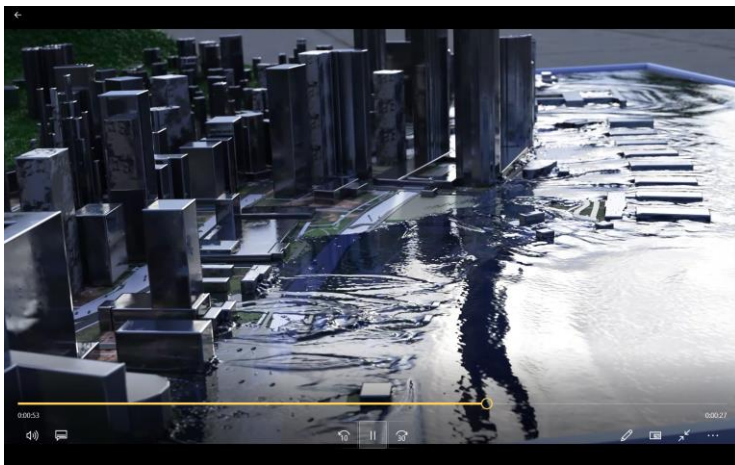


No easy way to communicate risks of climate change, new research finds

- *New research from the Singapore Management University shows that having individuals visualise the shock of future climate change failed to motivate them to change behaviour*
- *Research insights demonstrate the importance of customising communication strategies to different groups, from climate sceptics to individuals already living sustainable lives*
- *This research paper is newly published in [PLOS Climate](#), an open-access journal that furthers understanding of climatic impacts and solutions*

Singapore, 2 February 2023 – There is no easy way to engage with the general public to communicate the risks of climate change, according to a new study. Contrary to the adage of ‘seeing is believing’, individuals who saw what the future impacts of climate change may look like were not positively motivated to make behavioural changes. This was particularly true for climate sceptics¹ and for individuals who already live more climate-friendly and sustainable lives.

Led by Assistant Professor [Terry van Gevelt](#) from the [College of Integrative Studies](#), Singapore Management University (SMU), this research investigated the use of immersive virtual experiences to communicate the risks of climate change to the general public, with a focus on coastal cities in Asia. This latest study, “Using virtual simulations of future extreme weather events to communicate climate change risk”, is based on experimental survey data from 1,500 respondents in Hong Kong, conducted in 2021.



Respondents experienced a virtual simulation of a storm surge induced by a future typhoon in Hong Kong

Elaborating on the research methodology, Assistant Professor Terry van Gevelt said: “We created a completely feasible and rigorous model of an extreme weather event amplified by the expected impacts of climate change. This extreme weather event – a super typhoon – was then modelled to hit an Asian coastal city (Hong Kong, in this case) and we created a virtual simulation of the event. This virtual simulation was used as a risk communication vehicle, or a way to experientially communicate the future impacts of climate change.”

The authors underscored the importance of not overestimating the effectiveness of immersive visualisations to communicate climate risks.

¹ Climate sceptics refer to individuals who do not think anthropogenic climate change is happening.



“Visualising the devastating impacts of climate change play out in the cities we live in should provide the wake-up call needed to modify individual behaviour and support costly climate adaptation and mitigation measures. Unfortunately, our results suggest that ‘seeing is not believing’, especially for climate sceptics,” said Assistant Professor van Gevelt. “This goes to show that there is no easy solution to communicating climate change risk. Instead, we need to accept complexity and see highly targeted and contextual immersive experiences as one component within a comprehensive engagement strategy.”

These research findings were published on 1 February 2023 in [PLOS Climate](#), a Californian-based non-profit and Open Access journal with a focus on collaborative, interdisciplinary and multidisciplinary research to combat climate change. The research was conducted in collaboration with Duke University, Nanyang Technological University, University of Hong Kong, University of Macau, Hohai University and Sun Yat-sen University.

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About Singapore Management University

Established in 2000, Singapore Management University (SMU) is recognised for its disciplinary and multi-disciplinary research that address issues of global relevance, impacting business, government, and society. Its distinctive education, incorporating innovative experiential learning, aims to nurture global citizens, entrepreneurs and change agents. With more than 12,000 students, SMU offers a wide range of bachelors, masters and PhD degree programmes in the disciplinary areas associated with six of its eight schools - Accountancy, Business, Computing, Economics, Law and Social Sciences. Its seventh school, the SMU College of Integrative Studies, offers degree programmes in deep, integrative interdisciplinary education. The College of Graduate Research Studies, SMU’s eighth school, enhances integration and interdisciplinarity across the various SMU postgraduate research programmes that will enable our students to gain a holistic learning experience and well-grounded approach to their research. SMU also offers a growing number of executive development and continuing education programmes. Through its city campus, SMU focuses on making meaningful impact on Singapore and beyond through its partnerships with industry, policy makers and academic institutions. www.smu.edu.sg

FACTSHEET

“Using virtual simulations of future extreme weather events to communicate climate change risk”

Research conducted by

Singapore Management University, in collaboration with Duke University, Nanyang Technological University, University of Hong Kong, University of Macau, Hohai University and Sun Yat-sen University

Research objectives

The research team hypothesised that low risk perceptions of climate change lead to low levels of both individual climate change actions/behavioural change (e.g. acting sustainably) and support for climate policy.

Support for government climate policy (both adaptation and mitigation measures) from the general public can be secured only when there are relatively high risk perceptions of climate change.

Risk perceptions of climate change are a function of, among other things, experiential processing. That is, if people experience an event (usually extreme weather) they may attribute that event to climate change and experience an increase in risk perceptions of climate change. In turn, this will result in a negative feedback loop where we will see positive changes in their support for climate change mitigation/adaptation.

This study aimed to test if we can use immersive simulations of future extreme weather events to communicate climate change risk to the general public. Would exposing individuals to entirely plausible future scenarios reduce the psychological distance of climate change (where people think the impacts of climate change are either close or far away from them)? Does it lead to an increase in risk perceptions of climate change? And does this in turn translate into behavioural change?

Methodology

First, the research team modelled an entirely plausible future typhoon and its associated storm surges. They then used the data generated from the modelling to create a virtual simulation that uses the inundation data to hydrodynamically model and visualise the storm surge flowing into the central business district area of Hong Kong.

In this phase of the project, the simulation was a 3D cinematic animation that ran for 1 minute and 19 seconds and was optimised for viewing on mobile phones, tablets and personal computers. The simulation was populated with vehicles to lend a sense of scale and included a number of cinematic angles to engage participants from relatable perspectives. Watch the video simulation [here](#).

The research team used an experimental framework and protocols from experimental economics to isolate the effect of exposure to the simulation on a measure of risk perceptions and a measure of individual behaviour change.

They worked with YouGov Hong Kong to generate an experiment that could be deployed online to do so. A total sample of 1507 individuals that can be considered representative of Hong Kong’s adult population were randomly selected.

- Half were randomly assigned to experience the simulation as a ‘treatment’. The other half did not. This random assignment allowed for the effect of the simulation on risk perceptions and individual behavioural change to be isolated.
- For risk perceptions, the research team used a verified risk perceptions index measure that consists of eight questions measuring individual and societal risk perceptions of the impacts of climate change.
- For individual behavioural change, the research team used a modified dictator game from experimental economics, allowing the team to observe individual behavioural change. This is advantageous as the team can actually observe behavioural change rather than simply asking if people would change their behaviour (e.g. observed behavioural change vs stated behavioural change).

The study took around 2 years to complete. 1.5 years was spent on the modelling, visualisation and design of the experimental structure. The actual experiment was rolled out over a period of two weeks in September 2021 through an online platform.

Choice of Hong Kong for the virtual simulation

Like many of Asia’s more developed coastal cities, Hong Kong is characterised by low-risk perceptions of climate change, but is actually at future risk to the impacts of climate change.

Hong Kong is also subject to severe typhoons. It has arguably the best typhoon defences among Asian cities presently, but we can expect these typhoons to be amplified by the impacts of climate change and to pose an increasing threat in the future. It is likely that future typhoons (in the next 50 to 100 years) will be so increasingly severe that existing coastal defences may be overwhelmed leading to potential devastation.

Though this study took place in Hong Kong – these general insights are applicable to other developed coastal cities in Asia (e.g. Singapore).

The use of immersive visualisations to communicate risk to the general public

The research team found a reduction in risk perceptions and individual behaviour change attributable to the simulation. This is surprising.

The researchers found that the simulation backfired significantly for climate sceptics, who showed a substantial decrease in risk perceptions of climate change and behavioural change.

The simulation also backfired for a second group, who already hold relatively high risk perceptions of climate change and live more climate-friendly/sustainable lives. This suggests that the simulation may have potentially crowded out the intrinsic motivation of these individuals.

Immersiveness of the simulation was further highlighted as key to the effectiveness of the simulation. The next phase of the study will focus on a fully immersive virtual reality experience and that will be deployed in-person to a sample of the general public who display climate sceptic viewpoints. The goal is to see if changing the level of immersiveness of the simulation can help us engage with climate sceptics.