

Response to CC1 – Submission NHESS-2023-64

Dear Alexandre Pereira Santos,

Thank you for your thoughtful evaluation of our manuscript and for initiating a discussion regarding the application of theories and the multidisciplinary nature of resilience and its development. We acknowledge your viewpoints and recognize the many opportunities for further research of the research community to enhance our understanding of the driving factors of protective behavior and resilience in the context of natural hazards.

Nonetheless, we disagree with the suggestion to incorporate these considerations into our current manuscript for the following justifications:

First, you claim that the literature part could be improved by including more scholars and discussing more contextual factors that are assumed to influence resilience. We agree that many more factors influence resilience than those we discussed in the literature part of our manuscript and that, if one would like to draw a more comprehensive picture of the development of resilience, a more in-depth discussion on these factors should be included. However, we would like to emphasize that the primary research aim of our study is not the general development of resilience, although we recognize its significance as a research area warranting further exploration. Instead, our research objective is explicitly centered on examining frequent flood experiences' influence on protective behavior and self-reported resilience. Consequently, we believe that incorporating the literature and theories you mentioned may not enhance the manuscript's value in terms of alignment with our research objective and could potentially reduce its clarity in linking our research objective to theory and existing knowledge.

Second, you mention the well-established Protection Motivation Theory (PMT) and claim that its factors are not fully included in our empirical model. Whereas we agree that establishing stronger links between theory and empirical outcomes, we also want to highlight that the research strategy of our study follows an inductive reasoning approach, as we want to get a better idea of how the number of experienced flood events influences protective behavior and self-reported resilience. Therefore, we do not intend to test an existing theory as the PMT, as we would if we followed a deductive approach.

Third, you criticize the absence of the role of social capital in our study. We agree with you that social capital is an important factor in the context of protective behavior and resilience. It is important to note that many factors play a crucial role in this domain (for a review, Kuhlicke et al., 2023; Bamberg et al., 2017), as also highlighted in our manuscript. However, due to

constraints such as lack of data, or the Principle of Parsimony in empirical modeling, we will never be able to include all the factors that may influence the outcome variable in a regression model. Accordingly, it requires precision in selecting the independent variables to ensure the development of a robust and well-fitted model aligned with our research aim. With our study, we want to measure the influence of frequent flood experience on protective behavior in the past and self-reported resilience. Furthermore, we are interested in the existence of nonlinear relationships. To follow this specific research aim, we follow an exploratory research design, including the number of experienced flood events in the model as the primary variable of interest and other variables, referring to the demographic background and building characteristics, as control variables. Consequently, whereas social capital is an interesting research field, it does not belong to the key elements we want to analyze with our study.

Given these considerations, we appreciate the valuable insights and perspectives you shared. We believe your comments will contribute to the ongoing discourse and advancement in the field.

Sincerely,

Lisa on behalf of the co-authors

Cited literature:

Bamberg, S., Masson, T., Brewitt, K., and Nemetschek, N.: Threat, coping and flood prevention – A meta-analysis, *J. Environ. Psychol.*, 54, 116–126, <https://doi.org/10.1016/j.jenvp.2017.08.001>, 2017.

Kuhlicke, C., Madruga de Brito, M., Bartkowski, B., Botzen, W., Doğulu, C., Han, S., Hudson, P., Nuray Karanci, A., Klassert, C. J., Otto, D., Scolobig, A., Moreno Soares, T., and Rufat, S.: Spinning in circles? A systematic review on the role of theory in social vulnerability, resilience and adaptation research, *Glob. Environ. Chang.*, 80, <https://doi.org/10.1016/j.gloenvcha.2023.102672>, 2023.