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A Small Chance of a Something Terrible? Does providing additional information about likelihood and impact severity affect public responses to impact-based warnings?

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INTRODUCTION

Impact-based forecasts (IBF) combine information about the likelihood of severe weather events with information about potential impact severity to provide warnings based on local risk rather than the exceedance of meteorological thresholds. Having adopted IBF in 2011, the UK Met Office's Severe Weather Warning Service uses a risk matrix in determining warning level (i.e. yellow, amber, red). Within this system a red warning always denotes a high-impact event with high-probability of occurring. However, amber and yellow warnings can denote either high-probability lower-impact events or low-probability high-impact events. While the full risk matrix is provided to emergency responders, public weather warnings are issued using the warning colour only. In this project we investigated whether providing a public audience with additional information about probability and potential impact severity in different formats affects perception of weather risk, trust in the forecast and willingness to act.

METHODOLOGY

An online experiment was conducted with a sample of 550 UK residents through the Qualtrics market research panel. Participants were randomly assigned to one of three conditions: 1) warning colour only (i.e. reflecting current public weather warning communications); 2) warning colour with accompanying statement about probability and impact; or 3) full risk matrix. Participants were presented with wind warnings for events classified as high-probability high-impact (HPHI Red), high-probability moderate-impact (HPMI Amber) and low-probability high-impact (LPHI Amber). Presentation order was randomised. For each warning participant rated perceived risk (anticipated likelihood, anticipated severity, and concern), trust in forecast, and likelihood of undertaking a protective response.

RESULTS

Repeated-measures Analysis of Variance tests found that anticipated likelihood, severity, concern, trust and protective intention were all significantly higher for HPHI Red warnings than HPLI Amber warnings, and all significantly higher for the HPLI Amber warnings than the LPHI Amber warnings. Multivariate Analysis of Variance tests found that, compared to those in the colour-only condition, those shown the risk matrix reported greater anticipated likelihood, severity and concern when shown the HPLI Amber warning, and greater perceived severity when shown the LPHI Amber warning. There was no effect of warning format on response to HPHI Red warnings.

DISCUSSION

Our findings demonstrate that red warnings evoke high perceived risk, trust and protective intention irrespective of whether any information about probability or impact severity is present. For amber warnings however, we find that low-probability high-impact events evoke lower perceived risk, trust and protective intention, than warnings for high-probability moderate-impact events. This may indicate a tendency for events explicitly classified as being 'low likelihood' to be disregarded. While a tendency to be less concerned about low-probability high-impact events may not be objectively 'wrong', it does highlight the need for further work to explore how warnings for low-probability high-impact should be communicated when precautionary action is desirable.