

Principles & Practices for Designing High Impact Weather Warning Messages

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WFUSS4 KMEG 160241
TORMEG
ARC093-TNC097-167-160330-
/O.NEW.KMEG.TO.W.0043.220416T0241Z-220416T0330Z/

BULLETIN - EAS ACTIVATION REQUESTED
Tornado Warning
National Weather Service Memphis TN
941 PM CDT Fri Apr 15 2022

The National Weather Service in Memphis has issued a

* Tornado Warning for...
Southwestern Mississippi County in eastern Arkansas...
Central Tipton County in western Tennessee...
Southwestern Lauderdale County in western Tennessee...

* Until 1030 PM CDT.

* At 941 PM CDT, a severe thunderstorm producing a tornado was located near Wilson, moving southeast at 30 mph.

HAZARD...Tornado and golf ball size hail.

SOURCE...Radar indicated rotation.

IMPACT...Flying debris will be dangerous to those caught without shelter. Mobile homes will be damaged or destroyed. Damage to roofs, windows, and vehicles will occur. Tree damage is likely.

* Locations impacted include...
Osceola, Wilson, Fort Pillow State Park, Munford, Marie, Fulton, Dixonville, Gilt Edge, Burlison, Garland, Egypt, Evadale, Driver Grider, Quito, Golden Lake, Carson Lake, Rotan, Norden and B...

PRECAUTIONARY/PREPAREDNESS ACTIONS...

TAKE COVER NOW! Move to a storm shelter or an interior lowest floor of a sturdy building. Avoid windows. If you are outdoors, in a mobile home, or in a vehicle, move to the substantial shelter and protect yourself from flying debris.

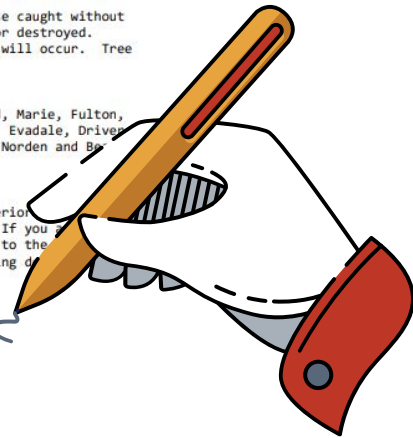
&&

LAT...LON 3572 9003 3556 8968 3539 8988 3539 8993 3557 9015

TIME...MOT...LOC 0241Z 304DEG 27KT 3561 9002

TORNADO...RADAR INDICATED
MAX HAIL SIZE...1.75 IN

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Objectives



Warning Message Design

What words, phrases in NWS warnings elicit cognitive and affective risk perceptions?



Severity & Susceptibility



Fear

Objectives



Protective Action Intentions

How do these perceptions simultaneously promote or inhibit behavioral intention?

Risk Perceptions?

Potter et al., 2018; Weyrich et al., 2018

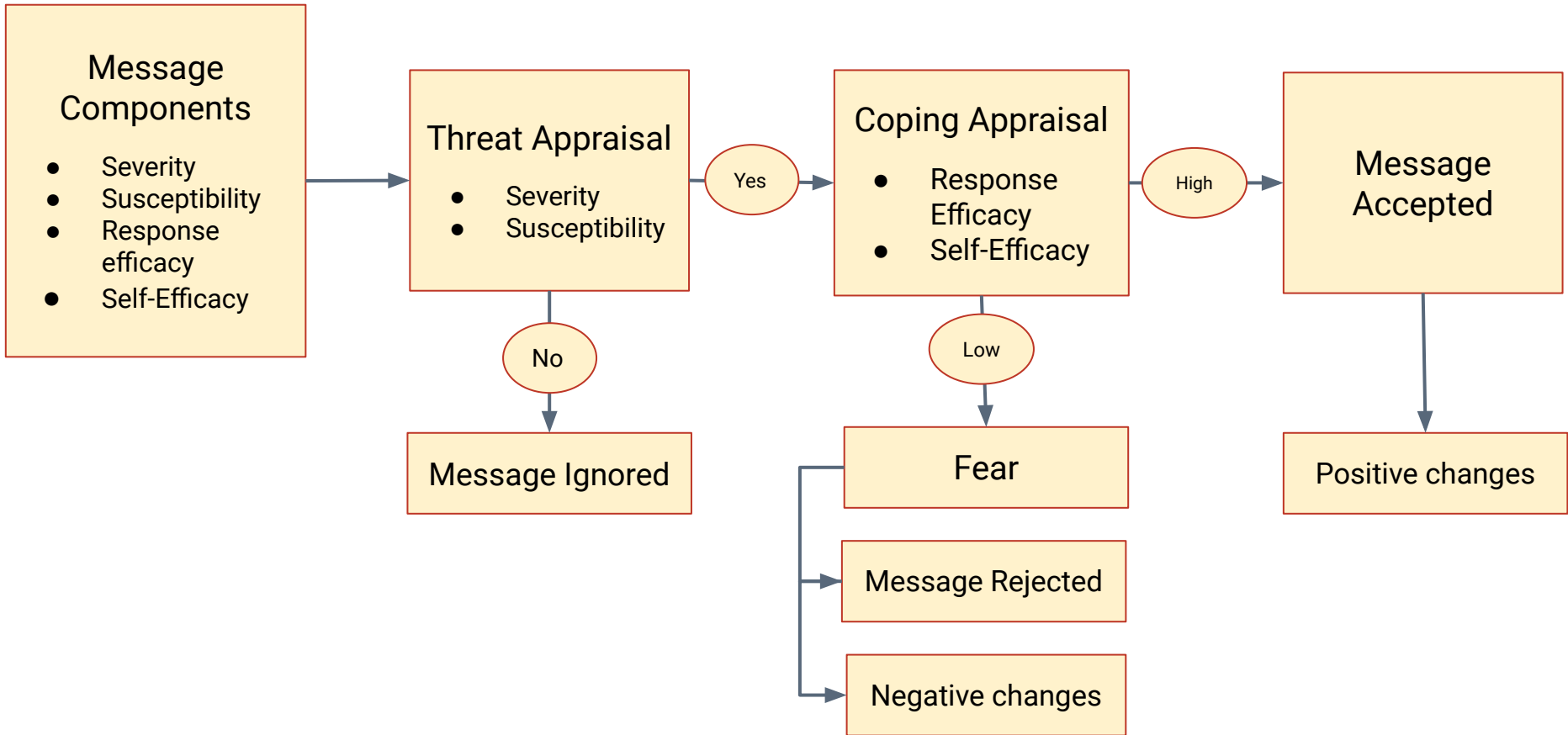
Protective Action?

Casteel, 2018; Potter et al., 2018;
Ripberger et al., 2015

Backfire?

Morss et al., 2018

The Extended Parallel Process Model



EPPM Perception



Mileti Warning Content



Threat-Efficacy Warning Message



Severity

Magnitude and/or the consequences of a threat

How threat poses a danger to people

Impacts or consequences to one's environment, safety; intensifiers

Susceptibility

Risk of experience a threat

Location information defining who is/not at risk

Specific location information (e.g., landmarks)

Response Efficacy

Beliefs about the effectiveness of the recommended response

Guidance about what people should do to protect themselves

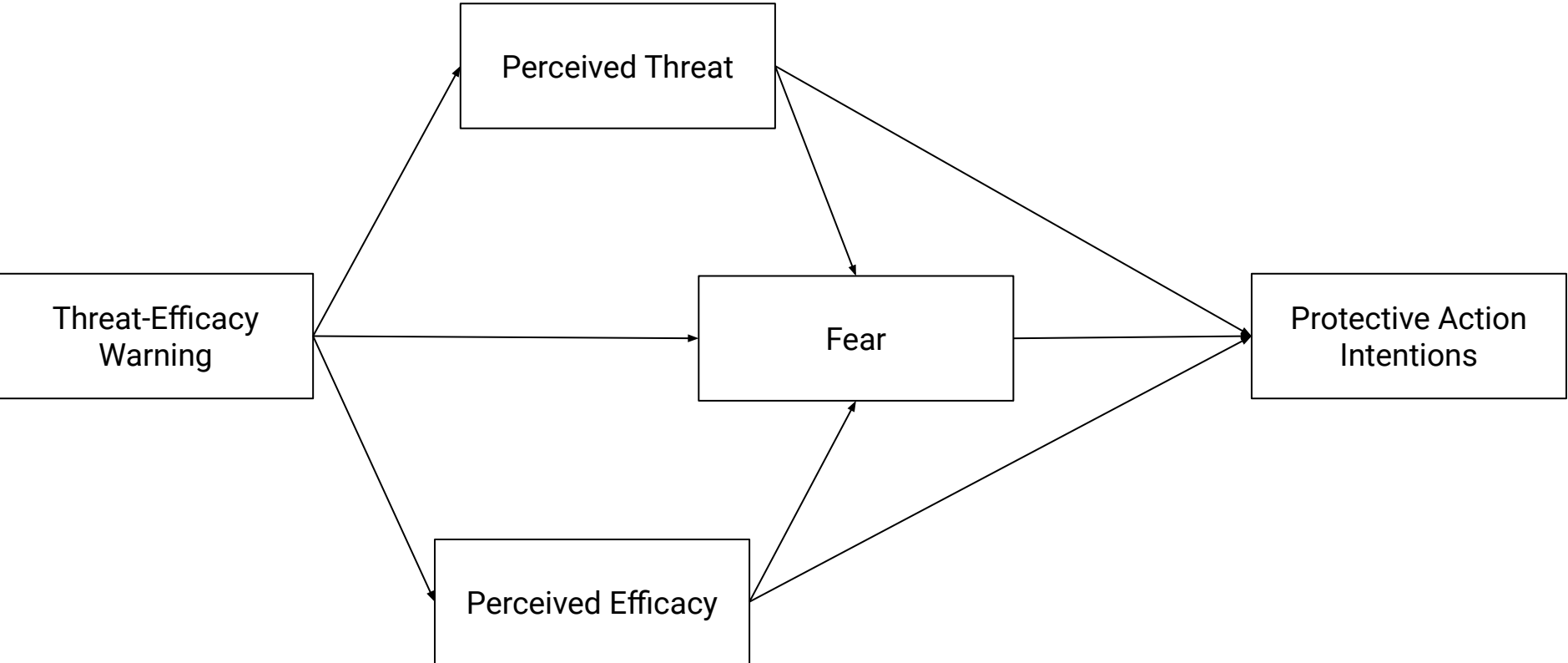
Guidance is effective

Self-Efficacy

Beliefs about one's ability to perform the recommended response

Guidance about what people should do to protect themselves

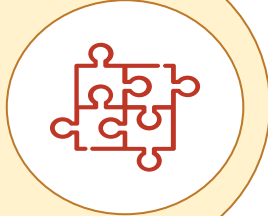
Encouraging one's ability to perform the behaviors; barriers to action



Method

Multi Message Approach

Tornado & flash flood emergency



Experimental Design

2 (hazard topic: tornado vs. flash flood)
x 2 (threat-efficacy: high vs. low)



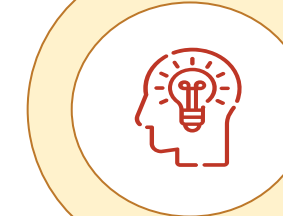
Sample

312 undergraduate students



Scenario

“Imagine it is 6 PM on a Tuesday.
You receive the following alert on your
cell phone”



Low Threat-Efficacy Tornado Warning

The National Weather Service in Louisville, Kentucky has issued a tornado warning for central Fayette County in east central Kentucky, until 6:30 PM EDT.

At 5:30 PM EDT, a confirmed tornado was observed 10 miles south of Lexington, moving north at 30 MPH.

A tornado is on the ground. Flying debris may be dangerous to those caught without shelter. Damage to homes, businesses, and vehicles is possible.

Precautionary/Preparedness Actions: Take cover now. Move to an interior room on the lowest floor of a sturdy building. Avoid windows. If in a mobile home, vehicle, or outdoors, move to the closest substantial shelter.

High Threat-Efficacy Tornado Warning

The National Weather Service in Louisville, Kentucky has issued a tornado warning for central Fayette County in east central Kentucky until 6:30 PM EDT.

At 5:30 PM EDT, a confirmed tornado was observed 10 miles south of Lexington, **near Fayette Mall**, and moving north towards the University of Kentucky at 30 MPH.

You are in a life-threatening situation. An **extremely dangerous and potentially deadly** tornado is on the ground. Flying debris may be dangerous to those caught without shelter. **Considerable** damage to homes, businesses, and vehicles is likely **and complete destruction is possible.**

Precautionary/Preparedness Actions: Take cover now. **The best way to protect yourself is to** move to an interior room on the lowest floor of a sturdy building and avoid windows. If in a mobile home, a vehicle, or outdoors, move to the closest substantial shelter. **Your ability to protect yourself increases by following these directions.**

Low Threat-Efficacy Flash Flood Warning

The National Weather Service in Louisville, Kentucky has issued a flash flood warning for central Fayette County in east central Kentucky until 8:30 PM EDT .

At 5:30 PM EDT, Doppler radar indicated heavy rainfall from thunderstorms over the warning area, where up to 5 inches of rain have already fallen . Additional rainfall amounts of 2 to 4 inches are likely. Basements and low-lying areas, including those around rivers, creeks, and streams could flood.

Numerous roads may be closed in the area. Several water rescues have occurred.

Precautionary/Preparedness Actions: Remain in a safe location. Do not attempt to travel unless you are fleeing an area subject to flooding or under an evacuation order from a public safety official. Do not drive or walk near flooded areas.

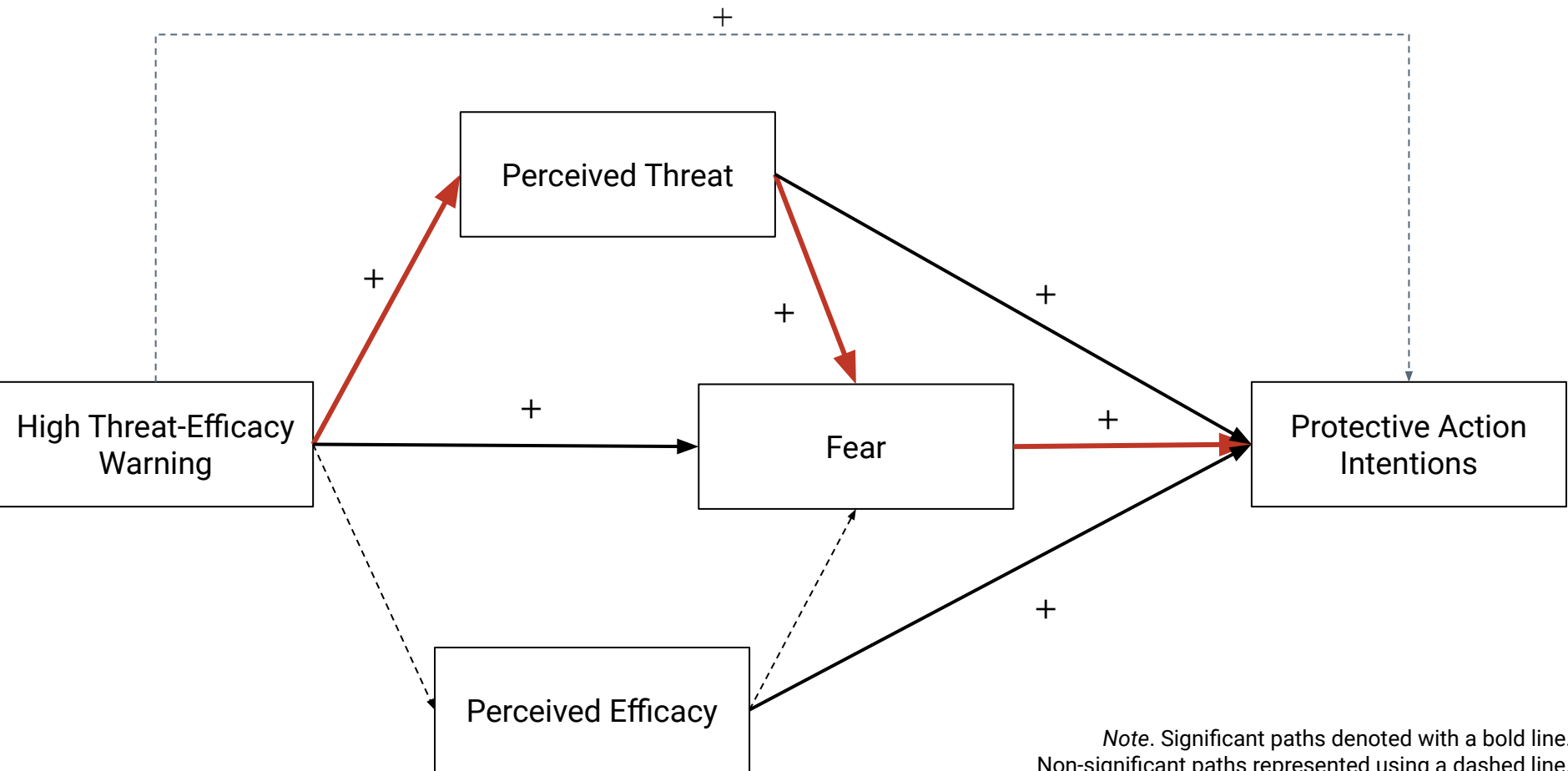
High Threat-Efficacy Flash Flood Warning

The National Weather Service in Louisville, Kentucky has issued a flash flood warning for central Fayette County in east central Kentucky until 8:30 PM EDT.

At 5:30 PM EDT, Doppler radar indicated thunderstorms producing **torrential** rainfall over the Lexington area. Up to 5 inches of rain have already fallen, causing severe and widespread flooding. Additional rainfall amounts of 2 to 4 inches are likely. Basements and low-lying areas, including those around rivers, creeks, and streams could experience **extreme** flooding.

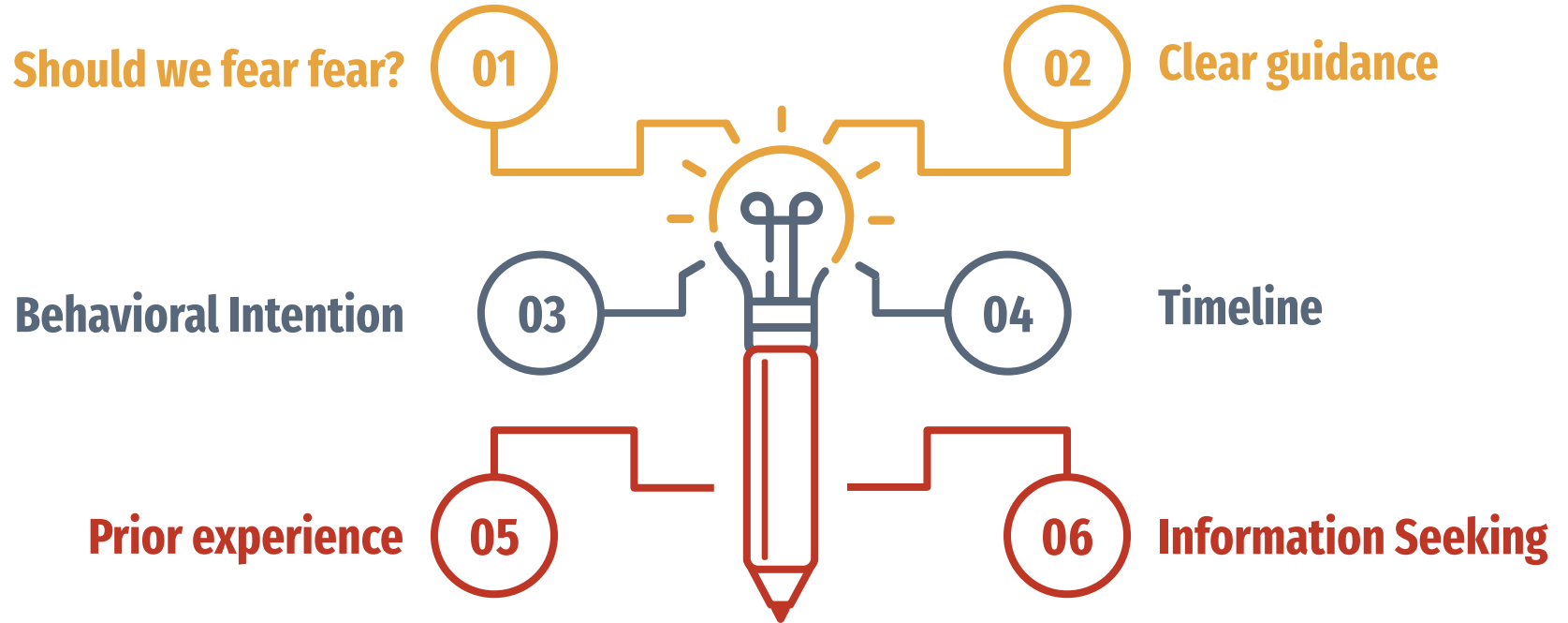
You are in a life-threatening situation. Extremely dangerous and devastating flooding has caused many roads to be impassable, resulting in several water rescues **around Kroger Field on the University of Kentucky campus.**

Precautionary/Preparedness Actions: **The best way to protect yourself is to** remain in a safe location and not drive or walk near flooded areas unless you are under an evacuation order from a public safety official. **Your ability to protect yourself and stay safe increases by following these directions.**



Note. Significant paths denoted with a bold line. Non-significant paths represented using a dashed line. Significant indirect effects denoted with a red line.

Discussion

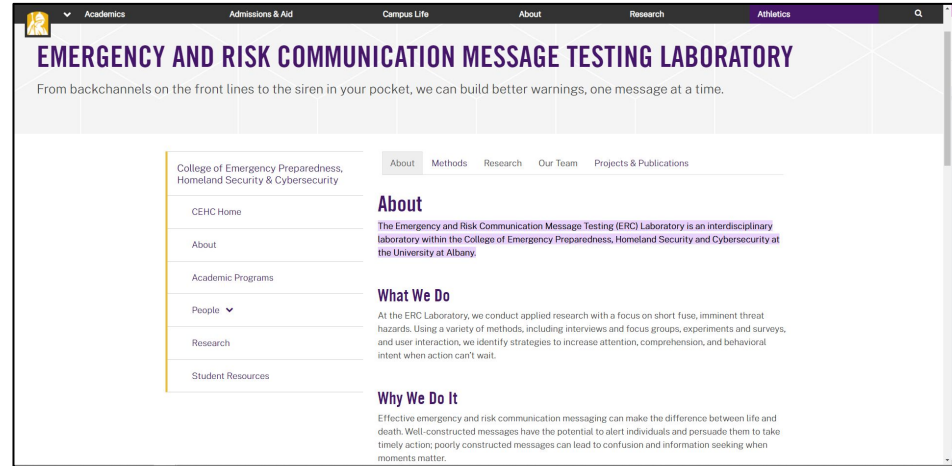


Thanks!



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