From perception to behaviour: The role of risk perception in self-protective behaviour, pro-environmental practices and policy acceptance

Christian Oltra (CIEMAT)

5TH ANNUAL MEETING OF THE SOCIETY FOR RISK ANALYSIS-EUROPE IBERIAN CHAPTER

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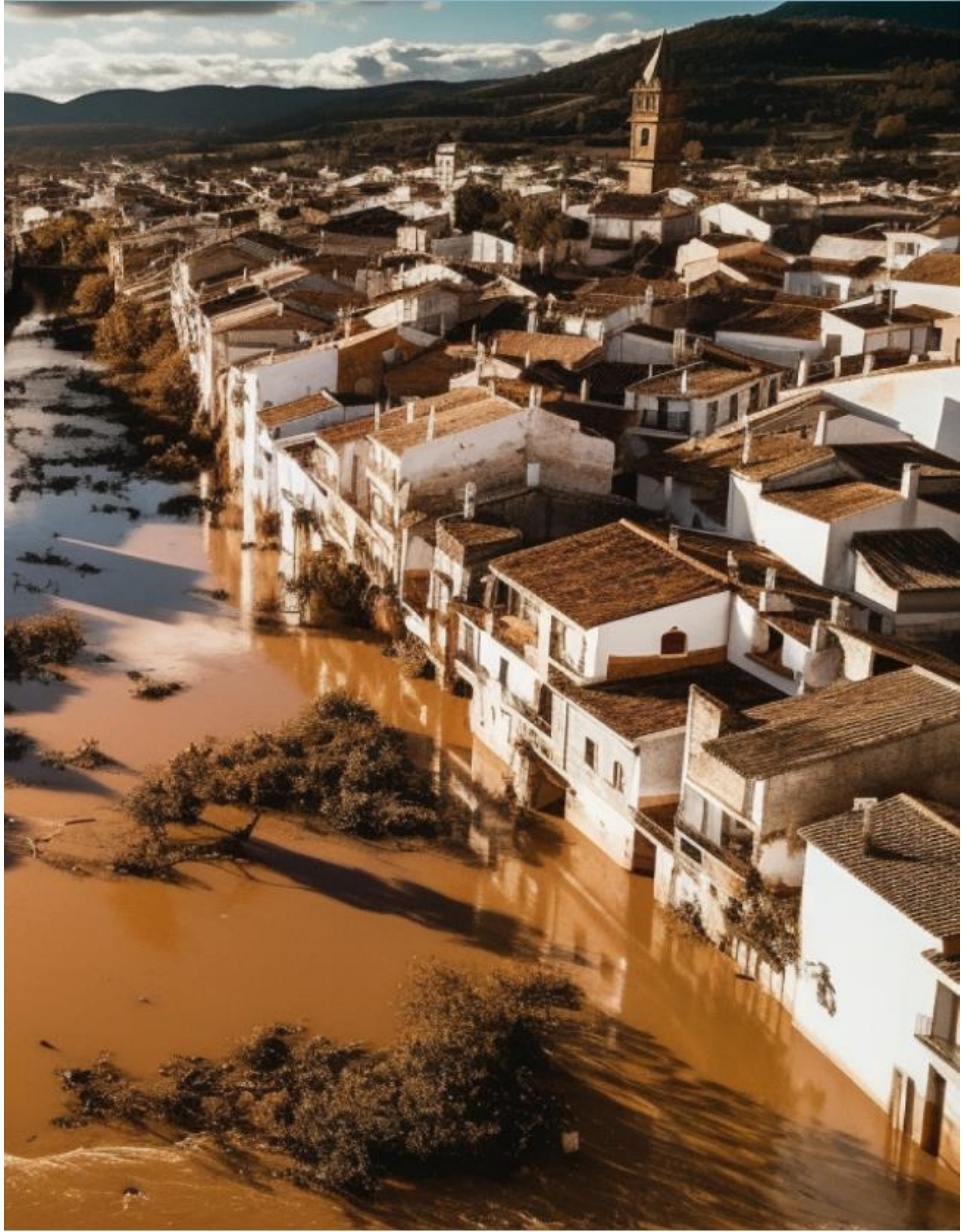
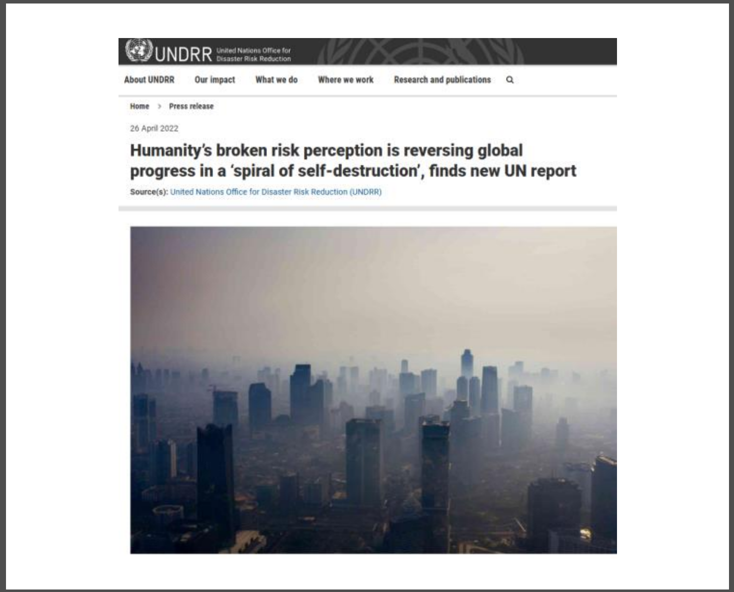
UCM, Madrid



Risk perception has emerged as a critical area for research and intervention in managing risks, addressing environmental challenges and facilitating energy transitions.

This focus stems from the recognition that individual action, both in the private (e.g. self-protection, consumption) and public spheres (e.g. voting, expressing support), plays a crucial role in these domains.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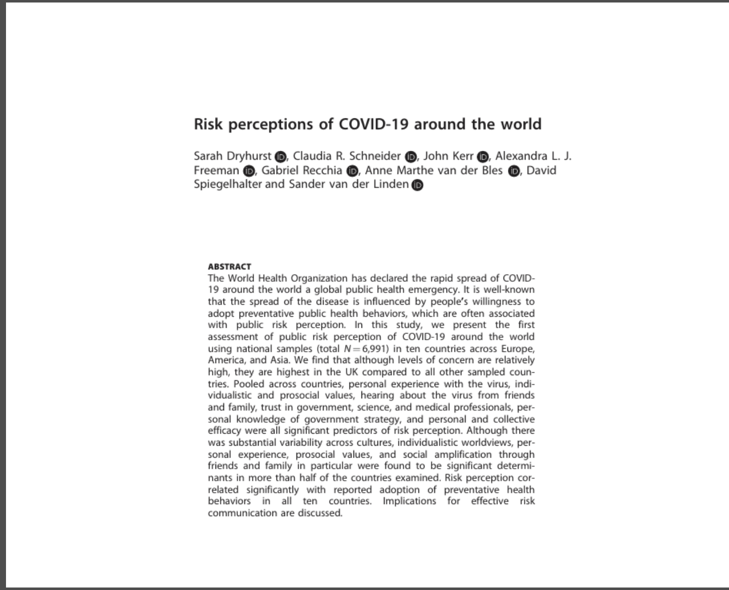
26 April 2022

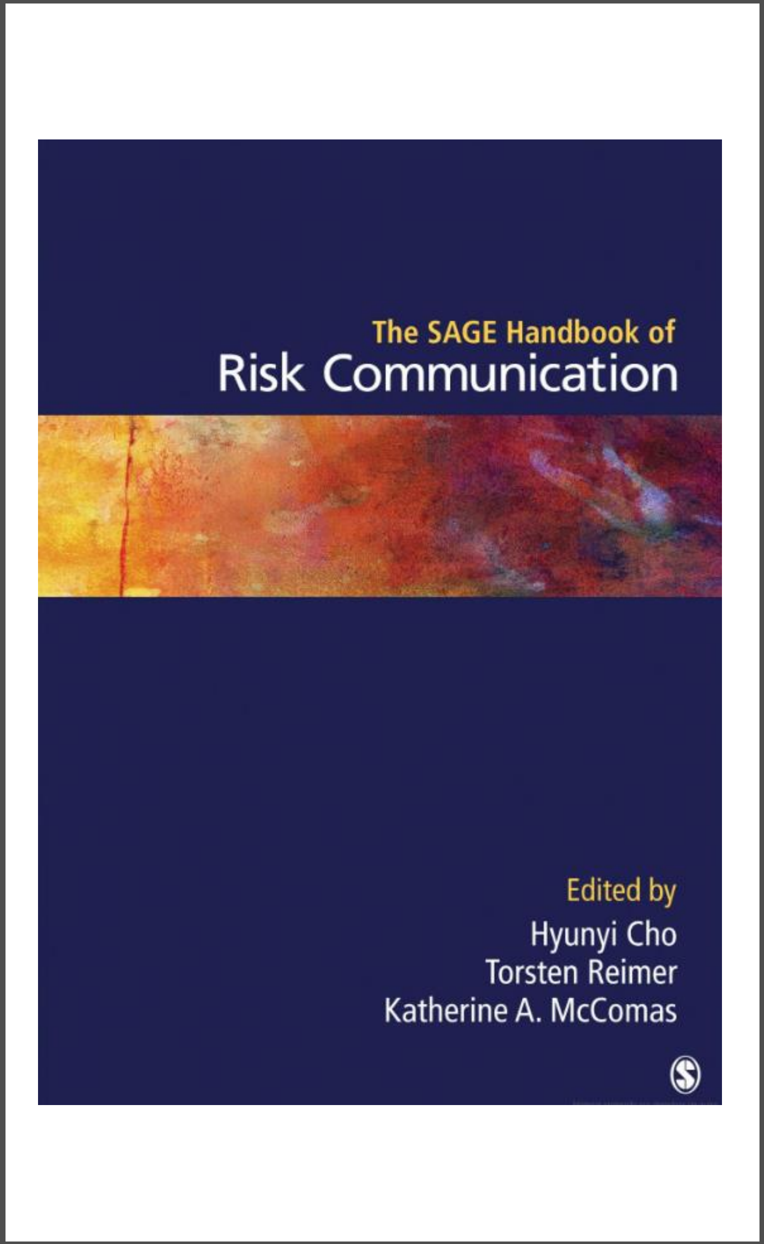
Humanity's broken risk perception is reversing global progress in a 'spiral of self-destruction', finds new UN report

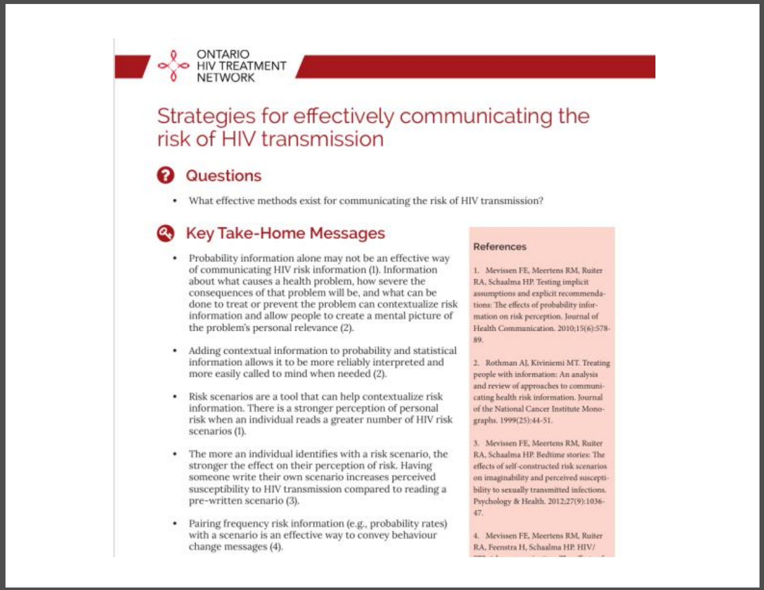
Source(s): United Nations Office for Disaster Risk Reduction (UNDRR)


Risk perceptions of COVID-19 around the world

Sarah Dryhurst, Claudia R. Schneider, John Kerr, Alexandra L. J. Freeman, Gabriel Recchia, Anne Marthe van der Bles, David Spiegelhalter and Sander van der Linden

ABSTRACT
The World Health Organization has declared the rapid spread of COVID-19 around the world a global public health emergency. It is well-known that the spread of the disease is influenced by people's willingness to adopt preventative public health behaviors, which are often associated with public risk perception. In this study, we present the first assessment of public risk perception of COVID-19 around the world using national samples (total $N = 6{,}991$) in ten countries across Europe, America, and Asia. We find that although levels of concern are relatively high, they are highest in the UK compared to all other sampled countries. Pooled across countries, personal experience with the virus, individualistic and prosocial values, hearing about the virus from friends and family, trust in government, science, and medical professionals, personal knowledge of government strategy, and personal and collective efficacy were all significant predictors of risk perception. Although there was substantial variability across cultures, individualistic worldviews, personal experience, prosocial values, and social amplification through friends and family in particular were found to be significant determinants in more than half of the countries examined. Risk perception correlated significantly with reported adoption of preventative health behaviors in all ten countries. Implications for effective risk communication are discussed.




ONTARIO HIV TREATMENT NETWORK

Strategies for effectively communicating the risk of HIV transmission

Questions

- What effective methods exist for communicating the risk of HIV transmission?

Key Take-Home Messages

- Probability information alone may not be an effective way of communicating HIV risk information (1). Information about what causes a health problem, how severe the consequences of that problem will be, and what can be done to treat or prevent the problem can contextualize risk information and allow people to create a mental picture of the problem's personal relevance (2).
- Adding contextual information to probability and statistical information allows it to be more reliably interpreted and more easily called to mind when needed (2).
- Risk scenarios are a tool that can help contextualize risk information. There is a stronger perception of personal risk when an individual reads a greater number of HIV risk scenarios (1).
- The more an individual identifies with a risk scenario, the stronger the effect on their perception of risk. Having someone write their own scenario increases perceived susceptibility to HIV transmission compared to reading a pre-written scenario (3).
- Pairing frequency risk information (e.g., probability rates) with a scenario is an effective way to convey behaviour change messages (4).

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Risk Analysis
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Original Research Article

Risk Perception: Reflections on 40 Years of Research

Michael Siegrist, Joseph Árvai

First published: 18 September 2020 | https://doi.org/10.1111/risa.13599 | Citations: 108

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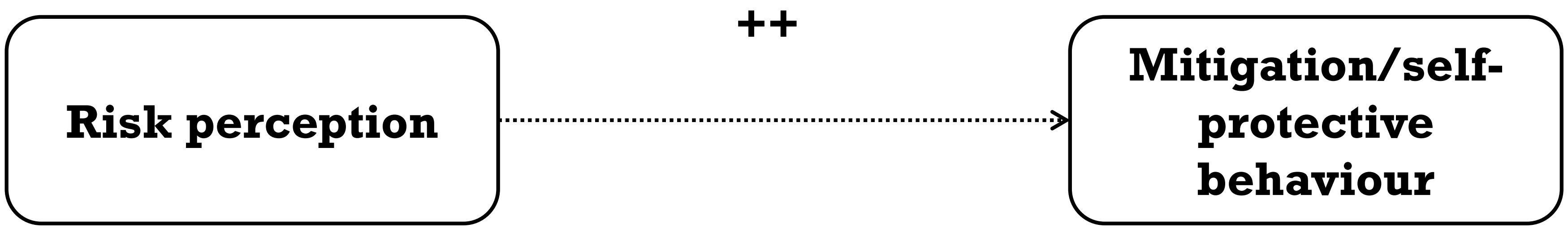
Abstract

Numerous studies and practical experiences with risk have demonstrated the importance of risk perceptions for people's behavior. In this narrative review, we describe and reflect upon some of the lines of research that we feel have been important in helping us understand the factors and processes that shape people's risk perceptions. In our review, we propose that much of the research on risk perceptions to date can be grouped according to three dominant perspectives and, thus, approaches to study design; they are: the characteristics of hazards, the characteristics of risk perceivers, and the application of heuristics to inform risk judgments. In making these distinctions, we also highlight what we see as outstanding challenges for researchers and practitioners. We also highlight a few new research questions that we feel warrant attention.

Underlying this emphasis is often the **implicit assumption** (in the academia, the media, the organizations and the policy spheres) that risk perception correlates positively with mitigation and/or self-protective behaviors at the individual level: if individuals change their beliefs about the risk, they will change their behavior



Behavioral Decision Theory Perspectives
on Protective Behavior

Paul Slovic, Baruch Fischhoff & Sarah Lichtenstein

September, 1985

sometimes distorted and that their preferences can be unstable, vague, or inconsistent. The results of this research run counter to the traditional presumptions of knowledge and rationality that underlie economic approaches to decision making under risk.

The third section of this paper shows how some of the findings of the first section can be applied to two specific policy problems dealing with protective behavior: purchasing flood insurance and wearing seat belts. We argue that, to be effective, policies need to be based on knowledge regarding the determinants of people's protective behavior. Empirical research can play an important role in providing such knowledge.

The fourth section describes research on the perception of risk. This research explores what people mean when they say that an activity or a technology is "risky". We find that many attributes other than death rates determine judgments of riskiness. Such attributes include catastrophic potential, risk to future generations, and dread. In contrast with the first section, the tone of this section is optimistic. We find that laypeople have strong, consistent and reasonable views about risk. In fact, their model of what constitutes risk appears to be much richer than that held by most technical experts.

The final section is a discussion of the problems encountered in trying to inform people about risk. A common reaction of industry and government officials to evidence of ignorance, misinformation, or faulty thinking has been to call for educational programs to correct these shortcomings. Although we applaud such efforts and do believe that


Analysis

Fear of immigration drove the leave victory - not immigration itself

Alan Travis

Home affairs editor

Victory for leave came despite fact that those who experienced highest levels of migration were least anxious about it

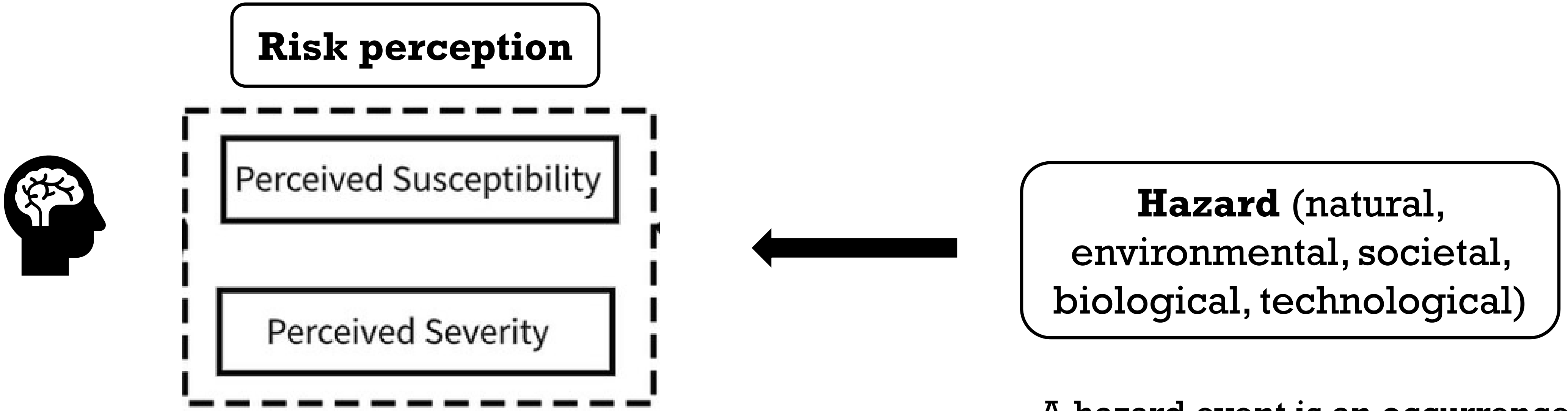
Is the assumption that risk perception is the main determinant of behavior empirically true?

Are there other more relevant factors determining behavior?

Is even risk perception a significant determinant of behavior?

What is risk perception?

Risk perception is a psychological construct (that can be measured or approximated) that results from the combination of two beliefs or perceptions: perceived susceptibility or probability and perceived severity of a hazard event



A hazard event is an occurrence that has the potential to cause harm, damage, or adverse effects

Perceived severity refers to an individual's assessment of how serious the consequences of a risk or threat would be if it were to occur. It's about the magnitude of harm or negative outcomes that a person believes would result from the risk. An individual's belief about the seriousness or magnitude of consequences if exposed to a threat or risk.

Perceived susceptibility is an individual's subjective assessment of their likelihood of experiencing a particular risk or threat. It's about how vulnerable a person feels to a specific risk.

Lay Foibles and Expert Fables in Judgments About Risk

BARUCH FISCHHOFF, PAUL SLOVIC, and SARAH LICHTENSTEIN*

Public perceptions of risk are a focal point of many debates about the management of hazardous technologies. Different views about what the public knows and wants often lead to quite different beliefs about what policies should be adopted and even about how society's policy-making processes should be structured. Often these views about the public are based on speculation or anecdotal observation. In the interests of having better informed debates, the present paper reviews existing empirical evidence about public risk perceptions. In doing so, it reaches a number of interim conclusions and draws forth their implications for the respective roles of technical experts and lay people in technology management.

KEY WORDS: Risk assessment; Risk perception; Subjective probability; Judgment; Technology management.

INTRODUCTION

ple and their capabilities, failure to validate such speculation may mean arrogating to oneself considerable political power. Such happens, for example, when one says that people are so poorly informed (and uneducable) that they require paternalistic institutions to defend them and, furthermore, that they might be better off surrendering some political rights to technical experts. It also happens, at the other extreme, when one claims that people are so well informed (and offered such freedom of choice) that one needn't ask them anything at all about their desires; to know what they want, one need only observe their behavior in the market place. It also happens when we assume that people are consummate hedonists, rational to the extreme in their consumer behaviour but totally uncomprehending of broader economic issues, so that we can impose effective fiscal policies on them without being second-guessed.

One reason for the survival of such simplistic and contradictory positions is political convenience. Some people want the lay public to participate actively in hazard management decisions, and need to be able to describe the public as competent; others need an incompetent public to legitimate an expert elite. A second

The Psychometric Study of Risk Perception

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Policy Sciences 9 (1978), pp. 127–152

How Safe is Safe Enough? A Psychometric Study of Attitudes Towards Technological Risks and Benefits*

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ABSTRACT

One of the fundamental questions addressed by risk-benefit analysis is "How safe is safe enough?" Chauncey Starr has proposed that economic data be used to reveal patterns of acceptable risk-benefit tradeoffs. The present study investigates an alternative technique, in which psychometric procedures were used to elicit quantitative judgments of perceived risk, acceptable risk, and perceived benefit for each of 30 activities and technologies. The participants were seventy-six members of the League of Women Voters. The results indicated little systematic relationship between perceived *existing* risks and benefits of the 30 risk items. Current risk levels were generally viewed as unacceptably high. When current risk levels were adjusted to what would be considered acceptable risk levels, however, risk was found to correlate with benefit. Nine descriptive attributes of risk were also studied. These nine attributes seemed to tap two basic dimensions of risk. These dimensions proved to be effective predictors of the tradeoff between acceptable risk and perceived benefit. The limitations of the present study and the relationship between this technique and Starr's technique are discussed, along with the implications of the findings for policy decisions.

Risk Analysis, Vol. 0, No. 0, 2020 DOI: 10.1111/risa.13599

Risk Perception: Reflections on 40 Years of Research

Michael Siegrist[1,*] and Joseph Árvai[2,3]

Numerous studies and practical experiences with risk have demonstrated the importance of risk perceptions for people's behavior. In this narrative review, we describe and reflect upon some of the lines of research that we feel have been important in helping us understand the factors and processes that shape people's risk perceptions. In our review, we propose that much of the research on risk perceptions to date can be grouped according to three dominant perspectives and, thus, approaches to study design; they are: the characteristics of hazards, the characteristics of risk perceivers, and the application of heuristics to inform risk judgments. In making these distinctions, we also highlight what we see as outstanding challenges for researchers and practitioners. We also highlight a few new research questions that we feel warrant attention.

KEY WORDS: affect heuristic; availability heuristic; hazards; naturalness; risk perception; values; worldviews

- Beyond simply accounting for what people fear and why, research on **risk perceptions is important because of what it means for risk exposure, risk communication, and risk management**.
- The terrorist attack of September 11, 2001 led—indirectly—to additional injuries and fatalities after the attack as more Americans, newly concerned about the security risks of air travel, opted for higher-risk long-distance travel by automobile instead
- Similar patterns emerge across a wide range of individual and societal hazards such as smoking, speeding, nuclear power, and genetic modification. In sum, **the manner in which people perceive risk is important because it influences individual behavior as well as the acceptance of—and commitment to—specific technologies, policies, and norms**.

Is risk perception as pivotal in shaping individual behavior as commonly assumed?

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DOI: 10.1111/jfr3.12752

ORIGINAL ARTICLE

CIWEM Chartered Institution of Water and Environmental Management | Journal of Flood Risk Management | WILEY

People, not just places: Expanding physical and social vulnerability indices by psychological indicators

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Abstract

Damage and disruption caused by floods do not just arise from the characteristics of physical structures, but also from the characteristics of residents inhabiting these structures. Social vulnerability analyses typically employ socio-demographic proxy indicators that do not address the risk attitudes, beliefs and agency of those living in areas at risk. To close this gap, this article introduces a range of indicators from psychological risk research. Physical, social and psychological indicators are compared for their influence on vulnerability outcomes such as building damage or emotional distress. Based on survey data of 456 Austrian at-risk households, hierarchical regression models confirm the added value of psychological indicators for measuring vulnerability above and beyond traditional physical and social indicators. Our findings show that psychological indicators are particularly important for explaining health impacts and distress. General intentions for flood preparedness, fear of flooding and self-efficacy are most relevant. For a more holistic view of vulnerability, measurement instruments should incorporate psychological indicators. Disaggregated household-level data is necessary to fully capture the variability between households living in the same flood-prone area. Indicators perform differently depending on the other indicators included, and the considered outcome; therefore, we caution against pooling indicators to composite indices of overall vulnerability.

KEYWORDS
coping capacity, natural hazards, resilience, risk assessment, vulnerability assessment

Risk perception, the combinationof perceived probability and severity of a hazard event, is a well-established precursor of private flood mitigation (e.g., Grothmann & Reusswig, 2006; Kievik & Gutteling, 2011). ***Although the magnitude of this relationship is contested*** *(Babcicky & Seebauer, 2019; Bubeck et al., 2012), households need to perceive a certain minimum level of risk in order to form intentions to take precautionary measures (Kievik & Gutteling, 2011).*

Risk Analysis, Vol. 32, No. 9, 2012 DOI: 10.1111/j.1539-6924.2011.01783.x

A Review of Risk Perceptions and Other Factors that Influence Flood Mitigation Behavior

P. Bubeck,[1,2,*] W. J. W. Botzen,[1] and J. C. J. H. Aerts[1]

In flood risk management, a shift can be observed toward more integrated approaches that increasingly address the role of private households in implementing flood damage mitigation measures. This has resulted in a growing number of studies into the supposed positive relationship between individual flood risk perceptions and mitigation behavior. Our literature review shows, however, that, actually, this relationship is hardly observed in empirical studies. Two arguments are provided as an explanation. First, on the basis of protection motivation theory, a theoretical framework is discussed suggesting that individuals' high-risk perceptions need to be accompanied by coping appraisal to result in a protective response. Second, it is pointed out that possible feedback from already-adopted mitigation measures on risk perceptions has hardly been considered by current studies. In addition, we also provide a review of factors that drive precautionary behavior other than risk perceptions. It is found that factors such as coping appraisal are consistently related to mitigation behavior. We conclude, therefore, that the current focus on risk perceptions as a means to explain and promote private flood mitigation behavior is not supported on either theoretical or empirical grounds.

KEY WORDS: Floods; mitigation; protection motivation theory (PMT); protective behavior; review; risk perception

"Our literature review shows, however, that, actually, this relationship (*between risk perception and mitigation behavior*) is **hardly observed** in empirical studies"

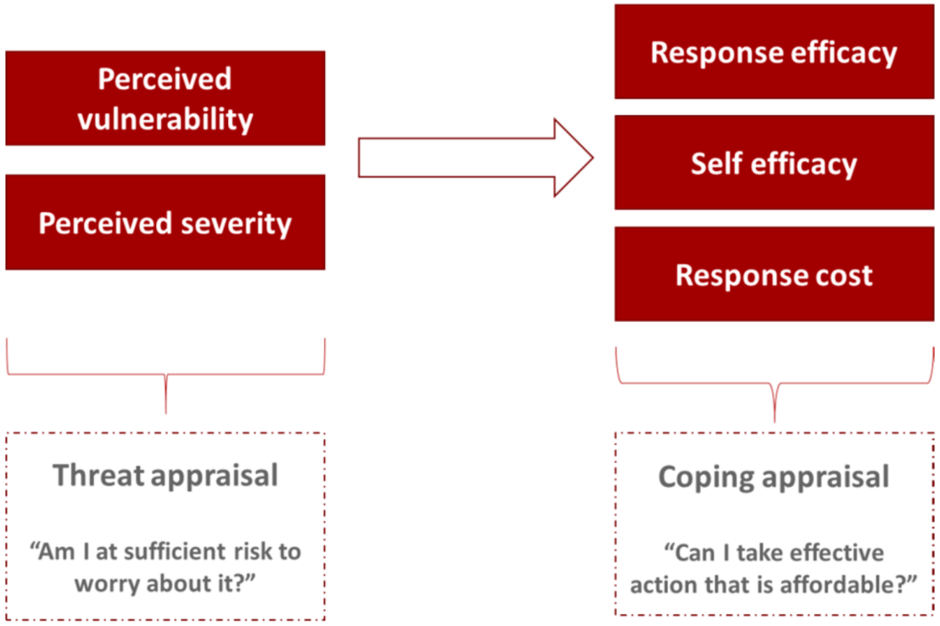
First problem: the role of emotions. Is fear or worry a better predictor of behaviour than perceived severity?

Traditional **risk perception models often focus on cognitive assessments** (e.g., perceived likelihood and severity). The assumption that these beliefs are the main determinant of behavior overlooks the crucial role that emotions play in the decision-making process and subsequent actions.

Emotional factors such as fear and worry show a positive correlation with the adoption of mitigation measures (Terpstra, 2011).

Slovic et al. (2007) proposed the **affect heuristic**, suggesting that emotions serve as a rapid, intuitive system for judging risks. This emotional assessment **often precedes and guides cognitive evaluation**. Loewenstein et al. (2001) argued that emotional reactions to risky situations often diverge from cognitive assessments (**Risk-as-Feelings Hypothesis**). In many cases, emotional reactions drive behavior more directly than cognitive evaluations of risk.

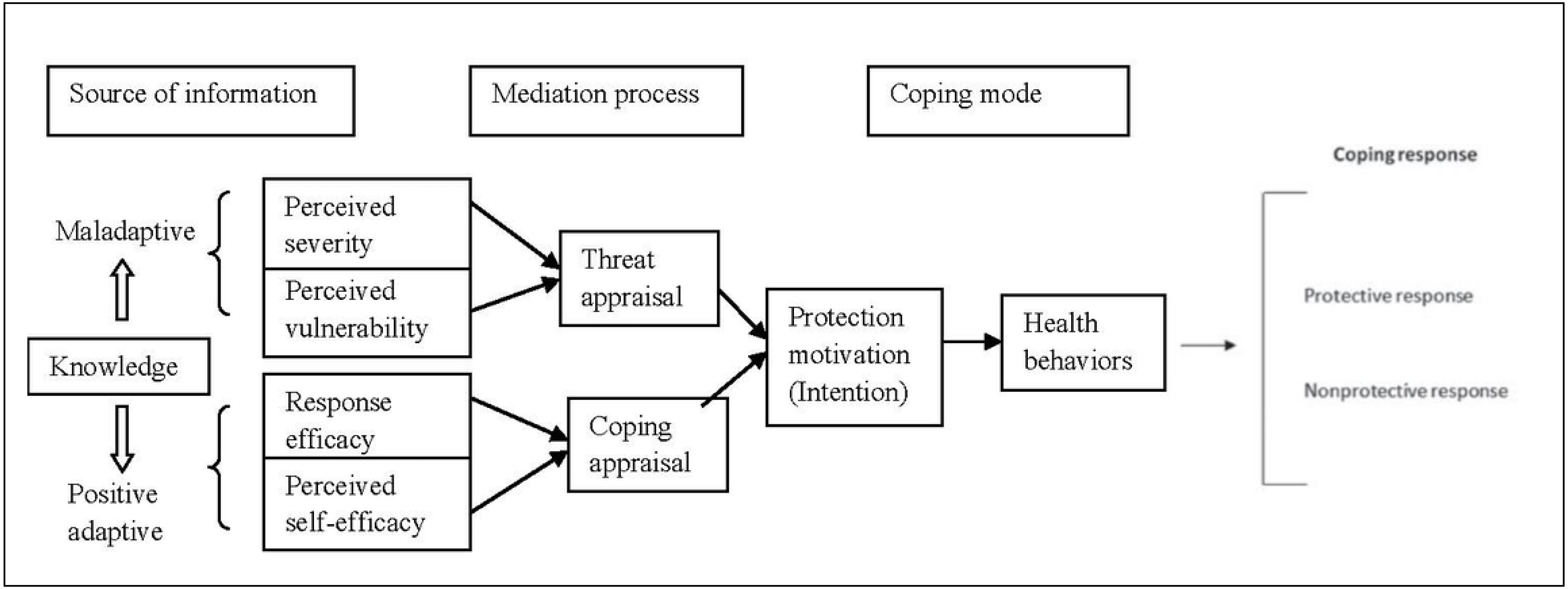
Second problem: threat appraisal alone might be insufficient to elicit protective responses without coping appraisal



Based on **Protection Motivation Theory**, **high-risk perceptions alone might be insufficient to elicit protective responses**. These perceptions must be accompanied by positive coping appraisal to result in effective protective behavior.

Without belief in the efficacy of protective measures or one's ability to implement them, high-risk perception may lead to maladaptive responses (e.g., fatalism, denial).

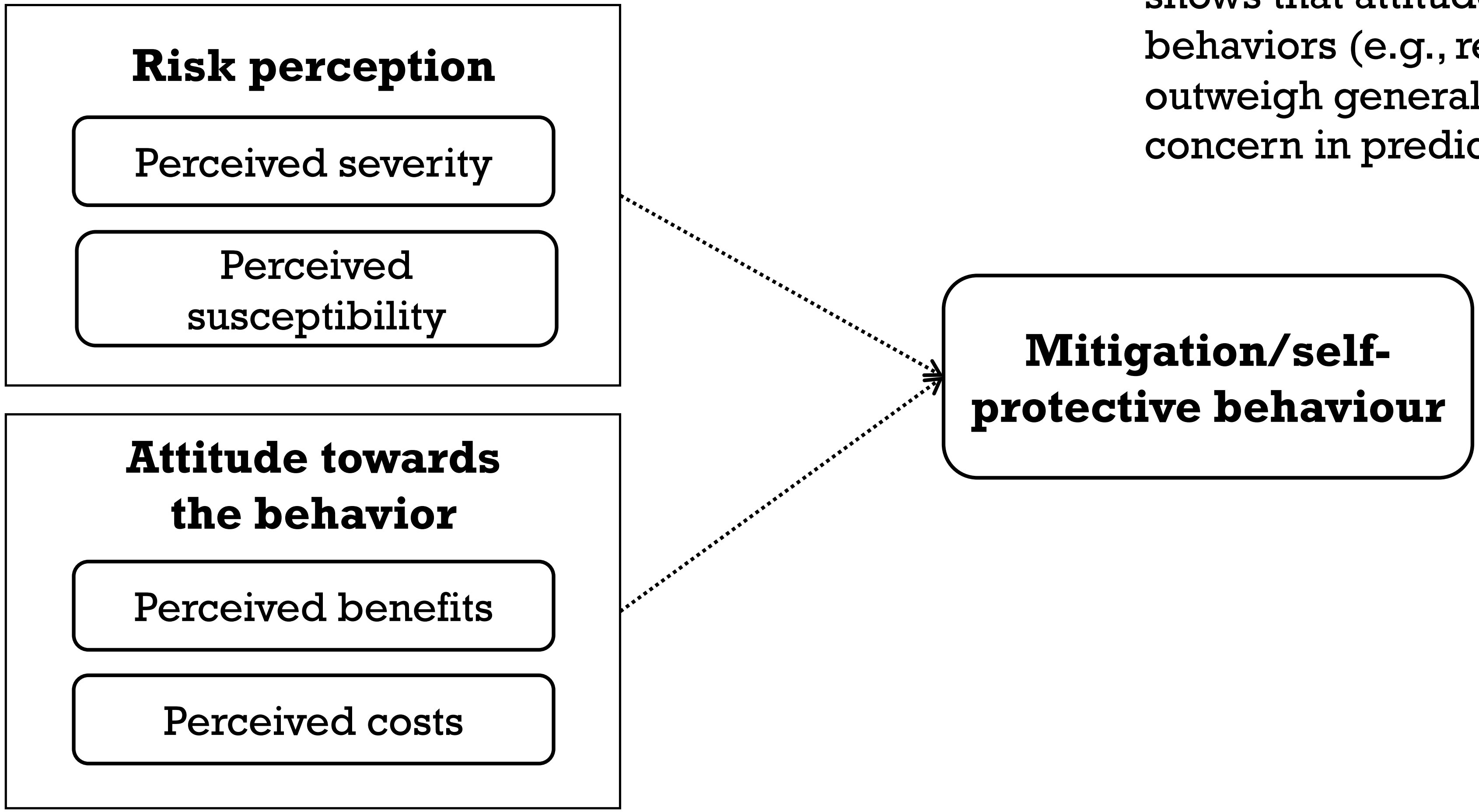
Two meta-analyses of PMT studies have evaluated the overall usefulness of PMT for predicting health-related protective behavior. Interestingly, both these meta-analyses, come to the conclusion that the "coping-appraisal" component of the model was found to have greater predictive validity of health-related intentions and behavior than the "threat-appraisal" component (Bubeck et al., 2012).



A schematic overview of protection motivation theory (adapted from Rogers and Prentice-Dunn, 1997).

Third problem: The attitude towards the behavior might be more important than the attitude towards the risk in predicting intention

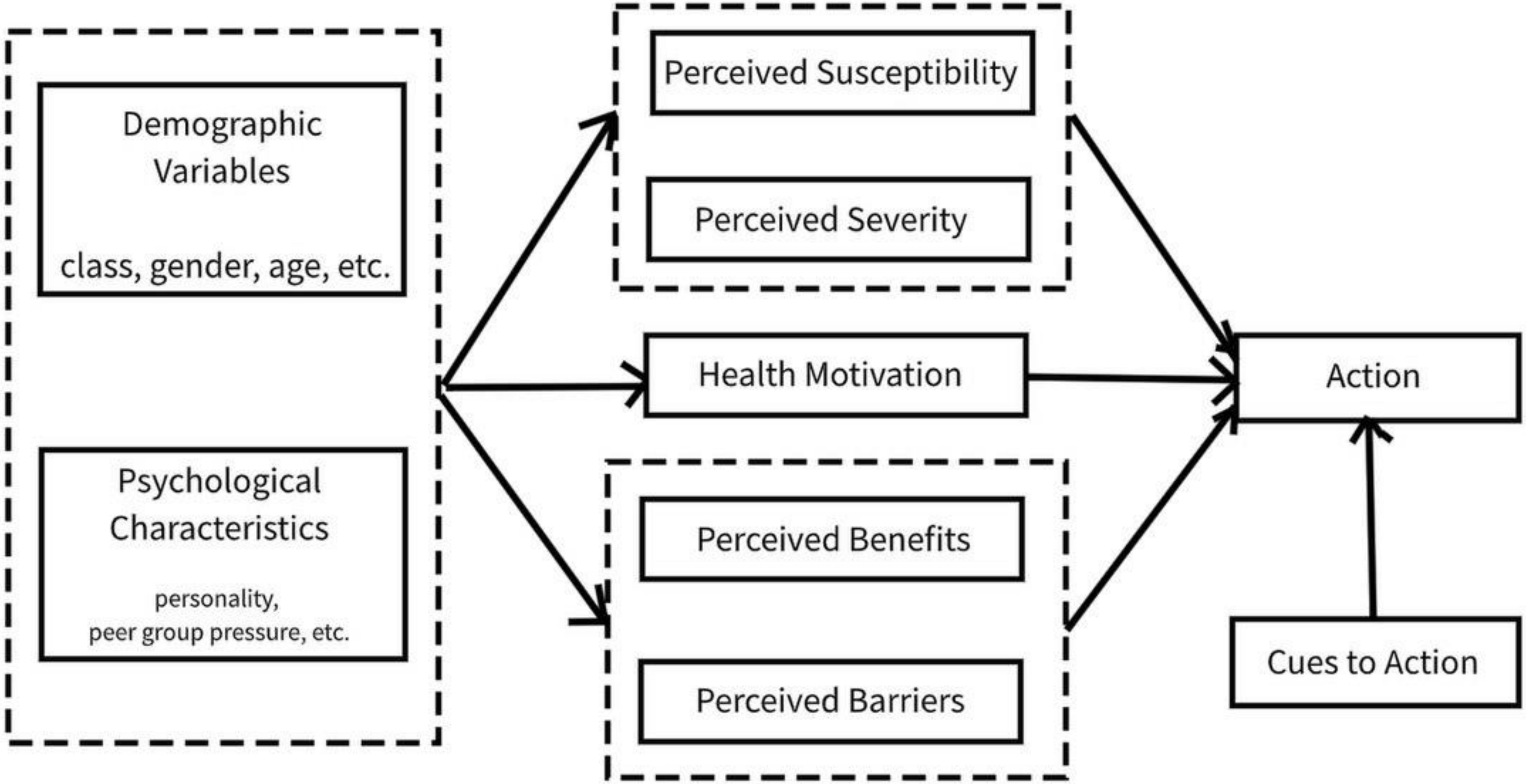
E.g. Research on pro-environmental actions (Bamberg & Möser, 2007) shows that attitudes towards specific behaviors (e.g., recycling) often outweigh general environmental concern in predicting actions.



Attitude towards the behaviour

- **Behavioral specificity**: Attitudes towards specific behaviors are more closely linked to actual actions than general risk attitudes.
- **Cost-Benefit analysis at the behavioral level**: Individuals evaluate each potential mitigating action based on its perceived: a) Benefits (effectiveness in reducing risk) b) Costs (time, effort, money, social implications). This granular evaluation leads to varying intentions across different risk-mitigating behaviors.
- **Multiple pathways for risk mitigation**: A single risk often has multiple potential mitigating actions. Individuals may have different attitudes towards each action, leading to varied intention levels.
- **Immediate vs. abstract consequences**: Behavioral attitudes often involve more immediate and concrete consequences. Risk attitudes may be more abstract and psychologically distant.

The Health Belief Model



Fourth problem: Perceived social norms and personal norms are often more important in driving intention (and behavior) that perceived severity and susceptibility

Table 1
Norm constructs with definitions and example items.

Norm construct	Definition	Example item
Personal norms	Self-expectation of specific action in a particular situation, experienced as a feeling of moral obligation (Schwartz, 1977)	"I feel that I should source-separate my green kitchen waste for composting for the sake of the environment" (Thøgersen, 2006)
Descriptive norms	What most people do. Motivate by providing evidence as to what will likely be effective and adaptive action (Cialdini, Reno and Kallgren, 1990, p. 1015)	"I believe that most of my acquaintances source-separate their green kitchen waste for composting" (Thøgersen, 2006)
Injunctive norms	Expected or perceived (dis) approval from others. Specify what ought to be done. Rather than simply informing one's actions, they enjoin it through the promise of social sanctions (Cialdini, Reno and Kallgren, 1990)	"I believe that most of my acquaintances expect that I source-separate my green kitchen waste for composting" (Thøgersen, 2006)

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Direct and mediated impacts of social norms on pro-environmental behavior

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ARTICLE INFO

Keywords:
Pro-environmental behavior
Personal norm
Social norm
Meta-analytic structural equation modeling
Meta-analysis

ABSTRACT

The social norm-based intervention is a frequently used tool for encouraging pro-environmental behavior. In designing effective interventions, however, both practitioners and researchers need more knowledge about the relationships between different norm constructs and pro-environmental behavior. In this study, we *meta*-analyze the predictive strength of injunctive, descriptive, and personal norms using *meta*-analytical structural equation modeling (MASEM). Data are extracted from 572 studies reported in 534 articles across 56 countries with a total sample size of $N = 312{,}127$. We find that internalized (i.e., personal) norms are consistently the strongest predictor of pro-environmental behavior and that personal norms mediate most of the impacts of injunctive and descriptive norms. Both injunctive and descriptive norms predict pro-environmental behavior, uniquely and with similar strengths. We find no significant moderations of collectivism or behavioral cost on the predictive strength of social norms on pro-environmental behavior.

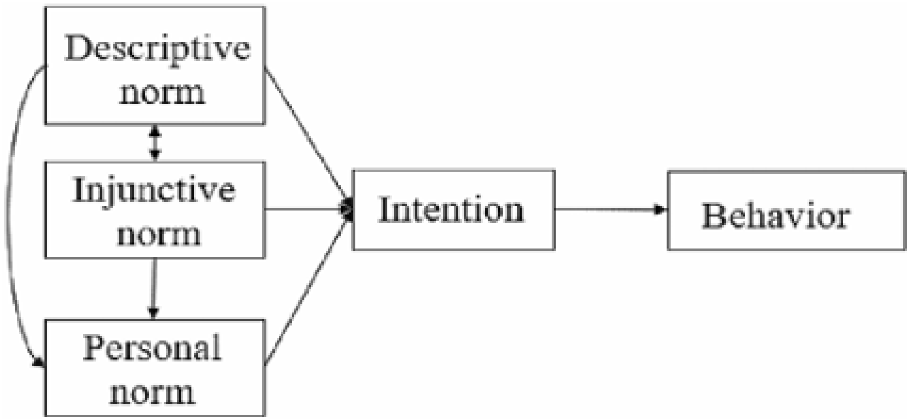

Fig. 2. Mediated model (model 2).

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Listen to others or yourself? The role of personal norms on the effectiveness of social norm interventions to change pro-environmental behavior

Judith I.M. de Groot [a], Krista Bondy [b], Geertje Schuitema [c]

Abstract

Social norm interventions are a cheap and convenient strategy to promote proenvironmental behavior change. However, the effectiveness of using them has been debated. The present study argues that the effectiveness depends on one's own internal moral compass, as presented by personal norms. We examined this main assumption across 3 studies focusing on pro-environmental behavior in a food and diets context. Study 1 shows in a cross-sectional design that people with stronger personal norms are more likely to reduce their meat consumption regardless of their perceptions of the static or dynamic social norms towards meat consumption. Furthermore, quasi-experimental findings show that dynamic (Study 2) and static (Study 3) social normative messages are more effective the weaker one's personal norms towards the pro-environmental behavior. Therefore, when evaluating the effectiveness of social norm interventions people's personal norms should be taken into consideration.

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Published online 15 April 2015 in Wiley Online Library (wileyonlinelibrary.com) **DOI:** 10.1002/jtr.2042

The Relative Importance of Social and Personal Norms in Explaining Intentions to Choose Eco-Friendly Travel Options†

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[2] *Norwegian School of Hotel Management, University of Stavanger, Stavanger, Norway*

ABSTRACT

Changes in current travel patterns are important in order to move towards a more sustainable future of tourism. This paper reports findings from a study ($N = 762$) investigating the relative importance of social and personal norms in explaining intentions to choose eco-friendly travel options. Personal norms showed the strongest association with behavioural intentions and further mediated the link between injunctive social norms and behavioural intentions. Overall findings indicate that social and personal norms seem both related to travel choices but that a particular emphasis should be given to the role of personal norms. Further implications of these findings are discussed. © 2015 The Authors. *International Journal of Tourism Research* Published by John Wiley & Sons Ltd.

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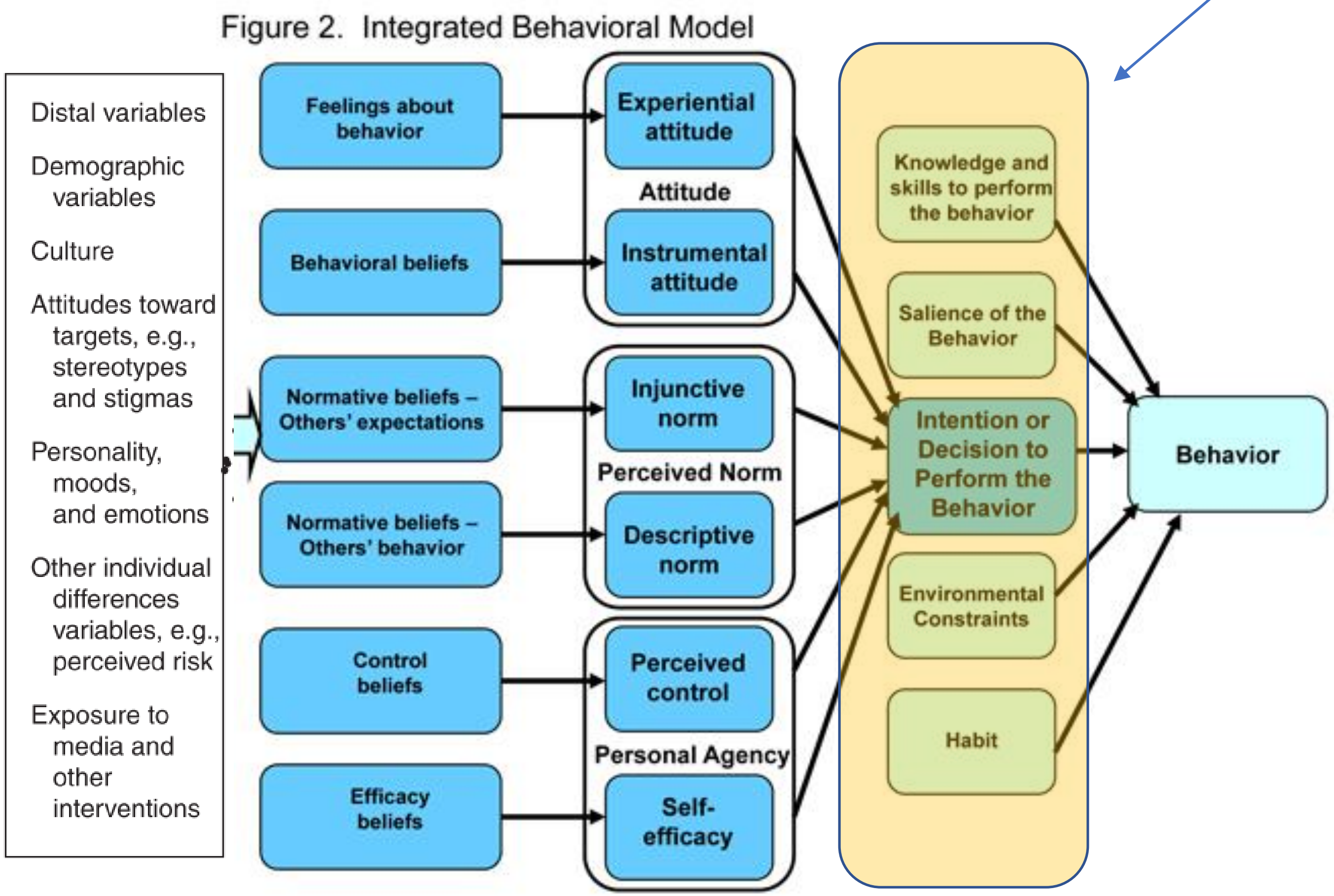
KEY WORDS sustainable tourism; travel choices; descriptive social norms; injunctive social norms; personal norms

Fifth problem: All these dimensions are determinants of intention to perform the behavior. But what about the other predictors of behavior not related to the personal intention?

Dimensions beyond intention



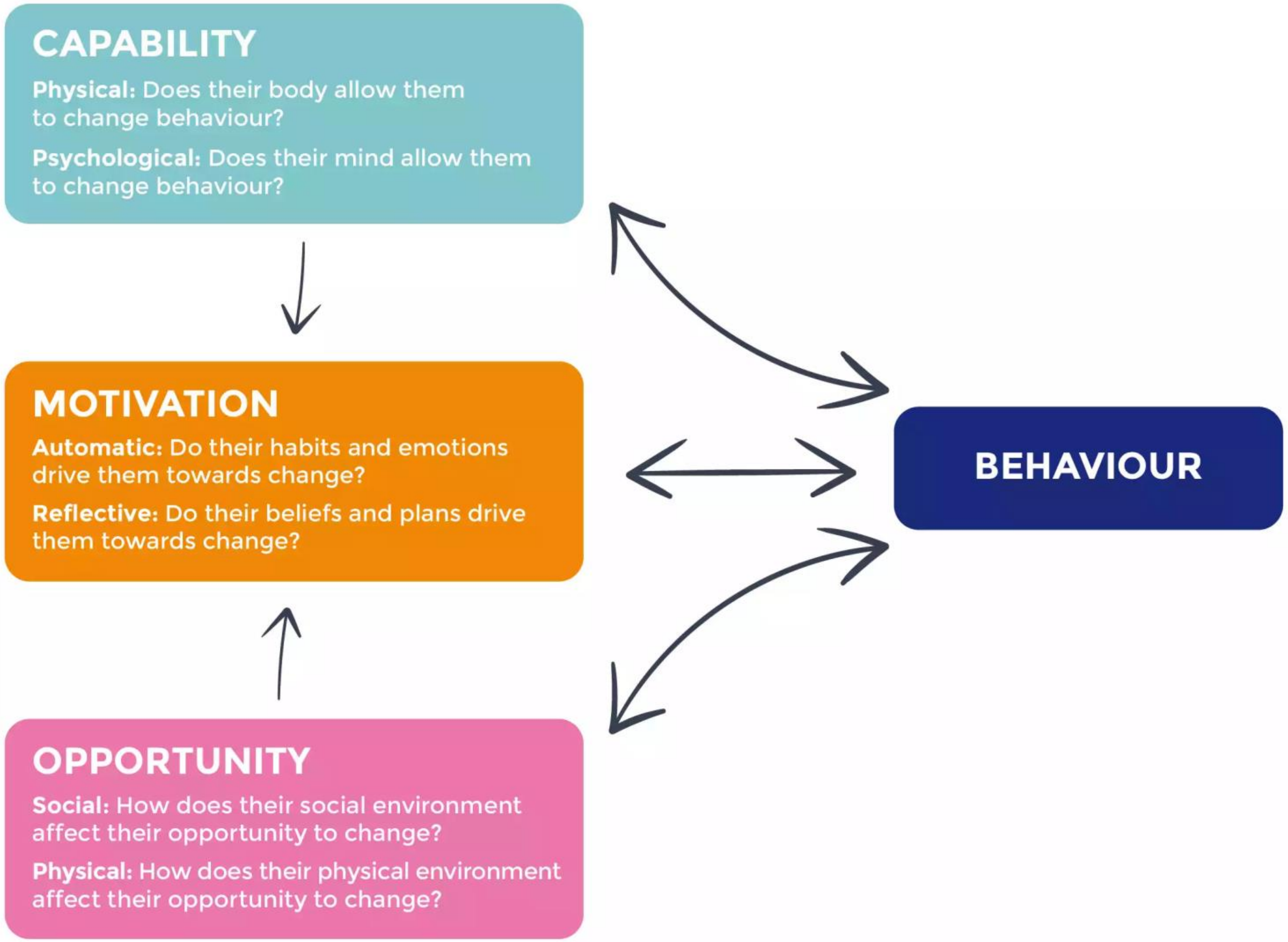
Integrated Behavioral Model (Fishbein and Yzer, 2003)

https://www.med.upenn.edu/hbhe4/part2-ch4-integrated-behavior-model.shtml

The COM-B model

The **COM-B model** for behavior change cites capability (C), opportunity (O), and motivation (M) as three key factors capable of changing behavior (B). Capability refers to an individual's psychological and physical ability to participate in an activity. Opportunity refers to external factors that make a behavior possible. Motivation refers to the conscious and unconscious cognitive processes that direct and inspire behavior.

This model recognizes that behavior is influenced by many factors, and that behavior changes are induced by modifying at least one of these components.



Other issues

- A possible feedback from already-adopted mitigation measures on risk perceptions has hardly been considered by current studies (reverse causality).
- Risk perception can be pre-determined by preexisting general attitudes and value orientations (e.g. moral values, ideology, new age beliefs, scientific reasoning capabilities, personal characteristics, etc.) (risk perception as a mediator variable)
- In the field of policy/project acceptance, other policy-specific beliefs (e.g. fairness) as well as trust in promoters and perceived legitimacy might be more relevant than risk perception

Conclusion

- While risk perception can influence behavior, **its significance varies greatly** depending on the context, the behaviour (policy acceptance vs mitigation behaviour) and the presence of other factors. In some situations, particularly when the risk is immediate and severe, risk perception can be a significant driver of behavior. However, in many cases, especially for long-term or abstract risks (like climate change), the link between risk perception and behavior is often weak.
- Perhaps individuals need to perceive a certain minimum level of risk in order to form intentions to take precautionary measures (Kievik & Gutteling, 2011).
- Various theories or models (value-belief-norm, theory of planned behavior, Integrated Behavioral Model and the COM-B model) suggest that **risk perception is just one component in a complex network of factors influencing behavior** (private consumption, self-protection and mitigation behaviours). These theories propose that attitudes towards specific behaviours, norms and perceived behavioral control all play crucial roles in determining actions.

Thank you for listening

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Social and subjective vulnerability to heatwaves in urban settings (VULNERA)

Funding: Proyectos de Generación de Conocimiento, Plan Estatal de Investigación Científica y Técnica y de Innovación (PEICTI)