transformation of social-temporal orders within a single framework calls for the development of a risk analytical approach to the appraisal of flexibility impacts.

Thus far, considerations around risk in the context of the transition to Net Zero have been dominated by accounts of the perceived risks of decarbonisation strategies leading to undesirable consequences such as blackouts.

We would argue, however, that we are in dire need of a more systematic risk analytical approach to current and future issues associated with balancing demand and supply.

Flexibility is not, and cannot be a win-win for everyone, but the more we know about demand, its flexibility, and the risks associated with the implementation of solutions aimed at increasing such flexibility, the better our opportunities to unlock the full potential of demand flexibility will be.

In this paper, we explore some of the critical areas where either over-reliance on flexibility, or overestimation of its benefits, may result in unmitigated risks, and draw on previous insights to highlight the need for a more comprehensive assessment of the risks associated with particular flexibility interventions.

Health and safety risks

The effects of knowledge and psychological factors on food hygiene behaviours

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Abstract

Our research aimed to assess the effects of knowledge and psychological factors (i.e., perceived control, social norms, behavioural intention, risk perception) on UK citizens' food hygiene behaviours. We designed and employed two surveys with nationally representative samples (N=2887 and N=875, respectively). Survey 1 revealed five types of hygiene behaviours related to cross-contamination, date labels, touching raw meat, checking information, and leftovers. Knowledge was represented by three factors: Knowledge about date labels, food poisoning, and the consequences of food poisoning.

Our findings show that psychological factors, with the exception of behavioural intention, have a significant impact on cross-contamination and information-checking behaviours. Date label-related behaviours are influenced solely by risk perception, while dealing with leftovers is influenced by perceived control. This suggests that promoting perceived control could enhance households' management of leftovers. While knowledge about date labels correlates with behaviours related to date labels, cross-contamination, and information checking, knowledge about food poisoning and its consequences does not have a similar association with behaviour. This underscores a need for educational interventions that emphasise the importance of date labels in ensuring food safety.

Survey 2 consisted of open-ended questions assessing why UK citizens engage in certain risky kitchen behaviours. The results indicate that time, money, convenience, habits, and waste-related concerns are some of the enablers of risky behaviours. On the other hand, participants who followed proper food hygiene practices indicated that they did so due to habits, disgust, and the risks of food pathogens and food poisoning.

We expect our results to inform the design of effective behaviour change interventions, such as promoting perceived control to improve leftover-related behaviours.

Why are aircraft accidents more likely if the captain rather than the co-pilot is at the controls?

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Abstract

Most commercial aircraft are flown by a flight crew of two: a captain or pilot in command (PIC) and a copilot or second in command (SIC). As well as the differential command status of the two pilots there are also two distinct functional intra-cockpit roles, each of which may be adopted by either the PIC or the SIC. Thus, for each flight one will be assigned the role of "Pilot Flying" (operating the controls) the other will be assigned the role of "Pilot Monitoring" who monitors the "Pilot Flying" and intervenes when necessary. In earlier work (Becker & Ayton, 2024) we analyzed global civil aviation data on 841 aircraft accidents and incidents for the period 2000–2020 resulting in 5318 fatalities. We found evidence of a strong *crew role assignment effect*: more than twice as many such events occurred and more than three times as many fatalities resulted when the captain rather than the co-pilot was the "Pilot Flying" rather than the "Pilot Monitoring" – even though the captain and the co-pilot adopt these roles equally frequently.

In the present study we evaluate evidence in relation to two hypothesized mechanisms possibly responsible for the crew assignment effect. One possibility (the status hierarchy theory) is that the status difference between captain and co-pilot prevents effective teamwork when the captain is flying. Thus, when the captain is flying, lower ranked co-pilots may be somewhat reluctant to speak up and/or captains may discount comments from co-pilots; when the co-pilot is flying any effects of status would not produce such outcomes as co-pilots wont so easily disregard advice from their senior who, in turn, would not, on the grounds of differential status, be intimidated from speaking up. An alternative though not mutually exclusive possibility (the cognitive overload theory) is that when the captain is flying, ability to make strategic decisions (e.g divert to another airport to avoid bad weather) is compromised by the increased cognitive load imposed by handling the controls when they are flying the plane - but not when they are the "pilot monitoring".

We tested whether the crew assignment effect varied across countries as a function of Hofstede's Power Distance Index - a "measure of the extent to which power differences within a society, its organization and institutions are accepted by less powerful members". The crew assignment effect did not vary as a function of Hofstede's Index.

We measured the degree to which the crew assignment effect varied as a function of the age of the captain and co-pilot. Despite research evidence that the cognitive performance of pilots declines with increasing age, we found no variation in the crew assignment effect as a function of the age of the captain. However the crew assignment effect was significantly larger with younger co-pilots – consistent with the notion that the status hierarchy effect is greater for younger co-pilots.

We thus found some evidence that status hierarchy is responsible for the crew assignment effect on aircraft accidents and incidents.

Stakeholder safety action: patients and families as a source of resilience for managing risk in hospitals

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Abstract

Healthcare research observes that patients and families often take action to prevent medical errors in hospitals (e.g., reporting safety concerns), and this is significant for the risk literature because it suggests that external stakeholders (e.g., service-users) can significantly influence organisational safety outcomes. Yet, the literature lacks a systematic conceptualisation or investigation of how stakeholder behaviours contribute to risk management in organisations. Due to safety being the responsibility of employees, research has naturally tended to focus on employee behaviour (e.g., identifying hazards, voicing concerns). This means that, for domains where accidents can be prevented or mitigated by external stakeholders (e.g., healthcare, transport, building safety, emergency services), explanations of the behaviours that underlie organisational safety outcomes may be incomplete because they do not factor how external stakeholders help organisations to manage risk.

We addressed this literature gap by theorising the concept of 'stakeholder safety action': this relates to external stakeholders engaging in *voicing* (e.g., speaking-up) and *correcting* (e.g., fixing mistakes) behaviours in order to resolve perceived errors within an organisation and prevent them from causing harm. We built our conceptualisation of stakeholder safety action through an analysis of the healthcare literature, and explored it within this domain. Specifically, we undertook a quantitative and qualitative analysis of reports by patients and families – contained with 2,000 complaints about unsafe treatments sent to hospitals – about engaging in *voicing* and *correcting* behaviours to resolve safety problems encountered during treatments. We considered complaints to be a useful data source because they often contain reports on problems experienced by patients and families during healthcare treatments, and the actions taken to address these.

To analyse the complaints we used a mixed-method quantitative and qualitative approach. First, we undertook a content analysis of that the complaints to identify instances of *voicing* and *correcting* behaviour, and used the data to establish the proposed model of stakeholder safety action, specify the types of safety problems they addressed, and determine their reported success in preventing harm. Second, we undertook an inductive qualitative analysis of how patient and family *voicing* and *correcting* behaviours led to the prevention of accidents, and did this to deepen understanding on the mechanisms by which stakeholder safety action contributes to organisational safety.

The analysis found patients and families to routinely report engaging in safety action (n=4,159 reports), with *voicing* being the most common behaviour (82%). Predominantly, stakeholder safety action was directed at resolving risks not recognised or effectively managed by staff (e.g., misdiagnoses, hygiene lapses, communication breakdowns). *Voicing* and *correcting* behaviours were found to be reported as preventing harm in nearly half of cases (44%), and did this through the following escalatory mechanisms: *helping* staff to avoid and fix mistakes, *intervening* to ensure safety is prioritised in clinical work, and *bypassing* teams and hospitals to avoid unsafe situations. We surmise that, in organisations where stakeholders observe safety problems and have agency to address them, stakeholder safety action can be an important yet unrecognised source of resilience for preventing harm from hazards that have been missed or not effectively addressed.

Should I stay or should I go? NHS Staff retention post-COVID-19 - precursors to failure and priorities for intervention – a systems perspective.

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Abstract
Background
The issue of staff retention in the NHS is not new but, has come into sharp relief in the post-COVID-19 era. Net gains from training new staff and overseas recruitment are at risk of being significantly blunted unless ways can be found to stabilise/enhance the retention of established staff.

This paper reports headline findings from the most recent (fourth) wave of our survey of NHS staff (2020-2023), initiated by the ESRC funded research *'Should I stay or should I go? NHS staff retention in the post-COVID-19 world: Challenges and prospects.'ttps://www.bath.ac.uk/publications/should-i-stay-or-should-i-go-2-influences-on-nhs-staff-retention-in-the-post-covid-19-world/attachments/should-i-stay-or-should-i-go-2.pdf*

Method
Taking a risk mitigation systems perspective, the research focused on mapping and weighting precursor influences on secondary care staff capacity/disposition to stay or leave NHS employment. Its principal aim was to provide human resource strategy and policy relevant insight into:

The impact of the COVID-10 pandemic and its legacy on employee attachment, commitment and capacity to remain in NHS employment
The relative salience and strength of push and pull precursor variables on staff say versus leave intentions and behaviour.
What might need to change to motivate/enable staff to remain in NHS employment.
The need, nature and focus for intervention to maintain/enhance retention rates; including the identification of vulnerable demographics and care delivery functions.

The employee survey question set focused on variables arising from prevailing working conditions/arrangements. Approximately 80% of the question set was kept constant across the four waves, the remaining 20% affording flexibility as issues emerged, waxed or waned. At each wave, the core sample (N=1500-2000) was sourced via the YouGov panel, augmented by booster samples from partner NHS Trusts and Trades Unions.

Findings
Between November 2022 and April 2023, 47% of staff checked non-NHS job listings, and 14% reported having applied for one or more non-NHS jobs. Their primary motivation was seeking higher pay. 23% of these applications were for supplementary paid work in addition to their NHS job.

Reports of symptoms of burnout show a rising trend, with 1L1 reporting 'feeling very tired or drained *'most days or every day'*
Ratings of intrinsic job satisfaction (caring for patients) and personal commitment to the NHS have weakened year on year since 2020
Staff confidence over improvement to working conditions and their future in the NHS remain low (notably regarding workload, staffing and resources) and more negative than at Wave 3 (summer 2022).

There was a marked 24 point drop (61^ to 37%) in the proportion staff *who 'would recommend working for the NHS to others'* between winter 2020/1 and spring 2023. The figure for nurses (26%; spring 2023) was significantly lower than the all-staff rate.
Improvement to pay, staffing level, workload and recognition by Government were the most widely cited priorities to address retention,

Conclusion
Across the four waves the core finding was that, while impacts directly attributable to the COVID-19 pandemic have attenuated, the feature of insufficient institutional capacity to meet the demand for care persists; presenting as the biggest single root cause challenge to staff resilience and retention.

Climate risks and resilience management

The UK Climate Resilience Programme (2019-2023)

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Abstract

Even with the successful implementation of the Paris agreement, a certain amount of climate change is now unavoidable over the next few decades and high warming levels by the end of the century cannot be ruled out. Therefore, urgent action is needed to build resilience and accelerate adaptation to climate variability and change. Informing the extensive range of actions needed to manage climate risks, reduce damage without exacerbating existing inequalities, and realise emerging opportunities, is a critical scientific and societal challenge. The UK has been at the forefront of climate adaptation policy with the Climate Change Act 2008 requiring the UK Government to conduct a five-yearly Climate Change Risk Assessment (CCRA) and National Adaptation Programme. Another important recent driver amongst UK organisations has been compliance with the Task Force on Climate-Related Financial Disclosures. The UK Climate Resilience (UKCR) Programme emerged as a response to these policy and societal needs. It aims to enhance the UK's resilience to climate variability and change through frontier interdisciplinary research and innovation on climate risk, adaptation and services, working with stakeholders and end-users to ensure the research is useful and usable.

The UK Climate Resilience Programme, led by UK Research and Innovation and the UK Met Office and running from 2019 to 2023, has funded over 50 projects worth £19 million. It is part of the Strategic Priorities Fund initiative which provides research funding to develop strategically important research for the national government. Topics central to the programme's research agenda have included improved characterisation and quantification of climate risks, enhanced understanding of the management of climate risks, and the development and delivery of climate services. Amongst its achievements, the programme has: developed a set of future UK socio-economic scenarios to be used alongside climate scenarios, delivered a step change in climate change risk assessment capability, and produced a roadmap for the development and implementation of UK climate services. It has funded arts and community based projects and pioneered an embedded researchers scheme in which the researcher collaborates with a host organisation to address their real world needs. The programme has also developed a more coherent community of climate resilience researchers and practitioners in the UK.

In this talk we will provide an overview of the programme, focusing on the nexus between UKCR–funded research, and UK policy and practice. For example, we will consider how the national CCRA process shaped the programme's research agenda while at the same time the availability of research sets the parameters of risk assessments. We will also provide

examples of co-production undertaken by researchers and practitioners and comment on what can be achieved in terms of societal resilience when there is collaboration on shared objectives. This programme is unique in dedicating significant time, funding and other resources to researching national resilience while working in close partnership with the national government. We anticipate that our learnings from this process will be of interest to other researchers, as well as policy makers and practitioners who work with researchers on climate resilience issues.

Social determinants of Risk and Resilience: Lessons Learned from a LMIC

Helene Joffe

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Abstract

Disaster resilience will become increasingly necessary as climate change's effects on people grow. Where once resilience was regarded as something that the individual may possess, there is increasing realisation that social processes can foster resilience. This paper will focus on empirical studies showing the centrality of the human sense of agency in the risk and the resilience literatures. In studies across a range of cultures, including that in the USA, Turkey and Indonesia, the human sense of agency plays a role in both risk preparedness and disaster resilience. However, beyond this factor, the paper will delve into specific qualities that engender resilience in a collectivist culture, reflecting on how these may be cultivated in more individualist cultures. With mental health and climate crises to the fore, the empirical lessons learned from lower-middle income countries can be brought back to higher income countries to foster future resilience.

A Study of Risk Perceptions in Tohoku, Japan after the 2011 and 2022 Earthquakes and Tsunamis

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Abstract

Prior research finds that the impact of disaster experience on perceived safety may vary depending on the severity of the event and other individual factors. This study explores the relationship between past experiences with earthquakes and tsunamis and changes in feelings of safety through focus group discussions followed by surveys conducted in 2023 with 300 inhabitants in the Tohoku region, Japan. This area was hit by both the March 2011 Great East Japan Earthquake and the March 2022 Fukushima earthquake, with very different impacts. Findings reveal that: (1) respondents feel generally either the same or safer after 2022 and 2011, with a small proportion feeling less safe, (2) additional physical protective measures which have been added either after 2011 or 2022 (e.g. seawall) are not associated with changes in feelings of safety, but (3) moving further away from the sea and living on higher ground appear to make feeling safer more likely. However, (4) our analysis does not find evidence of a relationship between changes in feelings of safety and behavior intentions. These results suggest that people may feel safer after a disaster if their physical vulnerability is decreased or if their experience indicates a lower personal risk.

Should we name heatwaves? Findings from online experimental studies in England and Italy

Andrea Taylor, Barbara Summers, Pietro Bellomo, Suraje Dessai

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Abstract

Summer 2023 saw record high temperatures across several European countries with these heat events being unofficially given mythological names such as Cerberus and Charon. This led to debate within the media and forecast providers as to a) whether naming severe heat events is an effective way to convey the risks that they pose; and b) what the conventions for heat event naming should be. Addressing a dearth of empirical evidence as to the effects of heat event naming on heat risk perception we conducted online experiments with regionally representative public samples in England (n=2152) and Italy (n=1984). Using a between groups design where participants were randomly allocated to one of three naming conditions, we assessed the effect of giving a heat event a mythological, a non-mythological or no name on anticipated severity, concern, trust/confidence and behavioural intention. English participants were additionally asked about their perceptions of weather event naming in the UK. Amongst English participants, we find that those presented with a message about a mythologically named heat event ('Heatwave Lucifer') rated the event as slightly more concerning and potentially severe than an unnamed heatwave. Italian participants meanwhile tended to rate a message about a non-mythologically named heat event as slightly less severe, concerning and reliable than mythologically named and unnamed events. For both countries the size of the effect was small, suggesting that naming in isolation does not substantially affect perceived risk and response. However, it also suggests that going against the established trend of using mythological names in Italy could diminish perceived risk, albeit slightly. We discuss the implications of our findings for weather warning communication and ongoing debate as to the standardisation of weather event naming.

Risk governance

Constitutional Geographies of Risk, Governance and the State

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Abstract

It is an ancient maxim that the first duty of government is to protect its citizens from harm; a duty that stands at the heart of the 'social contract' in which the public cede their liberties in exchange for protection. In recent years, the concept of 'risk' – combining both probability and consequence - has become increasingly central to determining the legitimacy of how that first duty is calibrated by helping identify, anticipate and prioritise which harms to respond to and which to accept. Indeed, risk is now often claimed - for good or ill- to be a universal organising idea for governance, by reframing problems across economic, political and social life as risks to be rationally identified, assessed and managed according to probabilistic logics.

Such universal claims suggest that risk has the potential to challenge long-observed inconsistencies in the governance of harms across even advanced economies, which have hitherto been largely explained in terms of economics, politics, cognitive biases and sometimes crude national stereotypes. Less attention, however, has been paid to how risk concepts and tools fit with deeply entrenched national conceits and principles for how and why different states protect individuals from harms. For while the first duty of government may be to protect its citizens, how governments perform that duty is likely to reflect nationally-specific bundles of political philosophies, institutional arrangements and societal

norms that make up the 'small-print' of different countries' 'social-contracts'. That raises the question of whether the probabilistic logics of risk are reshaping and driving the convergence in the way that governments perform their 'first duty', or whether the concept of risk is being adapted in ways that reflect pre-existing conceits and principles.

This paper investigates that question by exploring how the understanding and use of risk concepts and tools are shaped by the distinctive constitutional traditions of three different polities, namely the UK, Germany and France. While those neighbouring polities are amongst the most developed in the world, they also vary distinctively according to the extent to which their constitutional traditions: a) emphasise state obligations to avoid unnecessary interference with the negative rights and expectations of citizens that protect their liberties; and/or b) emphasise state obligations to fulfil the positive rights and expectations of citizens that protect them from harm. Drawing on historical documentary analysis the paper shows how the understanding and use of risk concepts and tools varies in highly patterned ways across those different contexts, both in terms of calibrating the legitimacy of efforts to prevent harm or provide restitution ex post. Building on those insights, the analysis helps identify and resolve misunderstandings about what is at stake when polities mobilise risk and related concepts and tools (e.g. precaution, danger) in order to protect their citizens from harm. In so doing, the analysis starts to develop a theory of how different national political philosophies of what the state is for, and how it can act, shape what we might call nationally distinctive 'constitutional geographies of risk, governance and the state'.

Governance of HIV prevention and risk: the case of access to a preventative pill among Brazilian gay and bisexual men in Lisbon

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Abstract

The last decades have seen the development of biomedical technologies that enhance opportunities for national governance in HIV prevention. One of the latest biomedical innovations is the use of Pre-Exposure Prophylaxis (PrEP), which involves interventions that begin before potential exposure to HIV. In practice, this is mostly implemented in the form of a pill that a person can take either daily or around the time of sexual activity.

On one hand, the World Health Organization (WHO, 2024) recommends that PrEP be offered to those at substantial risk of HIV infection. However, the WHO acknowledges that identifying individuals at substantial risk is not straightforward, as it involves factors such as population-level HIV incidence, as well as the characteristics and behaviours of individuals and their partners. On the other hand, a growing number of studies on PrEP emphasise the need to incorporate factors beyond risk into PrEP and HIV prevention governance (Kolstee et al., 2022; Curley et al., 2022; Kutner, Bourne, and Nutland, 2021). These studies suggest that reduced anxiety and more enjoyable sex may serve as effective reasons for introducing PrEP to individuals who are not consistently protecting themselves from HIV.

This presentation aims to explore the politics of PrEP and HIV governance in Lisbon. To do this, it draws on the concepts of infrastructure and infrastructural violence (Rodgers and O'Neill, 2012) to analyse 20 semi-structured interviews with Brazilian migrants' men in Lisbon who have sex with men, 8 interviews with doctors involved in PrEP provision in the city, as well as an analysis of official documents on PrEP guidance in Portugal. The main findings show that Brazilian MSM migrants have a range of motivations for using PrEP that extend beyond the biomedical rationale of risk, which predominates among hospital doctors and national policies. The emphasis on a biomedical rationale in PrEP governance tends to jeopardise PrEP provision and potentially makes certain populations more vulnerable to HIV.

'All we have to do is be uncertain': assessing the 'amplification of institutional incertitude' in European food safety communication

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Abstract

In recent years the European Food Safety Authority (EFSA) has notably foregrounded the identification and disclosure of scientific uncertainty in its risk assessments and communications. However, while EFSA's novel uncertainty reforms have opened a welcome space for academic and policy dialogue on how best to represent and visualise scientific uncertainty when communicating risk, key questions remain concerning the broader conceptualisation and role of uncertainty in risk communication, along with its practical implications and impacts. Addressing these questions, this paper identifies three distinct areas of 'institutional incertitude' as they relate to risk communication practice, termed 'aleatory', 'epistemic', and 'normative' uncertainty respectively, and traces their developmental trajectory vis-à-vis ESFA's uncertainty reforms. We observe that EFSA's predominant focus on communicating aleatory uncertainty has added variability to the characterisation of uncertainty typically included in risk communication, but has had limited success in resolving longstanding policy tensions over the credibility, legitimacy and use of its risk assessments. In turn, we argue that the agency has subsequently been prompted to further rethink and refresh its risk communication initiatives in order to better address the wider epistemic and normative uncertainty challenges it faces. In closing, we consider EFSA's progress on addressing these wider uncertainties, along with the research and policy implications of this assessment, before suggesting some future directions for inquiry involving fuller engagement with issues inherent to the intersection of uncertainty and risk communication.

Risks from the perspectives of scientific and narrative knowledge

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Abstract

Lyotard distinguishes between scientific knowledge and narrative knowledge. The latter is the common sense, the home truths, of a society. While scientific knowledge is always open to questions c.f. Popper's conjectures and refutations, in the public domain narrative knowledge is unquestioned. However, for scientists it is self-evident that narrative knowledge is irrelevant – it is myths and fairy tales. The problem this creates is that science may miss ways in which narrative knowledge contributes to the representation of scientific discoveries. Transgenics, putting foreign genes into a plant, led some believe in menacing images of genetically engineered plants as being larger than normal and that eating them might affect a person's genes. The Asilomar conference in 1975 focused on the hazards associated with the means (technical scientific issues) and not the ends (the consequences for society). With the social and ethical implications of rDNA as peripheral issues, scientists were blind to the possible reception of transgenics in the public sphere.

Influencing carbon behaviours

The role of leading by example to communicate climate risk and promote low-carbon behaviours

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Abstract

Behaviour change has great potential to reduce greenhouse gas emissions quickly, helping to avert the risks of global warming. Some of the most impactful changes are: flying less, eating less meat, driving electric cars, improving home energy efficiency, increased use of public transport and active travel. However, these choices have proved elusive at scale and are rarely encouraged or modelled by high-status individuals ("leaders"), despite established knowledge about the influence of leaders as role models. Applying theories of embodied leadership and credibility enhancing displays, our novel survey experiment (n=1,267) reveals that visible leading by example from politicians and celebrities significantly increases the willingness of members of the UK public to make these low-carbon choices. In addition, leading by example greatly increases perceptions of leader credibility, trustworthiness, competence, and favourability. We find no significant effects of leading by example on people's wider perceptions of climate change, including risk perception and climate concern, but a strong "appetite for leadership" among the public is revealed. In light of these findings, we discuss the potential of leading by example to communicate risk, convey meaning and stimulate climate-friendly behaviour change.

Evolution of Climate Change Discourse in Malaysia: Political, Media, and Societal Interactions

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Abstract

This research investigates the transformation of climate change discourse in Malaysia from 2016 to 2021, highlighting its transition from a peripheral environmental issue to a central socio-political agenda. Through a comprehensive analysis of media coverage and political developments, this study delineates how Malaysia's climate discourse has been shaped by local and global events, with a focus on the roles of media, policy makers, and societal actors.

Initially, Malaysian climate discourse was characterized by its distanced approach, where media reports primarily emphasized global environmental impacts without significant local contextualization. This phase was marked by a lack of public and political engagement, with climate change often presented as an abstract, distant problem. However, the narrative began to shift post-2016, influenced by several pivotal events including Malaysia's commitments under the Paris Agreement, significant political shifts like the 2018 general election, and environmental crises such as the Penang floods.

The period from 2019 to 2021 saw a marked internalization and politicization of climate issues. Media strategies evolved, featuring increased involvement of local thought leaders and a shift towards integrating climate discourse within the broader political landscape. This was complemented by growing public awareness and activism, particularly among the youth, spurred by global movements and local environmental challenges.

This study argues that the evolution of Malaysia's climate discourse is a reflection of a broader, more nuanced understanding and engagement with climate issues, influenced by an interplay of media narratives, political agendas, and public perception. The findings underscore the importance of local context in global environmental governance and suggest that effective communication and policy-making require an understanding of the socio-political dynamics that shape public discourse.

This research contributes to the understanding of risk perception and governance in environmental policy, offering insights into the complex interdependencies between media, politics, and society in shaping climate action.

Public understanding of carbon dioxide removal in Malaysian Borneo

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Abstract

The climate crisis is impacting on people around the world with the worst of these felt by those living in the Global South. Flooding, droughts, and heatwaves are becoming a regular occurrence in South East Asia including Malaysia where the agricultural sector is hugely important. People rely on farming for their livelihoods and with a changing climate this is becoming more of a challenge. Malaysia is a key palm oil producer, crucial for its economic value although not without its controversies as it is also a mega-biodiverse country known for its vast rainforests, including part of Borneo. These are a vital carbon sink but it is clear that large emissions reductions are essential as well as a need to remove carbon dioxide from the atmosphere through carbon dioxide removal strategies (CDR). Malaysia is already reforesting its lost rainforest and there is also a trial of enhanced weathering underway in Sabah, Malaysian Borneo. This strategy is most suited to a tropical environment as the climate means the material is broken down more rapidly sequestering carbon at a higher rate removing it from the atmosphere. Although the science behind the process of enhanced weathering is clear, little is known about what communities living in Malaysia think about climate solutions such as CDR including enhanced weathering.

We carried out five deliberative workshops including with local smallholders exploring three CDR techniques with particular relevance for the Malaysian context – enhanced weathering, reforestation, and Bio-Energy with Carbon Capture and Storage. Reforestation was a preferred CDR approach due to its familiarity and 'naturalness', as shown in work conducted in other countries. Enhanced weathering and BECCS were unfamiliar with participants perceiving these more negatively with many questions being elicited. BECCS was of concern to people due to possible air pollution and land availability with enhanced weathering highlighting concerns about mining and marine impacts. In the context of climate change, many felt other issues were of more concern to them however the majority wanted their voices heard when climate solutions were being considered.

Using 'Question-Led Innovation' to understand public priorities for Carbon Removal research in tropical agriculture

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Abstract

When upscaling novel climate interventions, public risk perceptions are crucial. However, for many novel technological proposals, such as removing CO_2 directly from the atmosphere and permanently storing it, the social sciences still receive considerably less attention than the physical sciences. In particular, there is a persistent lack of social science research in the Global South: thus climate pathways often propose massive upscaling of technologies in precisely the areas where we know nearly nothing about public risk perceptions. Clearly, Carbon Removal research can benefit from maximising inclusion and opening up to diverse perspectives, including those of local communities. We argue that ideally, this should involve public insight into the very *questions* we should be prioritising. In this presentation, we outline a transferrable methodology called 'Question-Led Innovation', which uses the questions asked by lay publics and local stakeholders as the basis for identifying priorities for future scientific research.

We demonstrate this methodology using data from a five deliberative workshops on public and community risk perceptions of Carbon Removal. The workshops were held in Sabah, Malaysia, a tropical emerging economy which is one of the largest producers of palm oil in the world, and therefore a significant location of interest for many climate interventions. The workshops focused on a particular Carbon Removal technique of Enhanced Rock Weathering (ERW), which aims to sequester carbon dioxide by spreading crushed rocks on agricultural land such as tropical plantations.

Following in-depth discussions about the risks and benefits of ERW, workshop participants were invited to 'ask the expert' questions they had about the technique, whilst the expert was out of the room. We then analysed these questions to identify public priorities for the state-of-the-art for ERW research, thereby developing a process for acting on the findings from public deliberations. We find that much of the current research on ERW is actually already in-line with what our participants most wanted to know about, particularly regarding rock resources. Nevertheless, significant knowledge gaps remain. Our workshop participants were interested in the implications of ERW beyond the lifetime and scale of the current field trials, which generates increasing scientific uncertainty. Many questions also related to socio-economic factors, particularly around governance, regulation, and cost, therefore we argue that such disciplines should be a priority for future research. Embedding Question-Led Innovation into an ongoing programme of scientific research could be used to shape the future of ERW research, so that it prioritises questions which matter most to people on the ground.

Risk management

Climate risk ownership in the age of asset management

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Abstract

At a high-profile sustainable finance conference in 2022, a presentation by HSBC's head of responsible investing titled "Why Investors Need Not Worry About Climate Risk" sparked significant debate. Contrary to the former governor of the Bank of England's warning of a "climate Minsky moment" with mispriced assets posing large risks to global financial stability, the presenter argued that investors' perceived short-sightedness on climate risk is a deliberate adaptation strategy. This perspective is based on evidence that such myopia has historically enabled the global financial system to withstand significant shocks, such as world wars, pandemics, and economic crises. This presentation delves into the apparent contradiction between these viewpoints, particularly given the shared recognition of both speakers about the catastrophic potential of unmitigated climate change and the economic consensus on leveraging market forces to address environmental issues.

The investigation centres on who bears the financial risks of climate change by examining the financialisation of climate change and the asset management industry's evolution. These trends, I argue, have resulted in a financial system where climate risk disclosure, intended to enhance risk management, actually enables private entities to shield profits from climate-related losses, while leaving systemic risks unaddressed.

Drawing on literature from the financialisation of nature, risk ownership, and climate risk assessment, the paper highlights how technological advancements in climate risk models and government incentives for low-carbon investments create adverse selection and moral hazard. The analysis introduces the concept of climate risk ownership through case studies on renewable energy investments and disaster insurance, illustrating the gaps in risk management between public and private sectors.

The road to olympic failure is paved in poor risk management

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Abstract

In recent years there have been numerous high-profile incidents in professional cycling that have endangered the lives of cyclists, fellow competitors, and spectators in track and road disciplines. Yet, there has been little research conducted to ascertain why, and how things can be improved within the sport to improve safety. To illuminate this area, we apply safety culture theory to the now infamous Australian Cycling 2021 Olympic incident that saw their Olympians handlebar snap clean off during the competition. The results show that dimensions of safety culture are apparent in this incident, with distinct parallels between it and high-profile failures in other industries. The lack of adherence to rules, the existence of light-touch regulation, and management safety attitudes are concerning, and suggestive of a need for immediate improvement at a governing level. This research provides a conceptual basis for further research in the area to ensure interventions are effective at preventing future safety critical incidents within the sport.

A validated definition and Taxonomy of High Impact - Low Probability Events

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Abstract

This paper outlines key elements for understanding and analyzing High Impact Low Probability (HILPs) events, known also as outliers, using a systematic approach to build on existing resources and promote a way forward to analyse the subject area. First, we consider the official definitions available, refining it to create a more consistent and applicable framework. We explore whether there are patterns that help define and categorize HILPs, and identify elements that could distinguish these events, such as historical records, frequency, and impact measures. Secondly, we explore common scenarios that can be considered as examples for benchmarking, including considerations about possible thresholds and boundary conditions reported in public risk registers. Finally, we propose a validated scientific definition aimed at an academic audience, a operational definition for stakeholders, and a taxonomy, which have incorporating feedback from both public and private sector to assure the leverage of future research.

The Microfoundations of Organizational Risk

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Abstract withheld

Resilience and preparedness

Defining and Measuring Flood Resilience in England

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Abstract

Climate change challenges current approaches to planning for flood risk; the past few years have seen increasingly frequent and severe flood events in Europe and beyond. Planning for increased flooding raises the cost of managing flood risk to protect households and assets, amid decreasing government budgets. In England, these constraints have prompted a change in policy focus – from reducing community vulnerability, to increasing community (and individual) resilience, i.e ability to recover from a flood. However, to design targeted interventions, it is important for policymakers to measure community resilience to flooding. The Environment Agency have developed a 'flood resilience index' to do this. Yet, there are challenges of scalability – for how to design a resilience index that can be used to track progress on both a local and national scale. To provide clarity on this debate, we carry out a systematic review of 33 resilience indexes created by both academics and practitioners. We find that the definition of 'resilience' varies across indexes – divided into either considering preparation before a flood, coping with effects during a flood, and adapting after a flood. As for measurement, resilience indexes often incorporate locally collected data, such as through interviews and surveys, to engage local communities in the process of understanding resilience. To operationalise this data, three common strategies include (i) spatially mapping communities at risk and calculating resilience levels by creating a baseline score; (ii) creating a resilience profile of an area, and (iii) creating an implementation plan for a community. We discuss the viability of different approaches in the empirical context of England, and propose that future research should map the heterogeneity in the conceptualisation, measurement, and operationalisation of resilience in different policy contexts.

Enhancing Resilience of the UK Roads Network: An Integrated Processed-based Flow and Stress-testing Model for Flood-Induced Disruption Assessment

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Abstract

Reliable road infrastructure networks are critical for daily commutes in the UK. However, these systems face increasing threats from extreme flooding events exacerbated by climate change. Effective risk management requires understanding pre-disaster traffic flow patterns on the physical road network, which depend on a comprehensive flow model to establish a baseline. In most risk estimations the indirect costs associated with traffic disruptions are either not factored in or estimated as a multiplier effect over direct damages. Current research often misses the constraints of traffic flow allocation by assigning origin-destination flows to least-cost paths without considering road capacities, leading to inaccurate risk assessments. Moreover, modelling flows on a national scale poses significant computational challenges.

To address these issues, we developed an open-source modelling framework for Great Britain that incorporates a process-based flow model to simulate national passenger-to-work flows and a stress-testing model for road disruption analysis. Our framework models the interconnection between physical road infrastructure and demographic entities. The flow simulation involves iterative modelling of road capacities, speed-flow curves, and travel costs. In each iteration, flows are initially assigned to their least-cost paths and then adjusted based on road capacities to avoid overflow. The average travel speed and cost of individual road segments are updated according to their remaining capacities, and the process repeats until all flows are accommodated.

We stress-tested our road network with an ensemble of historic UK flood events to model initial road disruptions. We calculated the average travel time for each origin node and assessed the criticality of each road segment under disruption, comparing these to the base flow condition to evaluate the flood impacts on physical infrastructure. Economic impacts are quantified by measuring both direct flood effects (people affected at workplaces) and secondary infrastructure-induced disruptions (people unable to travel due to road closures).

Overall, this research offers insights into large-scale flow modelling with capacity constraints and provides actionable recommendations to enhance the resilience of the UK's national road infrastructure. The model can be further adapted to different spatial scales and contexts, supporting multi-modal transport flow and risk analysis under multi-hazard scenarios.

Improving household preparedness in multi-hazard contexts

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Abstract

This paper will introduce the Lloyds Register Foundation (LRF) funded project "*Improving household preparedness in multi-hazard contexts*" (start date February 2024) and share some initial reflections on the desk-based element of the research. The Sendai Framework for Disaster Risk Reduction identifies household preparedness plans as a way to build resilience to disasters and reduce conditions of vulnerability. Given that hazards usually occur in combination with one another as multi-hazards and conditions of vulnerability are closely tied to relative poverty, it is vital that household preparedness plans can be used in low-income contexts and be responsive to multi-hazard interrelationships. The project responds to this need by aiming to strengthen resilience to multiple (interrelated) hazards by supporting the development, testing, and uptake of multi-hazard preparedness assessments for households in low-income contexts. The project is organised around three interconnected objectives. The first objective is to understand what contributes to existing high levels of household preparedness by conducting a literature review and engaging with the LRF World Risk Poll data (2021 and 2023). This objective will also be informed by qualitative fieldwork and knowledge coproduction in countries selected on the basis of World Risk Poll data analysis. The second objective is to then develop and test household-level multi-hazard preparedness tools (e.g., scorecards), again informed by qualitative fieldwork that will focus on knowledge coproduction. The third objective is to support the wide uptake of preparedness tools by ensuring project outputs are useful, useable, and used. Because fieldwork is not scheduled until the end of 2024, the paper will present findings from desk-based reviews of the literature on multi-hazard preparedness and the World Risk Poll database, including the newly released World Risk Poll 2023 database. This will lead into a discussion of the proposed research design and expected outputs.

Communicating risk

Understanding misperceptions of climate actions amongst climate-concerned individuals

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Abstract

Although climate change presents serious risks to human societies and natural ecosystems, current climate action at all levels remains insufficient to keep global warming below the worldwide goal of 1.5°C. Social science research finds that publics often overestimate the effectiveness of low-impact individual climate actions (e.g., recycling) and underestimate high-impact behaviours (e.g., reducing air travel). However, the prevalence of these misunderstandings among climate-concerned individuals and their connection to actual behavior remain unclear. Developing this understanding is essential as such misperceptions could result in engaged and motivated individuals prioritising low-impact climate actions over high-impact behaviours, thereby limiting societal potential to mitigate the risk of climate change.

Using national surveys in the UK and the USA, we find that even climate-concerned individuals overestimate the impacts of low-impact climate actions and underestimate high-impact behaviours. We also establish a link between the

perceived impact of climate actions and the frequency with which participants report engaging in those behaviours. That is, people are more likely to take climate actions they perceive as effective at mitigating climate change, regardless of their actual impact. This suggests that erroneous impact assessments of climate actions may indeed hinder efforts to reduce climate change.

We also explored several potential explanations for the misperceptions regarding the impacts of climate actions, which we derived from the literature. These were: (1) misinformation susceptibility, (2) motivational factors (e.g., convenience), (3) heuristics, (4) conflations of the causes of climate change, and (5) carbon innumeracy. However, we do not find meaningful evidence in support of any of the tested theories. We discuss other potential communication interventions to correct such misperceptions (e.g., increasing exposure to high-impact climate actions through the media).

Understanding Scam Susceptibility: The Role of Affective Content in Persuasive Messages

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Abstract

Fraud, accounting for approximately 40% of all crime in England and Wales, presents a significant societal issue with an estimated 3.2 million offences annually, resulting in an approximate cost of £6.8 billion (Home Office, 2024). This crime not only has profound financial implications but also inflicts substantial emotional distress on victims. Despite these severe impacts, the current body of research provides an incomplete picture of the factors influencing scam susceptibility. Prior studies have produced mixed results regarding the role of demographic characteristics and personality variables (e.g., age, risk-taking propensity) in scam susceptibility. Furthermore, the influence of specific scam design elements on an individual's likelihood of victimisation is more limited.

Initial investigations in this domain have examined persuasive elements within scams, such as scarcity cues ("don't delay, call now to claim your prize") and authority indicators (Wood et al., 2018). However, these studies have not conclusively established their impact, instead such studies emphasise the role of risk and benefit perceptions in likelihood of responding.

Reflecting on theoretical research that highlights the key role that affect can play in perception of risk and benefit perceptions (Slovic et al. 2011), as well as research highlighting how affect can lead to heuristic processing and sub-optional decision making in persuasive contexts (Kircanski et al., 2018), this study extends the existing literature by investigating the influence of increasing the affective content of scam-style messages on individuals' intentions to respond.

In an online experimental study involving 280 participants, we randomly assigned participants to receive either a low affect or high affect message. Participants rated their response intentions (1 question), perceptions of the message (14 items), and their perceptions of the associated risks (2 questions) and benefits (2 questions). Given that scams can evoke different emotional valences – either positive (joy/excitement) or negative (fear/worry), each participant was exposed to, and answered the above questions for two different messages presented in their assigned affect level (low or high). This consisted of a lottery scenario (e.g. you are the winner of our prize giveaway.... call to claim your winnings) for the positive valence scenario and a bank fraud scenario (e.g. Your debit card was recently used..... get in touch as soon as possible if you didn't make this purchase) for the negative valence scenario. We also collected a range of exploratory individual difference and demographic variables.

Our results indicate that exposure to high-affect messages does increase participants' response intentions. However, this was only in the positive emotion (lottery) scenario, not in the negative emotion (bank) scenario. These findings suggest that the affect level of a scam message could play a critical role in influencing susceptibility to scams. However, the impacts may not be universal and may depend on the specific message presented.

These findings underscore the need for future research into the influence of affect on susceptibility to scam messages and call for investigations considering a wide range of message types to gain a nuanced understanding of how people react to different types of messages.

Risk analysis you can trust: building, maintaining and measuring trustworthiness in a volatile world

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Abstract

In his speech at 5am on election night, the new Prime Minister said that 'the fight for trust is the battle that defines our age'. In an era of skepticism towards politics, institutions and industry, the trustworthiness of regulatory bodies is fundamental to perceptions of risk and the successful implementation of risk management strategies.

While some view regulators as essential protectors of public interest, others perceive them as bureaucratic, inefficient, or unduly influenced by vested interests.

Using UK food regulation as a case study, drawing on academic study and over a decade as a senior practitioner, this presentation looks at the drivers of trustworthiness, methodologies for measuring trust, contemporary citizen perceptions, and actionable strategies to sustain and enhance trustworthiness.

Beyond the headlines: On the efficacy and effectiveness of misinformation interventions

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Abstract

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Research into how to best counter misinformation has enjoyed a great deal of popularity, but a discussion about how efficacy (successful lab studies) translates to effectiveness (real-world impact, such as behavioural change) is lacking. Lab studies have shown that many types of misinformation interventions are efficacious at achieving their intended outcomes (e.g., improving "veracity discernment", or the ability to distinguish true from false information). However, drawing on implementation science, we identify six challenges facing misinformation interventions research, and behavioural (and learning-based) psychological interventions more generally: 1) an overabundance of lab research and a lack of field studies; 2) the presence of testing effects, which impede intervention longevity and scalability; 3) modest effects for small fractions of relevant audiences; 4) a reliance on item evaluation tasks (e.g., rating a series of headlines as true or false) as the primary efficacy measure of interest; 5) low replicability in the Global South and a lack of

audience-tailored interventions; and 6) an underappreciation of potential unintended consequences of intervention implementation. We argue that it is time to look beyond item task performance as the primary outcome measure and to elevate both real-world outcomes and alternative measures of effectiveness (e.g., intervention attractiveness or user uptake) as equally important ways of assessing "what works".

We further provide practical recommendations for addressing each challenge and improving intervention effectiveness. First, researchers and funders may consider investing in rigorous field research and assessing intervention *effectiveness* (rather than only *efficacy*). This may be achieved using a set of Key Performance Indicators, which could be estimated from data collected during lab studies and supplemented with publicly available statistics. An example is the probability of sharing a misinformation article for an average adult given one hour of social media exposure on a given platform, pre- and post-intervention. Second, it is time to elevate additional outcome measures alongside item evaluation task performance. A practical first step could be to collect data on how likely an intervention is to be engaged with by the target audience by asking about its attractiveness, ease of implementation or interaction, and so on. Third, to counteract testing effects, we recommend exploring innovative ways of incorporating active rehearsal, for example through quizzes or gamification. Fourth, we recommend tailoring interventions to target audiences and combining "system-level" and "individual-level" interventions. Fifth, it is imperative to develop a better understanding of geographical and audience diversity, for example by co-designing interventions with local partners and audiences. Finally, we must begin to prioritise qualitative, cross-sectional research (alongside the more conventional quantitative tests of efficacy) to better understand how information (including misleading or factually incorrect information shared by self-interested actors) impacts beliefs, attitudes, and behaviours.

Public perception and energy

Hydrogen, relationality: a psychosocial approach to industrial energy disruptions

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Abstract

Hydrogen has significant potential as a means of integrating a decarbonised power sector with other sectors of the economy which are harder to decarbonise, including heavy industry and domestic heat. In this talk we aim to conceptualise the challenges for public perception that hydrogen integration might present in terms of disruption, that is to say the risks hydrogen integration might present to anticipated values, emotions, relationships and identities already circulating in communities where hydrogen infrastructure may be deployed. Building on the work of Asa Boholm, and our own recent research on hydrogen in domestic heating, we outline a relational, psycho-social approach to disruption in order to draw out the place and regional implications of new hydrogen infrastructure acceptability. Drawing on ongoing research in the South Wales Industrial Cluster, we highlight how such an approach can be operationalised in practice through the use of online ethnographic methods which seek to understand how past and present trajectories of economic and social life, shape relationships of the future through expectations. By first surfacing these expected trajectories, we aim to further elucidate the dynamic and diverse ways in which hydrogen might emerge as an object of risk, excitement, or mundane daily life, depending on the past and future relations it becomes related to. In so doing, we argue that it is only by focusing on histories, experiences and futures already existing in the "mind's eye" of local communities that we can anticipate the conflicts and synergies that industrial visions for hydrogen may give rise to.

Heating up at home: public risk perceptions and experiences of the 2022 heatwave in the UK

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Abstract

Decarbonisation of the energy sector will play a crucial role in mitigating climate change. Whilst progress has been made to reduce emissions in the electric power sector, this has been limited in the area of heating (including space cooling), which accounts for over a third of UK emissions. Energy use for space cooling is growing faster than any other end use in buildings globally, with an increase in the frequency and intensity of heatwaves. A growth in cooling demand is associated with significant risks, potentially contributing to increased electricity consumption and carbon emissions, increasing reliance on polluting refrigerant gases and impacting human health and productivity. This research presents findings of public perceptions and experiences of heatwaves, cooling demand and cooling technologies in UK homes. We present both qualitative and quantitative findings. The exploratory qualitative research design used participant-led photography, semi-structured interviews and deliberative workshops. Data collection involved engagement with 70 participants drawn from 5 dwelling types within urban locations in Southern England. Over 170 photographs were provided by participants representing how 'keeping cool at home' was visualised and interpreted during periods of higher temperatures and heatwaves. Semi-structured interviews were then conducted and analysed thematically. Subsequent deliberative workshops examined perceptions of modelled future temperatures and attitudes and acceptability towards a range of sustainable cooling technologies. We also commissioned an online representative survey (n=1,580) to examine heat risk perceptions, coping strategies and future adaptive responses to heat in the wider UK population. This presentation sets out synthesised research findings from across these diverse datasets to enable a new understanding of current and potential future cooling behaviours and strategies in UK homes. Factors impacting cooling demand and how future cooling demand and expectations are imagined in a warmer climate, for example with an increase in the frequency of heatwaves, are presented. Implications for policy to manage increased risks of higher temperatures is discussed, including mitigative and adaptive behaviours to address future risks and social acceptability of sustainable cooling strategies and technologies.

How people perceive Enhanced Geothermal Systems: A cross-national study on affective imagery, familiarity, and support

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Abstract

Widespread adoption of enhanced geothermal systems (EGS) hinges not only on managing technical risks, but also understanding how communities interpret and respond to new developments. This study assesses the positive and negative mental images people associate with EGS, and then investigates how those associations relate to geothermal energy familiarly, and support for increasing developments nationally. Data were collected via an online survey conducted in the United States (N=1,003) and Switzerland (N=1,028), two countries significantly expanding geothermal systems as part of net-zero carbon emission strategies. Most (65.3%) associated EGS with positive affective images especially of the technology as beneficial, clean, sustainable, innovative, efficient, and energy independent. Just over a third (34.7%) associated EGS with either negative images like risks of earthquakes, tampering with nature, and pollution (17.4%); or more neutral images such as EGS operations (e.g., "drilling", "electricity production"), planet Earth (e.g., "core", "curst"), the energy sector (e.g., "renewable technologies", "extractive industries"), and general curiosity (e.g., "intriguing", "interesting") (17.3%). EGS also was associated

significantly more with clean, renewable energy technologies vs. dirty, fossil fuel technologies, and a good vs. bad way to address climate change. Geothermal energy continues to be unfamiliar in US and Swiss populations, while EGS, specifically, enjoys high support for increasing developments nationally. Familiarity with geothermal energy was significantly related to more positive image associations, and higher support for EGS, while support also had a strong positive relationship with affective image associations, and a good vs. bad way to address climate change. Study findings provide a baseline of public perceptions of EGS that can inform upstream public engagement, and future research on a promising but underexplored energy technology.

The influence of human-induced seismicity on public support of deep geothermal development in the UK and US: A cross-national experiment

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Abstract

Despite a growing emphasis from the public and private sector on deep geothermal development, research examining the energy technology's social acceptability has not kept pace. As with any technology, deep geothermal poses some risks, including the potential to induce seismicity in the reservoir stimulation process. Many of these earthquakes are too small for human detection at the surface; however, the question persists if the potential for any human-caused earthquakes will decrease support. Our research tested the claim that telling people that they have accepted similar risks in the past will increase their risk acceptance. Such "risk comparisons" are generally understood as fraught in the literature; however, the boundary conditions wherein such comparisons might be effective are less understood. We collected data from N=2,036 UK and US adults via a cross-national online survey in the US and UK in April 2023. In addition to measuring respondents' prior experiences with earthquakes, our survey also used a between-subjects experiment to investigate how the potential for human-induced seismicity influences views toward deep geothermal depending on whether participants believe they have experienced similar tremors in the past. Specifically, after measuring potential covariates in the survey, the experiment prompted participants to enter the name of their state or county to see a "fabricated" historical level of seismic activity in their region. They then randomly received one of four message conditions, identical in terms of earthquake frequency and magnitude (e.g., three since 2017 with magnitudes less than two) but modify the cause, i.e., (1) only natural earthquakes (2) natural/human-induced combination, (3) only human-induced earthquakes, and (4) no earthquakes. After exposure to the message condition, participants answered a series of questions to measure general affective responses to deep geothermal and attitudes towards the technology nationally and locally. The results showed that the experimental treatment seems to have no effect on the US sample, but it did influence the UK sample. In the UK, respondents who were told there were only human-induced earthquakes in their region were least likely to support geothermal, whereas respondents who were told that both human and natural events occurred were most likely to support geothermal. One reason for this difference could be that UK residents have less experience with earthquakes (54% never experienced one, compared to 36% in the US). Another explanation could be that induced seismicity has received a fair amount of attention in mass media coverage of fracking here. There are some areas in the US that have had similar coverage, but the focus on earthquakes in association with fracking is much more common in the UK as a whole compared to the US as a whole. Therefore, the potential for induced earthquakes might be seen as more of an influential factor in the UK.

Posters

Risk research practice in the 21st Century: Guiding Principles from the ACCESS Project

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Abstract

While many academic discussions centre around the creation and dissemination of new knowledge, less time is spent thinking about and reflecting upon the practices underlying research. For example, considering our research practices, to what extent are considerations such as environmental sustainability, knowledge co-production and equity, diversity and inclusion being made? This poster presents findings and reflections from ACCESS, a UK research network designed to champion social science in climate and environmental research& policy-a broad research area within which many academics attending SRA-affiliated conferences would likely conduct their research. The poster presentation discusses the three guiding principles outlined above, examples of how they have considered in our research and practice, and examines the challenges and benefits of incorporating them into our work. Overall, the poster aims to create space for broader reflection and discussion about the way we do risk research: the extent to which we incorporate these principles, and others, into our work, the tensions that exist in incorporating them, and the potential benefits of doing so to more successfully tackle climate and environmental challenges.

A study into how people search for information and absorb knowledge related to a specific given search term.

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Abstract

The information available to the public on a GDF (Geological Disposal Facility) is an important starting point in the community engagement process for selecting a possible site in the UK. Even if there is some knowledge, an online search will often be a useful source of additional information. The study explored what information is available to the public, and how individuals searched and engaged with a topic they may have been unfamiliar with. The study took place in a controlled environment in a computer lab at the University of Portsmouth. The study involved 30 to 50 participants who were given a minimum amount of information about nuclear waste. They were then asked to fill out a questionnaire with a number of questions that were designed to ascertain their current knowledge of the subject area and how they would normally obtain further information about a subject. They were then asked to spend 20 minutes searching on a computer for information about nuclear waste, and each participant had a brand new, blank Google account which had a number associated to it. Participants were then asked for age and sex as the only demographic information. Ability to use a computer was one of the recruiting factors for participation. After the 20 minutes internet search the participants were then asked to complete another short questionnaire to ascertain what they now knew post search about the given subjects and see what knowledge they may have gained. The whole exercise took between 45 minutes to an hour. The blank Google accounts were then accessed and the search history analysed to see what websites they visited and for how long they stayed on a specific page. The results were then looked at and the small amount of demographic information was also incorporated into the results.

The idea was to form a picture of what information is being accessed, how people search for that data and how effective at transferring knowledge it may be.

The results and implications for the findings of this study are discussed and form the basis of the poster that I would like to produce for the conference.

Making a Hubbub: How Nudges Create Change Through Sustainability Campaigns

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Abstract

Non-profit organisations play a significant role in communicating sustainability issues and the climate crisis to the general public. Environmental charity Hubbub uses various attitude and behaviour change techniques, including social norms and nudges, to address issues such as litter, recycling, and plant-based diets in the UK. Nudge theory, pioneered by Thaler and Sunstein (2008), involves subtle policy shifts that alter behaviours in small, predictable ways without significantly changing economic incentives or limiting individual choices. This research project evaluates the effectiveness of these I-frame (individual-level) interventions and their potential to complement broader S-frame (systems-level) approaches.

Nudge theory is rooted in behavioural economics, building on Kahneman and Tversky's (1974) work, and suggests that presenting choices differently can influence individuals to make decisions benefiting themselves and the wider community. Hubbub's interventions, such as a nudge-based cigarette bin that reduced litter by up to 73% and a campaign that increased awareness and trial of plant-based milk alternatives, illustrate the potential of these approaches. Evidence indicates that I-frame approaches can raise awareness, change behaviours, and positively impact social norms, thereby supporting broader societal change.

Despite the potential of nudges, they have faced significant criticism. Critics argue that the focus on I-frame interventions has led to the neglect of S-frame interventions, which could create wider societal impacts (Chater and Loewenstein, 2023). There are concerns that nudges can be misused by corporations to deflect responsibility onto individuals, thus maintaining the status quo (Williams et al., 2022). For example, BP's promotion of the 'carbon footprint' concept shifted climate responsibility to individuals, diverting attention from industry-level reductions. Additionally, studies have shown that the effectiveness of nudges can vary significantly and may sometimes backfire, depending on context and application (Hummel & Maedche, 2019). Policymakers must be aware of these limitations and ensure that nudges are part of a broader strategy that includes both I-frame and S-frame interventions.

While S-frame policies, such as regulations and systemic changes, can address the structural causes of sustainability issues, they often face significant implementation challenges due to their complexity and scope. Diepeveen et al. (2013) suggest that nudge-based policies generally enjoy greater public and political support than more intrusive measures, making them more likely to be implemented. However, I-frame approaches should not be abandoned but seen as complementary to S-frame solutions. For instance, increasing the availability of plant-based options has normalised these choices, paving the way for public support of more transformative policies (Garnett, 2019). Similarly, the success of Hubbub's work on plant-based diets demonstrates how I-frame strategies can cultivate public acceptance of new behaviours, which could support the implementation of S-frame reforms.

In conclusion, while the focus on I-frame interventions has faced criticism, they remain essential in combination with S-frame approaches. This project will spotlight Hubbub's and other NGO's work can demonstrate how I-frame strategies can effectively raise awareness and change behaviours, creating the public support needed for broader systemic reforms. By balancing both approaches, policymakers could address sustainability issues more comprehensively, fostering societal change at both individual and systemic levels.

Framing and evaluating hazard impact knowledge using newspaper articles: an application to Kathmandu Valley, Nepal

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Abstract

Newspaper articles provide effective sources of natural hazard impact information. They can act as a proxy for hazard impacts not widely reported by other sources, such as those on "marginalised" communities. Here, we use newspaper articles to examine the impacts of natural hazards on squatter settlements in Kathmandu Valley, Nepal. Using Boolean searches, we use the LexisNexis online newspaper archive (1980s-2024) to systematically search for examples of natural hazard events (e.g., flood, fire) and their impacts in English. Results include hundreds of newspaper articles for each hazard (e.g., 155 articles for flood events). A content analysis of impact keywords, resulting in 21 categories of impact, indicates a focus on quantifiable impacts (e.g., damage to infrastructure), usually those that are direct and tangible, akin to other sources of impact information documented in disaster databases and grey literature. However, direct quotes from residents of squatter settlements (e.g., "Where to sleep, what to eat and how to spend the night?") provide valuable qualitative impacts that may be overlooked in other source types, as well as insights on risk drivers and the hazardscape context. These exemplars of hazard events and their impacts can help evaluate where to target disaster risk reduction strategies to reduce impacts on at-risk communities. The breadth of information captured in newspaper articles can also complement other data sources and enrich existing impact databases, especially in more data-scarce regions.