

Response to RC1 – Submission NHESS-2025-1362

Dear Reviewer,

Thank you for taking the time to review our manuscript “Polarization in Flood Risk Management? Sensitivity of norm perception and responsibility attribution to frequent flood experience”. We appreciate your evaluation and the insightful comments that help to improve the quality of our work. Below, we address each of your comments point by point and propose corresponding adjustments to the submitted manuscript.

Comment 1: The introduction frames the literature gap as there being limited knowledge on the drivers of responsibility attribution and norm perception, and suggest frequent flood experience as being a possible driver. Yet, from my understanding quite some studies have looked into the drivers of these two concept, as shown in the literature overview as well. The authors could elaborate how their study extend on previous literature to strengthen their research gap.

Answer: In the literature review, we present existing knowledge and theories on the drivers of norm perception and responsibility attribution. From this we support your impression that studies have already looked at the drivers of responsibility attribution and (to a much lesser extent) norm perception generally. However, we also conclude from the existing literature that there is a lack of knowledge on how experience, specifically *frequent* experience, interacts with these two concepts, emphasized in the literature part:

Lines 129-130: “However, the effect of personal experience, exemplarily through social learning and ingroup dynamics, remains widely unclear.”

Lines 133-135: “(...) studies investigating personal experience as a driver, especially of norm perception, are scarce. In addition, the relationships between experience, perceived norms, and responsibility attribution are rarely integrated in existing theoretical frameworks.”

We are open to write this in a less finite tone, by replacing “widely unclear” with “relatively unclear”.

Further, we contribute distinct analyses of attributions to different players in the domain of flood risk management: to self, the community, the city and the state, and compare them. Most of the studies that we reviewed were not distinguished in that detail.

From your comment, we understand that we did not highlight these knowledge gaps and the corresponding contributions to existing knowledge sufficiently in the manuscript. Therefore, in the revised version we will emphasize this more.

Comment 2: Throughout the manuscript locus of control and self-efficacy seems to be used interchangeably, whereas only self-efficacy is included in the independent variables. While both are construct related to control, self-efficacy in behavioral literature refers to one’s confidence in being able to perform/implement a measure. Locus of control, on the other hand, refers to one’s belief whether they can control the outcome of their life. The authors could examine which concepts they are referring to, and adjust the manuscript accordingly.

Answer: We support the importance of being strict in using technical terminology. In the manuscript, we investigate the effect of perceived self-efficacy and helplessness on the relationships between frequent flood experience, norm perception, and responsibility attribution. Throughout the text, we sometimes refer to these terms by using the term “locus of control”. We did not intend to use self-efficacy and locus of control interchangeably, but rather as a term to subsume perceived self-efficacy and expected helplessness during future floods under one umbrella word. We agree that using “locus of control” can be misleading, as the term is its own psychological concept. Therefore, we propose adjusting the three text parts that include the term by not referring to “locus of control” but “perceived control” or “sense of control” instead. We propose to change the following textparts:

Lines 167 – 168: “From the theoretical considerations, we hypothesized that locus of control and group identification could play a mediating role.”

Proposed revision: “From the theoretical considerations, we hypothesized that perceived control of future flood risk and group identification could play a mediating role.”

Lines 475 – 477: “In conclusion, we observe patterns of polarization with respect to the attribution of responsibility and the perception of norms when people experience multiple flood events, particularly pronounced in certain groups. Based on this, we hypothesize that locus of control and the desire to maintain a capable self-image are drivers of the observed polarization.”

Proposed revision: “In conclusion, we observe patterns of polarization with respect to the attribution of responsibility and the perception of norms when people experience multiple flood events, particularly pronounced in certain groups. Based on this, we hypothesize that factors related to sense of control over future flood risk and the desire to maintain a capable self-image are drivers of the observed polarization”

Line 528 – 531: “For people with low self-efficacy beliefs and low expected controllability of future floods, a polarization between an increase in perceived social norms versus a decrease in moral obligation to participate in collective actions can be observed. From these results, we conclude that locus of control and group identification could have a polarizing effect.”

Proposed revision: “For people with low self-efficacy beliefs and low expected controllability of future floods, a polarization between an increase in perceived social norms versus a decrease in moral obligation to participate in collective actions can be observed. From these results, we conclude that sense of control over future flood risk and ingroup identification could have a polarizing effect.”

Comment 3: Regarding the questions used to elicit the variables, the author could elaborate on the development of these items/scales. Are these validated items/scales based on previous literature, or did the author develop the items themselves?

Answer: We agree that sharing information on the scaling and definition of the items benefits the scientific value of the manuscript. Therefore, we will add this information to the revised manuscript. Specifically, we propose adding information on the scaling (7-point-likert scale) and conceptualization of the items to section 4.2.

Comment 4: Another concern relates to the representativeness of the sample, especially in relation to the generalizability of the results. Providing the socio-demographics and reflecting on the representativeness would strengthen the study.

Answer: We agree that the idea that presenting the sociodemographic characteristics of the sample increases the generalizability of the results. Therefore, we will include respective information as well as the information at the national level in the revised version of the manuscript.

Comment 5: Most concerningly, the (polarization in) flood risk management and implications for disaster risk reduction section is written as if it is broadly applicable. Yet social norms seem to be strongly influenced by their local environment, limiting the more general recommendations.

Answer: In the limitations section of the manuscript, we mentioned that the results and interpretations must be seen in light of this, and that replication studies are needed to support the results and drawn conclusions/ stated implications for disaster risk reduction. However, from your comment, we understand that we should also make this clearer in the implications section and formulate it less generalized. We will take this into account in the revision of the current manuscript by adding the assumed regional dependency of norm perception and responsibility attribution also to the implications section.

Comment 6: In the limitation section, the exclusion of covariates, such as the socio-demographics, and its implications is reflected upon. I am not suggesting that this should be included explicitly, but the reasoning for such methodological decisions could be reflected upon.

Answer: We acknowledge that including more independent variables in the model would most likely increase the explained variance of the outcome variables, thereby improving a general understanding of the drivers behind norm perception and responsibility attribution. Against this backdrop, we agree that in the manuscript we should better reason why we decided against including further independent variables. The decision is mainly based on two reasons. First, there is (to our knowledge) no theoretical framework nor empirical evidence that sociodemographic variables are necessarily impacting responsibility attribution and norm perception that would reason the respective model specification. Second, with the current study, we aim to shed light on a potential relationship between frequent flood experience, norm perception, and responsibility attribution and not to build a model that best predicts the outcome variables. We will add this reasoning to the revised version of the manuscript to section 4.2.

Independently of that, we want to emphasize that including gender, ownership structure, and age as covariates does not alter the effect strength and significance of the experience variable. We are open to adding this information as footnote to the revised manuscript.

Comment 7: No regression statistics are reported, such as the observations and adjusted r-squared per model iteration.

Answer: We agree that presenting the sample size per model iteration would benefit the study. Therefore, we will add this information to the revised version of the manuscript. However, we do not think that adding the adjusted R-squares and F-statistics to the presented regression statistics would substantially improve the interpretability of the results since the scientific goal of our study is to estimate the link between frequent flood experience, norm perception, and responsibility attribution rather than explaining a high share of variance in the outcome variables. However, we have no strong objection to including the respective values in the revised manuscript in the interest of completeness and transparency.

Comment 8: Line 37, Köhler & Han (2024) should be Köhler and Han (2024)

Answer: We will adjust this in the revised version of the manuscript.

Comment 9: Line 73, Begg (2017) should be Begg et al. (2017)

Answer: We will adjust this in the revised version of the manuscript.

Comment 10: Line 106, highly, should this be highly?

Answer: This should be “highly” and will be corrected in the revised manuscript.

Comment 10: Appendix A1 seems to be missing confidence intervals for personal responsibility

Answer: The missing confidence intervals are not intended and will be added in the revised version of the manuscript.

Thank you again for your valuable input and critical assessment of our manuscript. We are looking forward to your feedback on the proposed revisions.

Sincerely,

Lisa on behalf of the co-authors