

# Alternative ways of flood risk communication: Evaluating a serious game and a workshop

## Introduction

Household-level protection measures can help reduce potential damage to private households in flood-prone areas. To promote private precaution, different risk communication methods have been applied, such as brochures and online material. Workshops and serious games as innovative risk communication tools potentially reach a broader audience and offer different learning opportunities. To date, risk communication methods are rarely evaluated. They have both not been implemented and evaluated systematically, so far. These studies aim at filling this gap.

## Methods

In independent studies, set in flood-prone communities, a workshop and a serious game on private flood protection were evaluated. A pre-post questionnaire based on the protection motivation theory (PMT) was used to assess their effect in Germany.

## Serious Game

The game was tested in two experiments: Experiment 1 (01-03 2017) was carried out in Magdeburg (238,000 inhabitants), a city located at the river Elbe in Saxony-Anhalt. The 121 participants were randomly assigned to one of three groups: one group played the serious game SchaVIS (fig. 1) while a second used a flood map and a third used a leisure map (control 1, map). Experiment 2 (03-06 2018,  $n = 60$ ) took place in Regensburg (Danube), Lüneburg (Elbe) and Potsdam. Participants either played the flood game or a leisure game (control 2, game).



Figure 1. Scene from the serious game SchaVis. (Midtriggerer GbR, www.midtriggerer.de)

A repeated measures ANOVA for self-efficacy showed a treatment effect,  $F(3, 176) = 4.4, p = .005, \eta^2_{part} = .07$ . However, only the difference between the flood game and the flood map were significant (fig. 2). Self-efficacy can be regarded as a prerequisite for protection motivation and action.

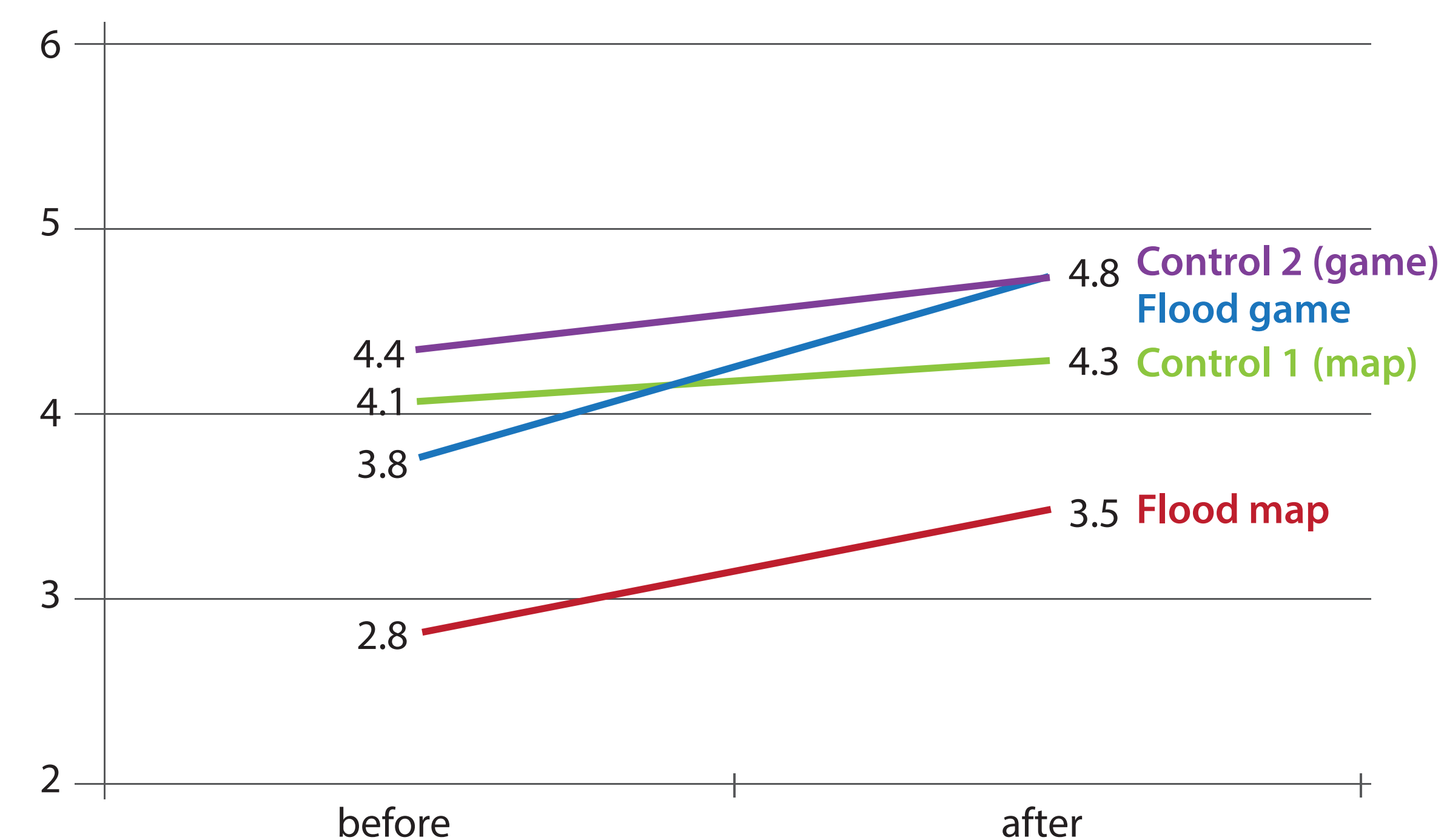


Figure 2. Self-efficacy across the groups flood game ( $n = 69$ ), flood map ( $n = 40$ ), control 1 ( $n = 41$ ) and control 2 ( $n = 30$ ). The three items indicating self-efficacy were measured on a 7-point scale (1/does not apply at all – 7/fully applies).

## Workshop

Six workshops were held in different municipalities in the German federal states of Saxony, Saxony-Anhalt, Hamburg and Berlin. A flood expert and a researcher led the interactive workshops. Topics ranged from behavioural precaution to property protection (fig. 3). 115 participants filled in the pre-post questionnaires.



Figure 3. Choice of illustrative material used during the workshop. (K. Brewitt)

The participants' self-efficacy, flood knowledge and protection motivation increased while fear did not (fig. 4). Moderator analyses further revealed, that especially people with little previous knowledge on flood protection and those with no flood experience benefitted from the workshop.

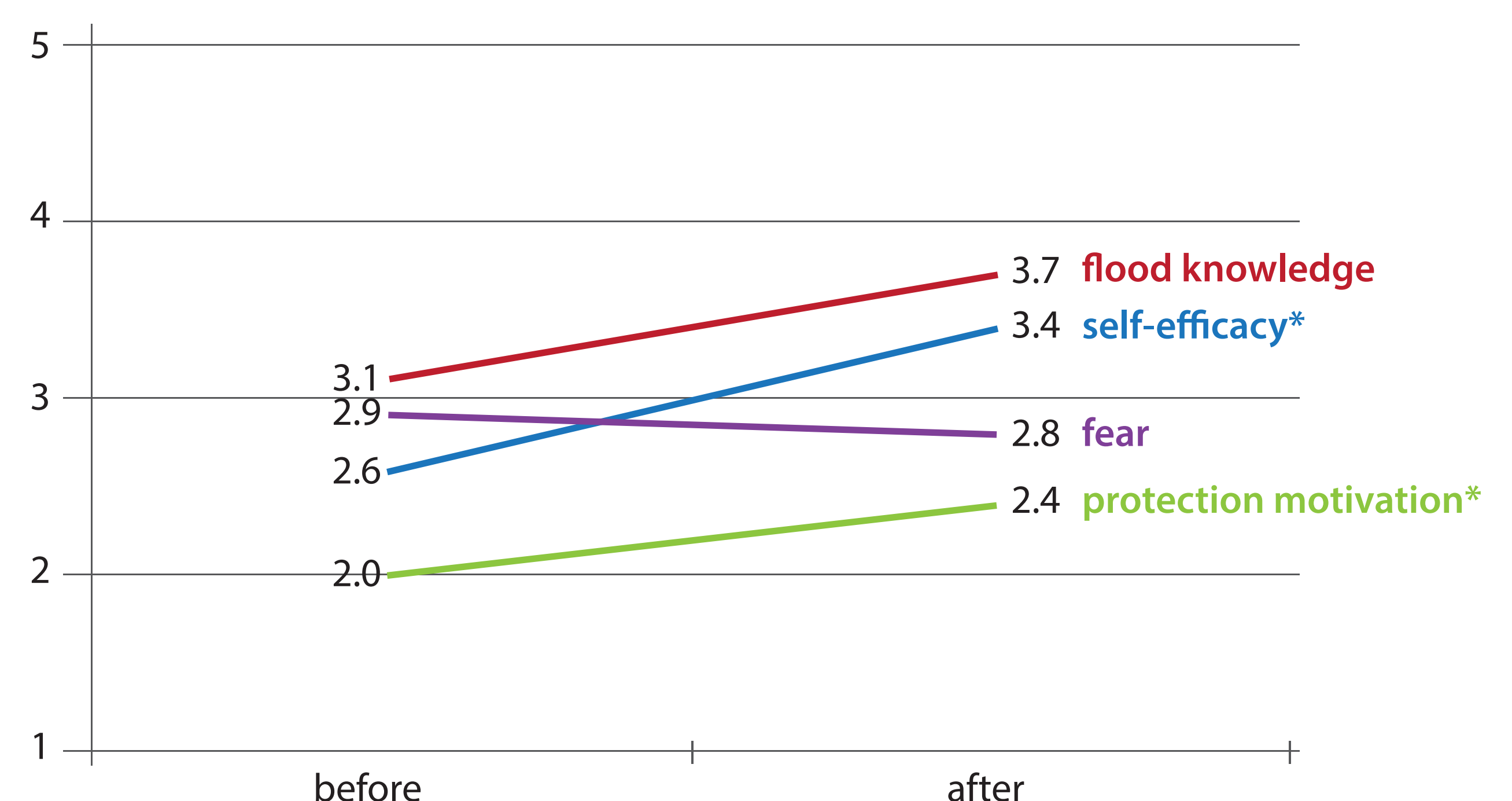


Figure 4. Scale means of self-efficacy, flood knowledge, protection motivation and fear. Each scale consisted of three items (except of protection motivation, five items), which were answered on a 5-point scale (1/does not apply at all – 5/fully applies). \* $p < .001$

## Limitations & Open Questions

- How to reach flood-prone individuals (in the experimental setting and in real life)?
- How to install a meaningful control group?
- Do serious games and workshops have a long-term-effect on protection motivation and lead to an actual implementation of measures?

## Conclusion & Outlook

Serious games and workshops are still rarely used for flood risk communication. The studies show how flood cognition can be influenced positively through such alternative tools. Both measures need to be continuously refined and evaluated to keep costs low and reach more flood-prone residents in order to keep them informed and motivated.

### Literature

- Heidenreich, A. (2017). Vor mir die Sintflut?! Ein Experiment zur wahrgenommenen Selbstwirksamkeit in Bezug auf Hochwasserschutzverhalten (unpublished master thesis). Otto von Guericke University Magdeburg.  
Heidenreich, A., Masson, T., & Bamberg, S. (in review). Beware of the flood! Evaluating a workshop on private flood protection.