Risk Communication
to Motivate Disaster Risk Mitigation

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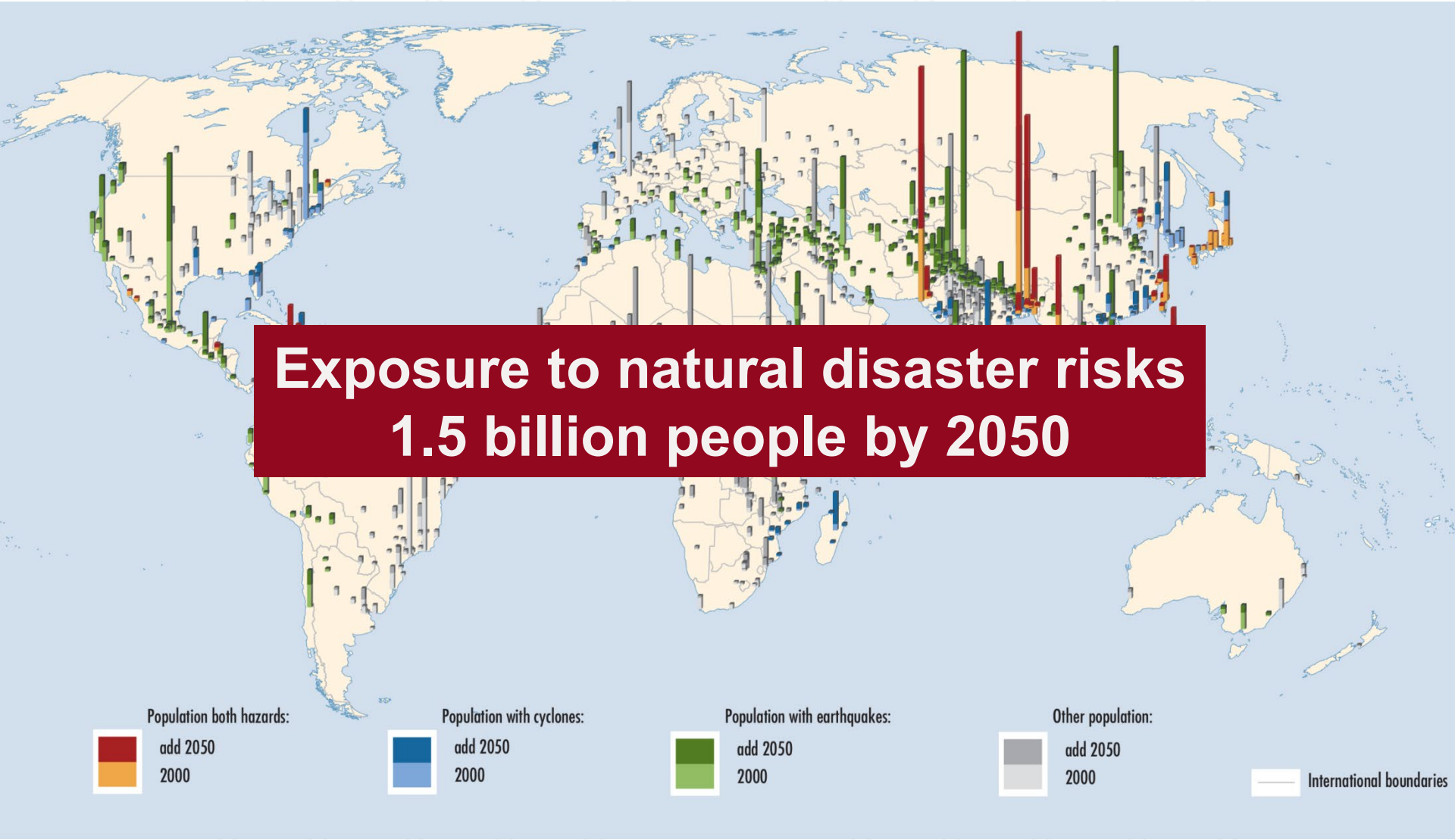
Research Context

Increasing Natural Disaster Risks



Research Needs

Risk Communication for Disaster Risk Mitigation

Low Disaster Mitigation Behaviors

Risk Communication Before Crises

Effective Risk Communication for
Disaster Risk Mitigation

Knowledge Gaps

1. Awareness & Behavioral Engagement
2. Preferred Info Sources & Communication Channels
3. Drivers of Mitigation Behaviors
4. Effective Communication Messages

Drivers of Mitigation Behaviors

- Risk Perception
- Coping Appraisals
- Social Norms
- Responsibility
- Climate Change Perception

For Effective Risk Communication

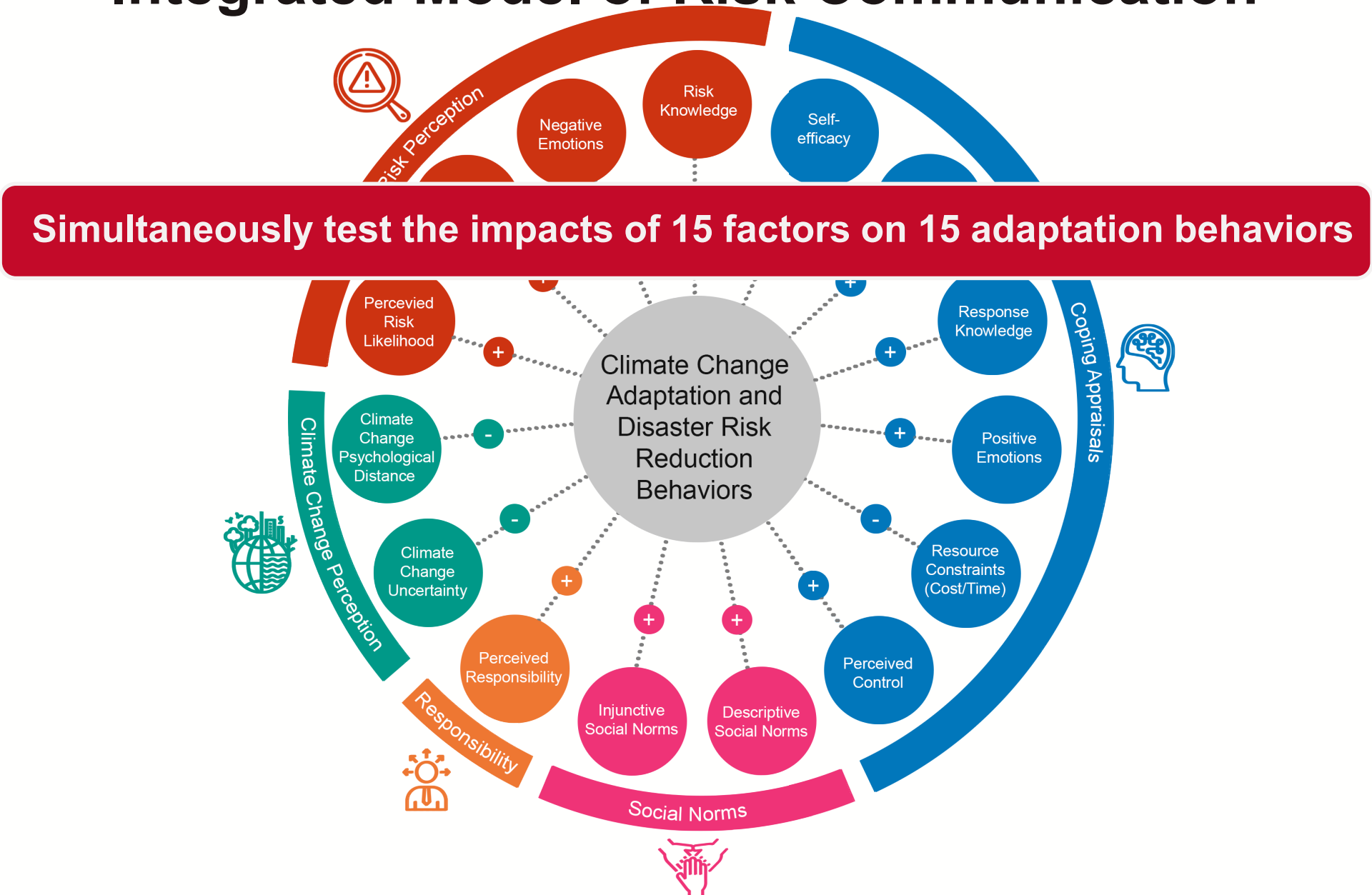
Which Factors are Most Impactful?

Fragmented Research
Using Limited Sets of Variables

	Protective Motivation Theory (PMT)	Extended Parallel Process Model (EPPM)	Protective Action Decision Model (PADM)	Theory of Planned Behavior (TPB)	Risk Information Seeking and Processing (RISP) Model
Risk: Knowledge					X
Risk: perceived likelihood	X	X	X	X	X
Risk: perceived impact	X	X	X	X	X
Emotions: negative		X	X		X
Efficacy: self-efficacy	X	X	X	X	X
Efficacy: controllability				X	
Efficacy: response efficacy	X	X	X		
Resource constraints	X		X		
Response Knowledge			X		X
Social norms	X			X	X
Perceived responsibility			X		

Factors Motivating Disaster Risk Mitigation

Integrated Model of Risk Communication



Target Behaviors

Simultaneously test the impacts of 15 factors on 15 adaptation behaviors

Types	Wildfires	Hurricanes/ Floods
Non-structural mitigation	**Clear plants, trees, and any ignitable materials** within 5 feet around the house	**Move valuable furniture** and important documents to a higher floor or a safe place
	Clear dead branches, leaves, pine needles from your roof, yard, and gutters	
Structural mitigation	**Install mesh metal screening** over roof vents and windows	**Purchase flood protection devices**, such as protection flaps and water barriers
	Put a fire-resistant roof on your home	**Install a roof covering** or **galvanized metal hurricane straps** that can withstand high winds
Insurance	**Purchase fire/flood insurance** against fire damage	
Preparedness	**Have a list of items** and valuable documents that you will bring in emergency with their locations	
Policy support	• **Enhance building codes** • **Change land use** and enforcing restrictions for existing buildings in wildfire/flood-prone zones to reduce potential damage • **Provide tax incentives** • **Provide long-term mitigation loans**	

Study 1: Finding Info Sources & Key Factors

Quantitative Surveys (*N* = 3,468)

- 2 most federally-declared disaster types
- 3 disaster-prone states with 20,000,000+ residents

Wildfires

California & Texas

Hurricane & Floods

Florida & Texas

- About 38 minutes on average
- Amazon Mechanical Turk (MTurk)
- **Structural equation modeling (SEM)**

Study 1 Select Findings

Top 5 Preferred Information Sources (RQ3)

Hurricane & Floods
Florida & Texas

Rank	Hurricane Risks
1	**Weather forecasters**
2	**National Oceanic and Atmospheric Administration (NOAA) and/or National Weather Service (NWS)**
3	Family
4	State emergency management department
5	Federal Emergency Management Agency (FEMA)

Wildfires
California & Texas

Rank	Wildfire Risks
1	**Local fire department**
2	**State fire department**
3	State emergency department
4	A forest agency (state or federal)
5	Weather forecasters

Study 1 Select Findings

Factors Motivating Disaster Risk Reduction Behaviors

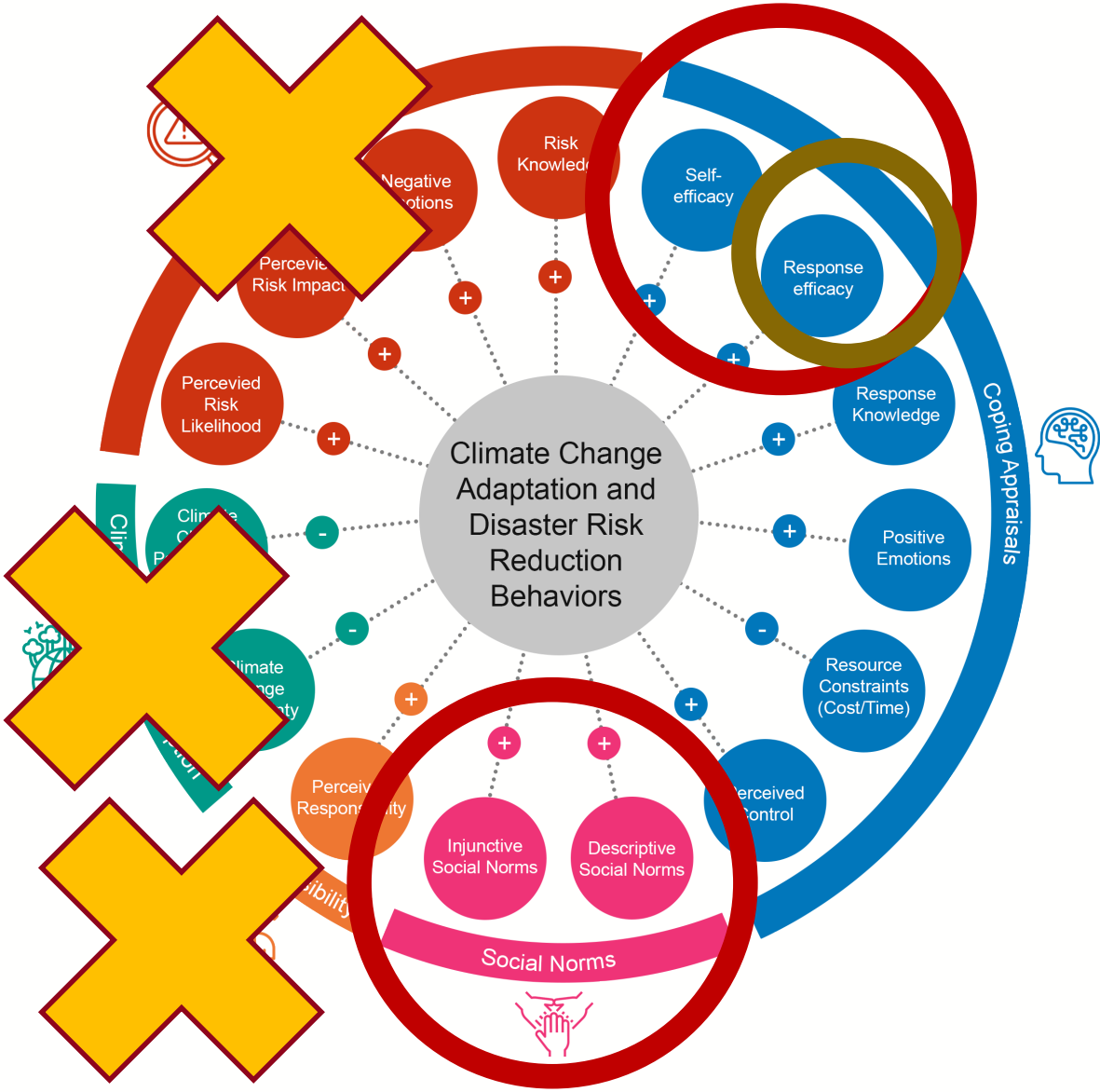
DVs1: Preparedness behaviors

Social Norms
22 out of 22 behaviors

Self-Efficacy
21 out of 22 behaviors

DVs2: Policy support behaviors

Response Efficacy
16 out of 16 behaviors



Study 1 Implications

Why People Adopt Disaster Risk Mitigation Behaviors

Preferred Information Sources

Hurricanes: Weather Forecasters, NWS, NOAA

Wildfires: Local and State Fire Departments

Integrated Model of Risk Communication

Key drivers:

- Preparedness behaviors
- Policy support
- Social norms
- Self-efficacy
- Response efficacy

Insignificant or weak factors:

- Risk perception
- Climate change perception
- Risk Knowledge
- Responsibility

Suggestions:

Risk perception → Social norms; Self-efficacy; Response efficacy

Study 2: Developing & Testing Effective Intervention Messages

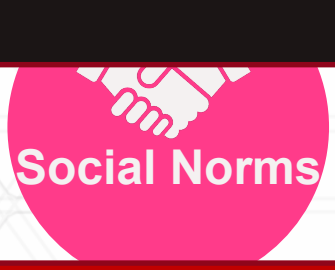
Four 2 X 2 X 2 X 2 Between-Subject Experiments (*N* = 5,027)

Social Norms Messages

Coping Appraisal & Vicarious Experience

Drivers of Adaptation Behaviors
(Study 1)

Hurricane-Prone States
Florida, Texas, North Carolina, Alabama, Louisiana, Mississippi



Effective Communication Messages
(Study 2)

Two Target Behaviors

Study 2: Developing & Testing Effective Intervention Messages

Four 2 X 2 X 2 X 2 Between-Subject Experiments (*N* = 5,027)

Ready
1d ·

⚠ Over 10 million Florida residents have purchased flood insurance.

FEMA

- Modeled Ready.gov Facebook posting
- Professional voice-over

- Stimuli Check (*N* = 68)
- Consultation with communication experts (*n* = 8)

Study 2

Developing Social Norms Messages

Descriptive Norms Message

⚠ Over 10 million **Florida residents** have purchased flood insurance.

Injunctive Norms Message (Weather Forecaster)

⚠ All of your **local weather forecasters** agree that everyone living in hurricane-prone areas should purchase flood insurance.

Injunctive Norms Message (Neighbor)

⚠ Most of your **neighbors** think you should purchase flood insurance.

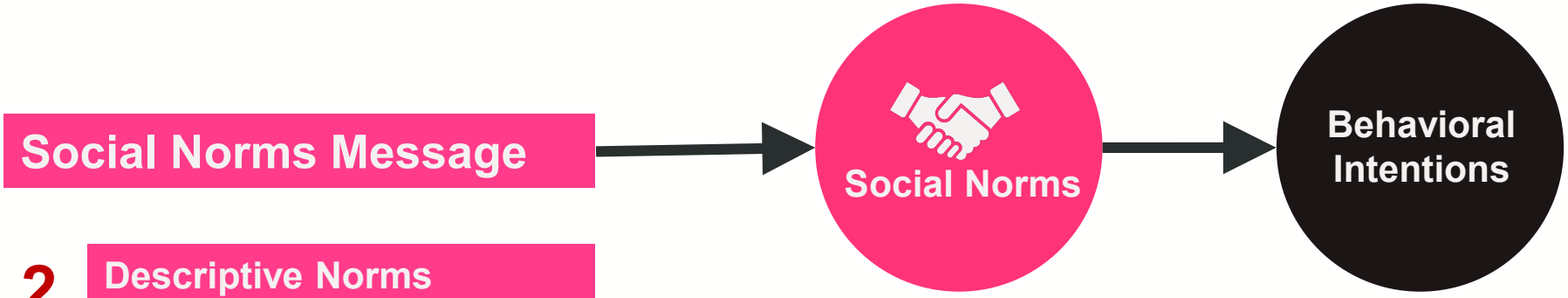
Disapproval Rationale Message

⚠ **If you don't** purchase flood insurance, your damaged home can **harm others'** homes and **lower your community's** property values.

Study 2

Testing Social Norms Messages

- Analysis of Variance (ANOVA)
- SEM - Multiple-indicator-multiple-cause (MIMIC) approach



2 Descriptive Norms Message
x (present vs. absent)

2 Injunctive Norms Message (Weather Forecaster)
x (present vs. absent)

2 Injunctive Norms Message (Neighbor)
x (present vs. absent)

2 Disapproval Rationale Message
(present vs. absent)

Social Norms Messages	
H14a H14b	Descriptive norms messages
H15	Injunctive norms from weather forecasters messages
H16	Injunctive norms from neighbors' messages
H17	Disapproval rationale
	will increase social norms, which in turn increase behavioral intentions.
RQ4	How, if at all, do descriptive norms, injunctive norms from weather forecasters, injunctive norms from neighbors, and disapproval rationale messages interact to increase behavioral intentions?

Study 2 Select Findings

Testing Social Norms Messages

	Purchasing Flood Insurance	Installing Water Barriers
Descriptive Norms Message	X	X
Injunctive Norms Message (Weather Forecaster)	O	O
Injunctive Norms Message (Neighbor)	X	O
Disapproval Rationale Message	O	O

Study 2 Select Findings

Developing Coping Appraisal Messages

Why Message

Why should I buy flood insurance?

Hurricanes can affect your community.
⚠ Just one inch of water can cause $25,000 worth of damage.
Most homeowners' and renters' insurance policies don't cover flood damage.
Flood insurance protects your home and savings by covering the cost of flood damages.
But, flood insurance takes 30 days to go into effect.

How Message

How can I buy flood insurance?

Find an insurance agent on the FloodSmart.gov using your computer or smartphone.
Call the insurance agent near your home.
Then, work with the insurance agent to learn more about flood insurance.

Cost Message

How much does flood insurance cost?

You don't have to worry about looking for the lowest price.
Flood insurance providers all have the same rates.
It doesn't cost anything to get a quote. It will just take only a few hours in total.

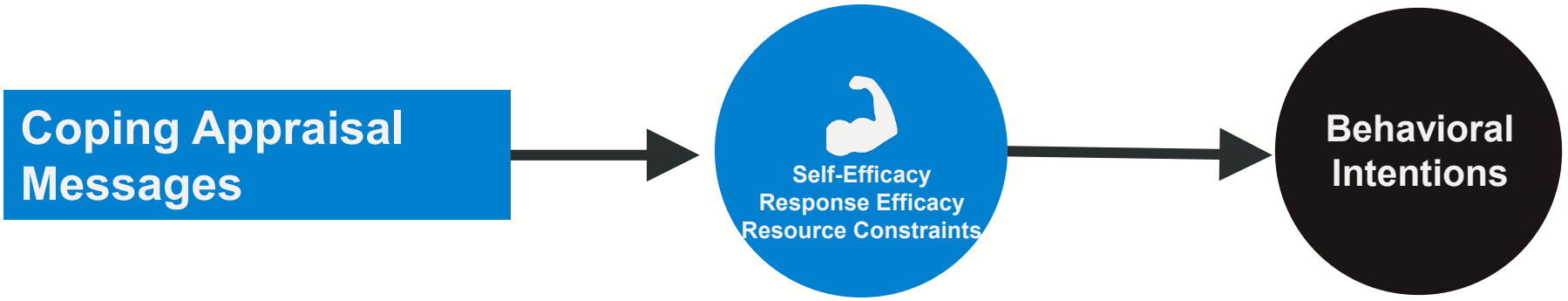
Can Message

Get a quote for your insurance. You can do it.

The process is convenient and easy.
It is extremely easy to find an insurance agent on FloodSmart.gov.
You can also get a quote very easily by calling the insurance agent.
Everyone can purchase flood insurance. It's easy as A-B-C. You can do it, too.

Study 2 Select Findings

Testing Coping Appraisal Messages



2 x 2 x 2 x 2

Why Message (present vs. absent)

How Message (present vs. absent)

Cost Message (present vs. absent)

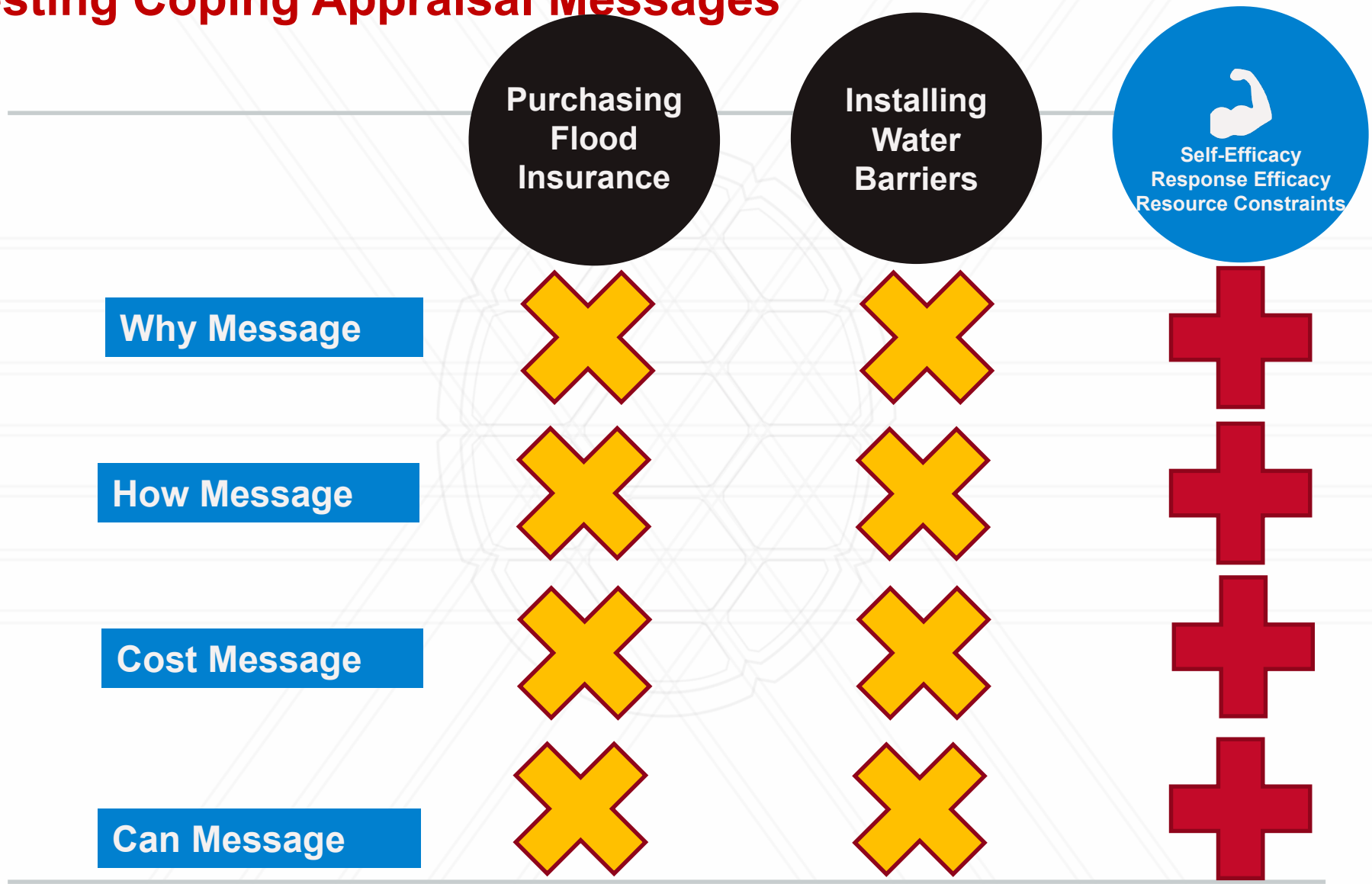
Can Message (present vs. absent)

- Analysis of Variance (ANOVA)
- SEM - Multiple-indicator-multiple-cause (MIMIC) approach

Coping Appraisal Messages	
H18	Why (explanation) messages about why to take actions and actions themselves
H19	How (instruction) messages explaining how to take actions
H20	Cost (required resource) messages
H21	Can (verbal persuasion) messages
	will (1) increase self-efficacy, (2) increase response efficacy, and (3) decrease resource constraints, which in turn increase behavioral intentions.
RQ5	How, if at all, do why (explanation), how (instruction), cost (required resources), and can (verbal persuasion) messages interact?

Study 2 Select Findings

Testing Coping Appraisal Messages



Study 2

Developing Vicarious Experience Messages

Vicarious Experience Message = **Narrative** + **Matched Spokesperson**

Hello, I'm Sam. My partner and I are just like you.
Living in [Participant's State] for [Participant's Years of Living],
we knew that hurricanes were a threat.

🌩 But, things changed for us when a hurricane actually hit our community.
⚠ Just one inch of water caused $25,000 of damage.

Luckily, we purchased flood insurance last year.
🛋 Most homeowners' and renters' insurance policies don't cover flood damage.
🌊 Flood insurance protects your home and savings by covering the cost of flood damages.
📅 But, flood insurance takes 30 days to go into effect.

🔍 Finding an insurance agent on FloodSmart.gov was extremely easy. We found the insurance agent on FloodSmart.gov using our computer and smartphone.
💰 We didn't have to worry about looking for the lowest price. Flood insurance providers all have the same rates.

🛒 Getting a quote was also very easy. We called an insurance agent near our home.
💰 It doesn't cost anything to get a quote. It just took only a few hours in total. We worked with our insurance agent to learn more about flood insurance. The process was convenient and easy.

We were grateful that we purchased flood insurance. Otherwise, we would have lost a lot.
Everyone can purchase flood insurance. It's easy as A-B-C. You can do it, too.

Study 2

Testing Vicarious Experience Messages

- Analysis of Variance (ANOVA)
- SEM - Multiple-indicator-multiple-cause (MIMIC) approach

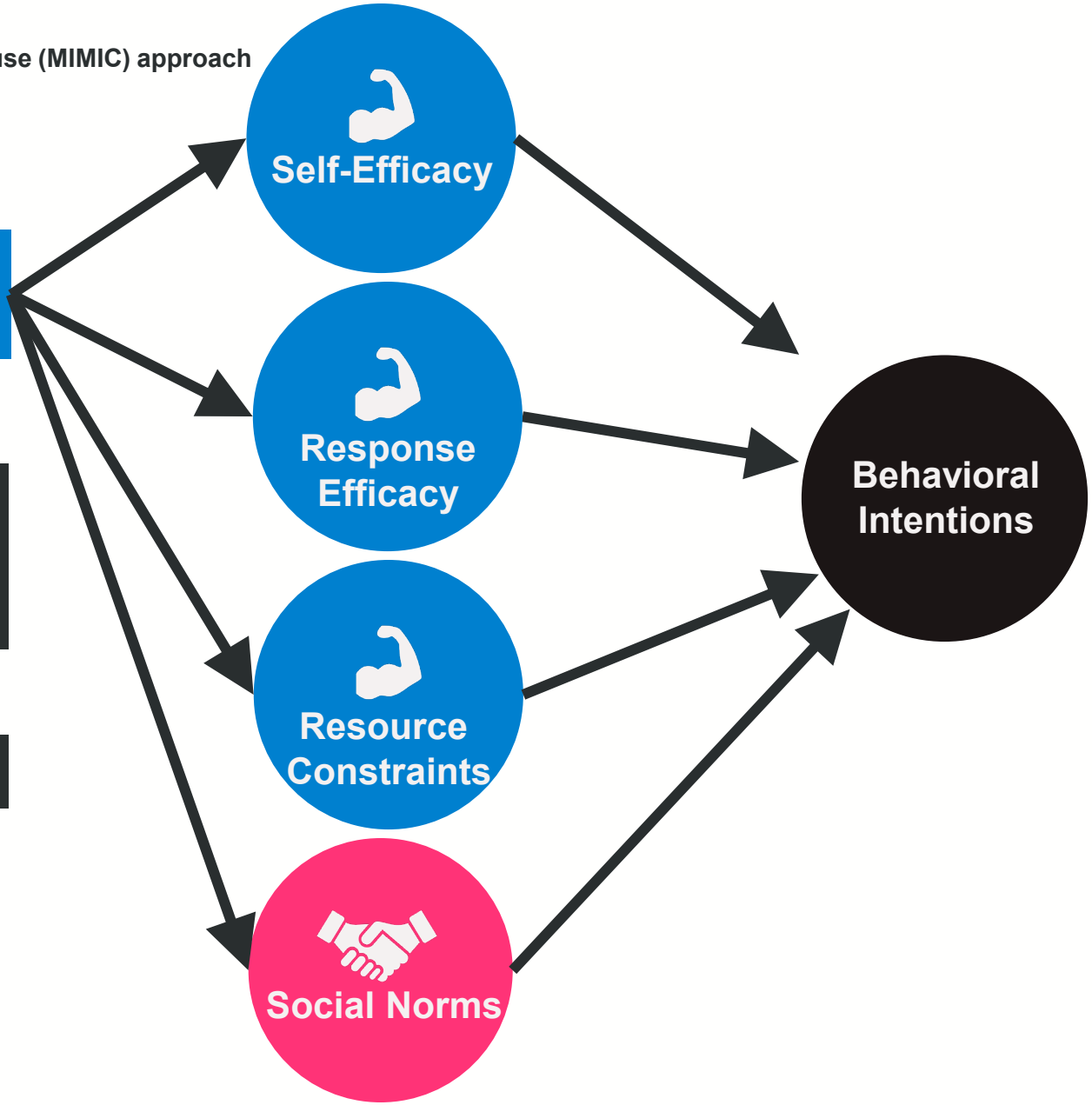
Vicarious Experience Messages

vs.

Non-Vicarious Experience Messages

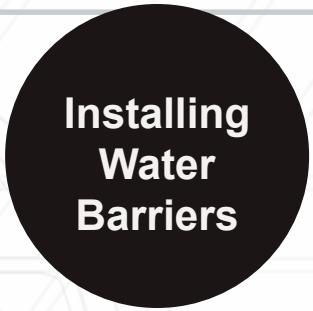
vs.

No Stimuli



Study 2 Select Findings

Testing Vicarious Experience Messages



Vicarious Experience Messages

Vicarious Experience Messages		Flood Insurance	Water Barriers
H22	Vicarious experience messages (narrative and spokesperson matched with at-risk publics) will (1) increase self-efficacy, (2) increase response efficacy, (3) decrease resource constraints, and (4) increase social norms, which in turn increase behavioral intentions, compared to non-vicarious messages.	Partially Supported	Not Supported

Implications

How Can We Encourage People to Adopt Disaster Risk Mitigation Behaviors?

Social Norms Messages Are Effective

- Weather Forecasters Injunctive Norms Messages
- Disapproval Rationale Messages

Use & Study Preferred Information Sources for Social Norms Messages

Use & Study Disapproval Rationale Messages

Coping Appraisal Messages Are Not Effective

Vicarious Experience Messages Can Be Effective

Concluding Thought

Effective Risk Communication

Disaster Risk Mitigation

Thank you
Any questions?

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