

Investigating Factors that Influence Cyclone Mitigation Behaviour: A Pilot Study

M.D. Scovell, C.J. McShane, A.L. Swinbourne & D.J. Smith

College of Healthcare Sciences, James Cook University (Townsville);
Health and Behaviour Change in the Tropics Research Group (HABITT);
Cyclone Testing Station (CTS)



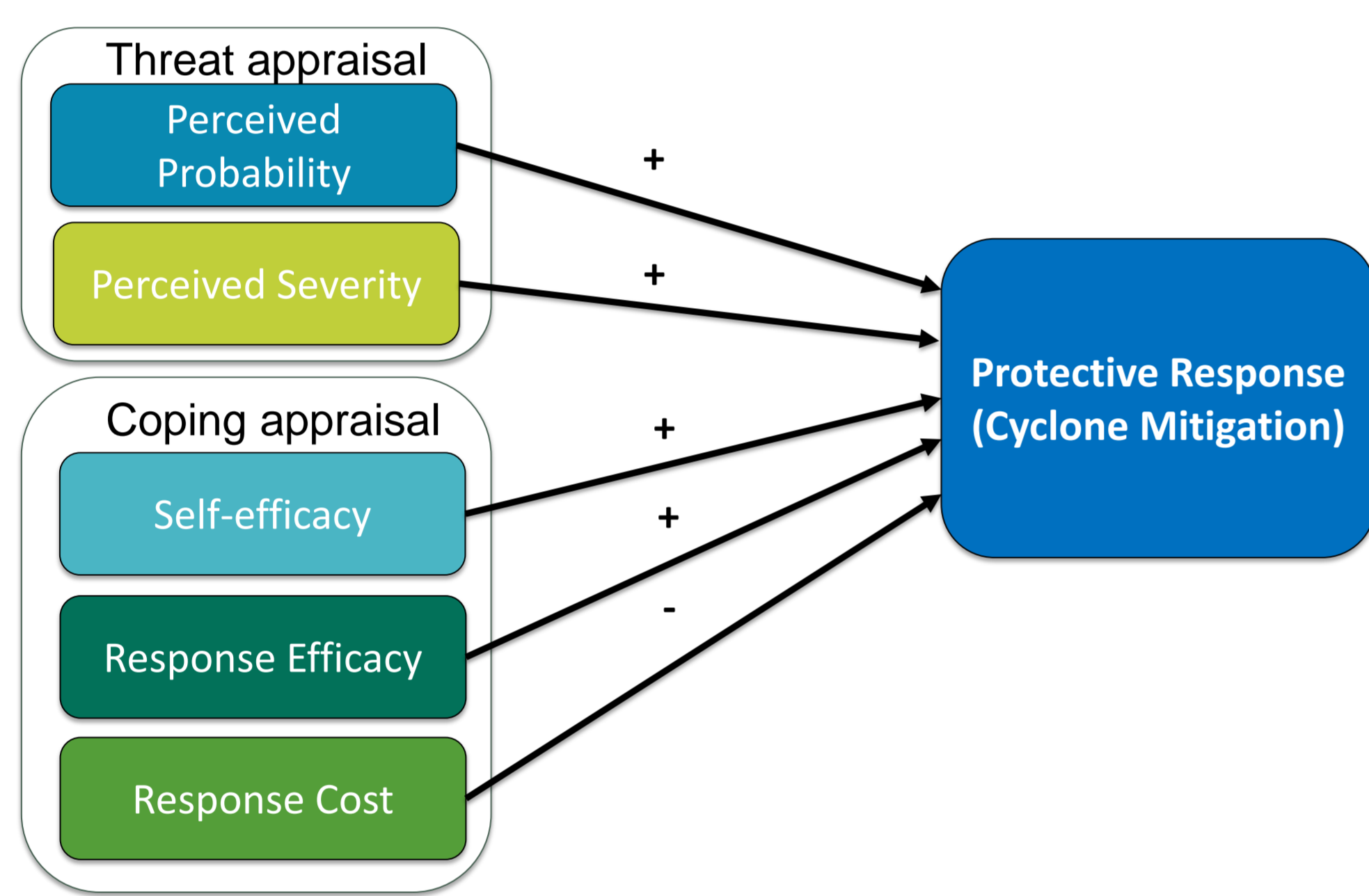
In cyclone-prone regions like North Queensland, insurance premiums are priced to reflect the high potential for economic loss from cyclone events. To address premium affordability, insurance companies (e.g., Suncorp) have begun offering their customers discounts for installing or performing mitigation measures aimed at reducing property damage. However, there is still a significant at-risk population who choose not to invest in mitigation measures. It is therefore important to further understand factors that facilitate or impede an individual's decision to invest in cyclone mitigation measures (e.g., experience, risk perception and perceptions about mitigation measures), so that preparedness messaging and incentive programs can be optimised for the population in which they are to be delivered. In 2016, James Cook University (HABITT and Cyclone Testing Station), Suncorp and the Queensland Government commenced a research project to investigate factors that influence mitigation behaviour.

This presentation reviews findings from the first project study, which investigated the results from a pilot study of a self-administered questionnaire. The pilot study was delivered at an annual community cyclone awareness event in Townsville ("Cyclone Sunday"). A total of 72 respondents were recruited at the event and asked to complete the questionnaire assessing variables hypothesised to be of interest including age, homeownership, perceptions of risk and cyclone mitigation status. Preliminary data from the pilot study suggest that respondents tended to perceive future cyclone related property damage as likely but not severe. It was also found that while relatively low-cost preparedness activities were commonly performed, few respondents had installed more costly mitigation measures specifically aimed at reducing cyclone related property damage (e.g., cyclone shutters). The pilot study findings provide needed insight for the Phase I study into psychological drivers of cyclone mitigation behaviour which will take place later this year.

Background

- Individuals living in cyclone prone areas are vulnerable to an increased potential for property damage^{1,5}.
- Structural upgrades to property and preparedness activities can mitigate property damage caused by cyclones⁶.
- To promote mitigation behaviour, it is important to understand the factors that facilitate or impede an individual's decision to upgrade property or perform preparedness activities³.
- The Protection Motivation Theory (PMT), a commonly applied health psychology model of behaviour change, will be used as a framework for understanding cyclone mitigation behaviour^{2,4}.

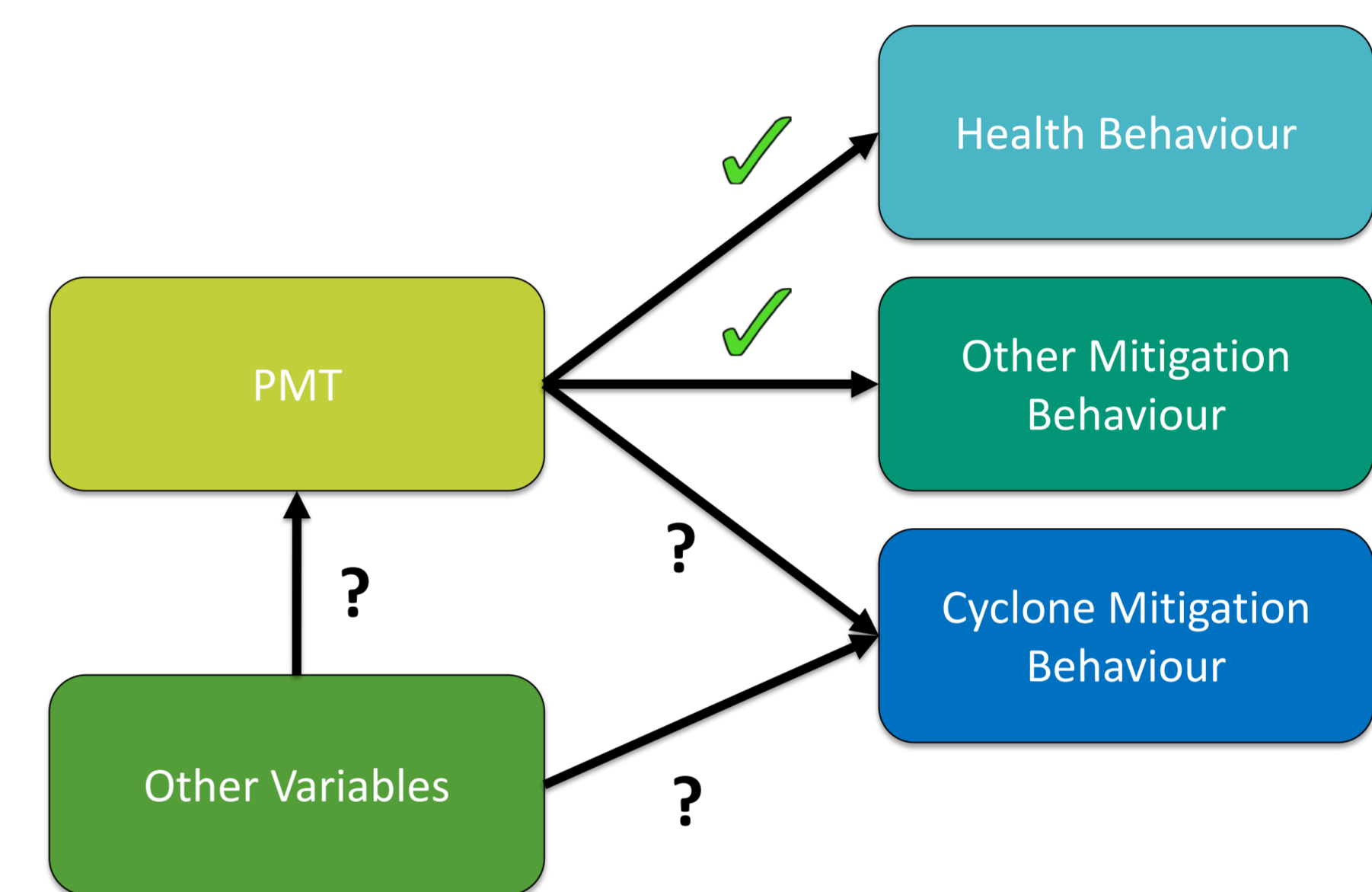
Predicted relationships based on Protection Motivation Theory (PMT)



Aim

The broader research project aims to understand the factors that influence cyclone mitigation behaviour.

Knowledge gaps of interest for the broader research project



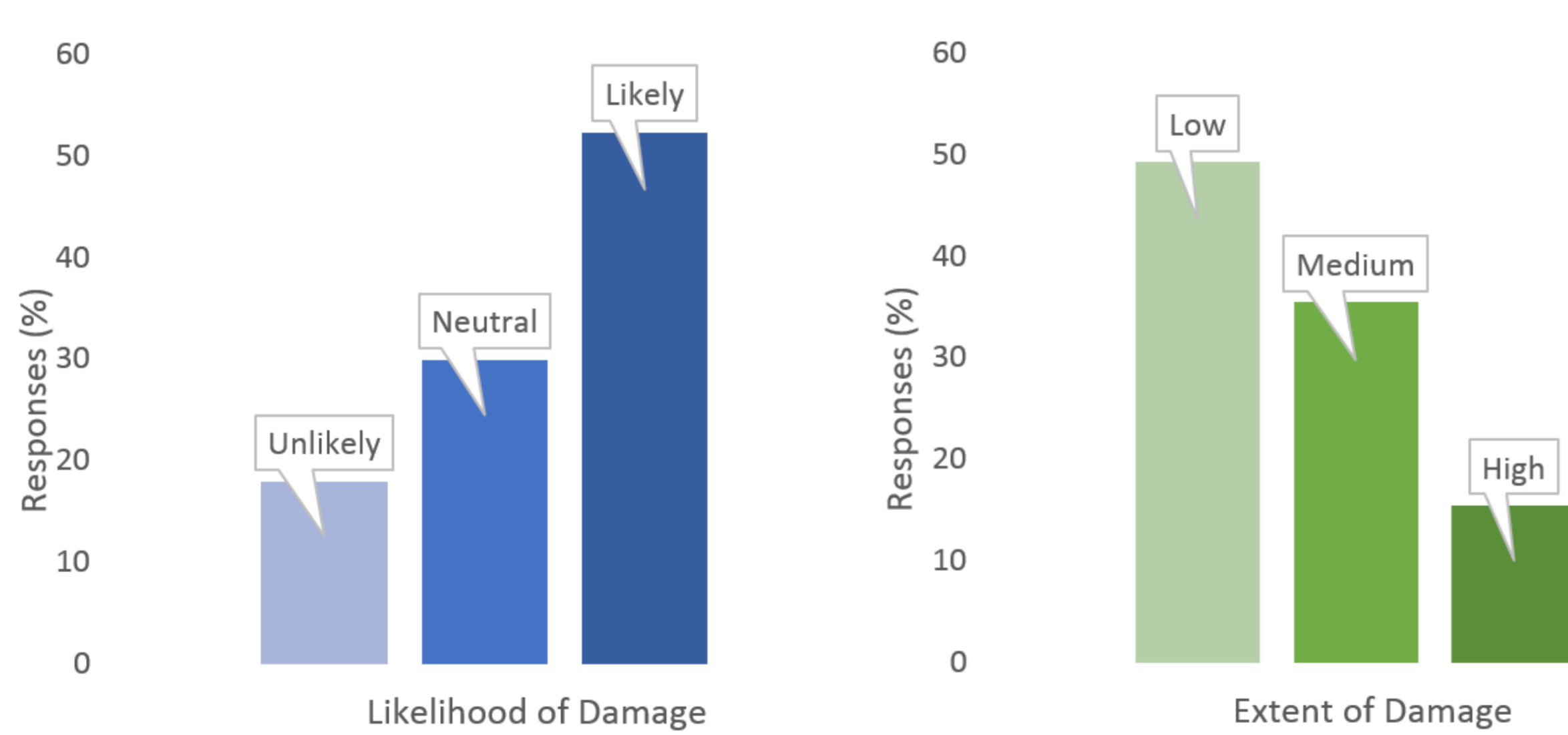
The aim of this pilot study was to generate an appropriate measure for assessing factors of interest (i.e., a well-designed questionnaire) to inform a further study that will take place later this year. The pilot study was important as:

- Few studies have investigated the factors influencing cyclone specific mitigation behaviour
- Protection Motivation Theory (PMT) variables yet to be assessed in relation to cyclone mitigation behaviour

Results

- A majority (77%) of the respondents overestimated the level of winds experienced in Townsville due to Cyclone Yasi. Actual wind speeds from Cyclone Yasi were Category 2 in Townsville.
- Just over half (52%) of the respondents perceived property damage over the next five years to be at least likely to occur and a similar proportion (49%) predicted the level of damage to be low or very low (see Figure 1).

Figure 1: Threat Appraisal Reported by Respondents



- 86% of respondents were at least, 'somewhat worried' about a cyclone affecting their community.
- Individuals in the sample overwhelmingly rated themselves as being knowledgeable or very knowledgeable (over 66% in all cases) about cyclone risks and what they can do to prevent damage.
- Mitigation measures were more popular if they were less expensive and had other protective utility (e.g., security): 67% respondents had deadlocks installed whereas only 10% had cyclone shutters installed.
- A relatively high percentage of the sample were unsure if their sheds were designed for high wind rating/reinforced with a cyclone kit (20%).
- 59% of the sample indicated that they would be either likely or extremely likely to implement future property upgrades if they could get a government rebate.
- Relatively low-cost preparedness activities (e.g., clearing yards and securing furniture) were commonly performed. However, only 32% of the respondents put plywood on their windows before a cyclone.

References

- Emanuel, K. (2011). Global Warming Effects on U.S. Hurricane Damage. *Weather, Climate, and Society*, 3(4), 261-268. doi:10.1175/WCAS-D-11-00007.1
- Floyd, D. L., Prentice-Dunn, S., & Rogers, R. W. (2000). A Meta-Analysis of Research on Protection Motivation Theory. *Journal of Applied Social Psychology*, 30(2), 407-429. doi:10.1111/j.1559-1816.2000.tb02323.x
- Haer, T., Botzen, W. J. W., de Moel, H., & Aerts, J. C. J. H. (2016). Integrating Household Risk Mitigation Behavior in Flood Risk Analysis: An Agent-Based Model Approach. *Risk Analysis*, n/a-n/a. doi:10.1111/risa.12740
- Milne, S., Sheeran, P., & Orbell, S. (2000). Prediction and Intervention in Health-Related Behavior: A Meta-Analytic Review of Protection Motivation Theory. *Journal of Applied Social Psychology*, 30(1), 106-143. doi:10.1111/j.1559-1816.2000.tb02308.x
- Peduzzi, P., Chatenoux, B., Dao, H., De Bono, A., Herold, C., Kossin, J., ... Nordbeck, O. (2012). Global trends in tropical cyclone risk. *Nature Climate Change*, 2(4), 289-294. doi:10.1038/nclimate1410
- Smith, D., Henderson, D., & Gieger, J. (2015). Cyclone Resilience Research - Phase II. CTS Report: TS1018.

Method

The study was conducted at the Cyclone Sunday event in Townsville on the 5th of November, 2016. A total of 72 respondents were recruited:

- 26 males, 39 females and 7 respondents that did not disclose their sex;
- An average age of 52 (SD=12.4) years with a range of 23 to 73 years;
- Most homeowners (68%), were married (64%) and just over half of the sample (54%) did not have any children.

Participants responded to a questionnaire assessing a variety of factors including demographics, cyclone experience, PMT variables, level of preparedness and current property upgrade status/intention.

Conclusion

Pilot study results provide the necessary support for the validity of the questionnaire in assessing factors of interest. The next study aims to build on these findings by measuring similar factors as predictors of cyclone mitigation behaviour. The next study will use a revised questionnaire incorporating the following changes:

- Revise how mitigation efforts are measured using the predicted utility of the property upgrade (e.g., a mitigation scale that sums the amount of upgrades based on the amount of money or effort that is required to install them).
- Assess how the broader utility of certain upgrades (e.g. deadlocks aid wind-resistance and provide security) may be leveraged to increase mitigation action.
- Include pictures to help respondents identify specific upgrade items.
- Assess the perceived cost-benefit ratio of various activities and the influence on mitigation preferences.
- Individually assess each of the psychological factors in relation to specific mitigation measures to determine whether some factors are more important for promoting particular behaviours opposed to others.

So what? Where next?

Individuals may recall past cyclone events as more severe than they were. The next study will investigate if this has an influence on mitigation behaviour.

Individuals perform low-cost behaviours but are less likely to invest in high-cost mitigation upgrades. Different approaches to risk communication and incentives may be required to promote high-cost mitigation behaviour.

Individuals may be unaware about specific upgrades or if their properties need these upgrades (e.g., participants unsure about shed upgrades)

