



Review

Rethinking the relationship between flood risk perception and flood management



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HIGHLIGHTS

- We critically review theoretical developments around flood risk perception.
- Contemporary flood management thinking is inadequately informed by risk perception.
- Past research over-emphasises the cognitive perceptions of those at risk.
- Flood risk perception research could benefit from a more constructivist agenda.

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ABSTRACT

Although flood risk perceptions and their concomitant motivations for behaviour have long been recognised as significant features of community resilience in the face of flooding events, there has, for some time now, been a poorly appreciated fissure in the accompanying literature. Specifically, rationalist and constructivist paradigms in the broader domain of risk perception provide different (though not always conflicting) contexts for interpreting evidence and developing theory. This contribution reviews the major constructs that have been applied to understanding flood risk perceptions and contextualises these within broader conceptual developments around risk perception theory and contemporary thinking around flood risk management. We argue that there is a need to re-examine and re-invigorate flood risk perception research, in a manner that is comprehensively underpinned by more constructivist thinking around flood risk management as well as by developments in broader risk perception research. We draw attention to an historical over-emphasis on the cognitive perceptions of those at risk to the detriment of a richer understanding of a wider range of flood risk perceptions such as those of policy-makers or of tax-payers who live outside flood affected areas as well as the linkages between these perspectives and protective measures such as state-supported flood insurance schemes. Conclusions challenge existing understandings of the relationship between risk perception and flood management, particularly where the latter relates to communication strategies and the extent to which those at risk from flooding feel responsible for taking protective actions.

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1. Introduction

Flooding is a significant and worsening challenge for many human societies. Between 1900 and 2006, nearly one third of all natural disasters in the world were floods, and they accounted for nearly half of all people affected by natural disasters (Adikari and Yoshitani, 2009). Furthermore, the frequency of flood events appears to be on the rise, as is the amount of damage they cause (Schanze, 2006; Adikari and Yoshitani, 2009). Recent research has linked specific flooding events, as well as a general rise in the intensity of wet weather in the Northern Hemisphere, to the effects of rising greenhouse gas levels and global climate change (Schiermeier, 2011). Coupled with this trend is the growing recognition that absolute flood prevention or protection is unattainable, which has shifted attention towards managing flood risks from a more holistic perspective (Schanze, 2006; Scott et al., 2013). This observation holds true in much of the general literature around disaster risk and management, which is increasingly focused on understanding how and why damage from disasters occurs, who is affected, and what strategies, measures and interventions can be implemented to manage and mitigate the impacts. These investigations have been intimately connected with and informed by developments in understandings of ‘risk’ and how people live with uncertainty (Tversky and Kahneman, 1982; Douglas, 1985; Blaikie et al., 1994; Slovic, 2000; Faulkner and Ball, 2007; Slovic, 2010).

Definitions of ‘risk perception’ must inevitably draw from characterisations of risk itself. Simpler portrayals of risk as ‘measures of hazards’, with hazards then defined as ‘threats to people and what they value’ (Kates and Kasperson, 1983, p. 7029) have slowly been supplanted by more sophisticated definitions which portray risk as the intersection between a hazard, the exposure of people/assets to the hazard, and the vulnerability of the people/assets that are exposed (Crichton, 1999, cited in Schneiderbauer and Ehrlich, 2004). This breakdown of the three elements of risk (hazard, exposure, vulnerability) underpins current understandings of risk in a wide range of fields, including research around natural disasters (e.g. Blaikie et al., 1994; Nott, 2006). Furthermore, it usefully illustrates the relationship between behaviour and risk (i.e. certain behaviours can potentially alter exposure and/or vulnerability to a hazard). Such behavioural responses are driven by human assessments which incorporate a weighting of the perceived risk (White, 1945; Slovic et al., 1974; Kates and Kasperson, 1983; Burton et al., 1993). These intuitive judgements, through which people assess the potential impacts and consequences of a hazard and choose appropriate behavioural responses, are commonly referred to as risk perceptions (Slovic, 1987).

The important role that perception plays in how individuals and communities respond to risk has achieved widespread contemporary recognition in the general risk management literature. A recent Special Issue of the Journal Risk Analysis on the subject argues that ‘perceptions of risk and risk related behaviors may amplify the social, political, and economic impact of disasters well beyond their direct consequences’ (Burns and Slovic, 2012, p. 579). The contributions also highlight the need for better understandings of the links between emotions, risk perceptions and behaviours, as a precursor to developing more effective risk communication and disaster management policies. However, when the focus shifts from general risk to flood risk management, the role of risk perception in the literature appears somewhat under-developed. Historically, flood management approaches – i.e. those which focus on physical flood defences or on improvements in monitoring and prediction – have tended to

overlook the social dimensions of flooding, such as public understanding of the hazard (Brown and Damery, 2002). Nonetheless, flood risk perception has, for some time, been recognised as a crucial factor in developing effective flood management strategies. The manner in which people (households, businesses, governance bodies, etc.) perceive and understand flood risk shapes the judgements they make and the actions they take in preparing for and responding to flood events. Research interest in the field has been growing (e.g. Messner and Meyer, 2006; Raaijmakers et al., 2008), but still warrants further development.

This paper argues that there is a need to re-examine and reinvigorate flood risk perception research, in a manner that is comprehensively underpinned by contemporary thinking around flood risk management as well as by developments in broader risk perception research. We note recent contributions from Bubeck et al. (2012) and Kellens et al. (2013) which have articulately reviewed the empirical literature on flood risk perceptions. Both found significant weaknesses in current understandings, highlighting a paucity of evidence for the relationship between individual flood risk perceptions and mitigation behaviour, and a failure to make use of theoretical frameworks that are available in social science research. Our analysis seeks to address some of these weaknesses and strengthen the theoretical underpinnings of the field by reviewing the major constructs that have been applied to understanding flood risk perceptions (Section 2), and contextualising these within broader conceptual developments around risk perception theory and contemporary thinking around flood risk management (Section 3). In doing so, we highlight two broad strands of thinking in relation to risk perceptions, which we call constructivist and rationalist approaches. We show that progress in the broader domain of risk perception, which has to some degree sought to unite the insights drawn from both approaches, has not yet been reflected in research around flood risk perceptions. This presents a significant opportunity to enliven and enrich the field, in order to better inform flood management policies and strategies (Sections 4 & 5).

2. Major theoretical constructs used to describe flood risk perception

2.1. Bounded rationality

Interestingly, some of the earliest explorations of risk perceptions around natural hazards were focused on flood risk with researchers seeking insights into why people choose to live on floodplains, despite a constant threat of flooding, and the adjustments they made to enable them to cope in these environments (White, 1945; Kates, 1963, 1964; Burton et al., 1968). These studies broke new ground in conceptualising the problem as being at the interface between social and natural systems (Burton et al., 1968; Kates, 1971). The basic premise behind the research was that ‘floodplain occupancy represents an interaction between the requirements of a human system with its economic, social, and geographical relationships, and a hydrologic system marked by strong elements of uncertainty’ (White, 1945, p. 436). These enquiries into why people select to live in risk-prone areas worked under the assumption that habitation choices are based on the trade-offs that exist between the benefits of living in a particular location and the associated hazards (Kates, 1963; Burton et al., 1965; White, 1972). Whilst these contributions were strongly rooted in rationalist thinking, this generation of risk perception researchers soon realised that conventional rationalist cost–benefit assessments were insufficiently nuanced to capture

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