

Development of Time-dependent,
Audio-Visual, Stated Choice
Method of Data Collection for
Hurricane Evacuation Behavior

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Motivation

- Evaluation of alternative evacuation policies, like staged evacuation, contra flow, using mass transit for transportation disabled, requires evacuation behaviour data
- Data collected using traditional Revealed Preference (RP) survey method tends to be inadequate for modelling evacuation
- limitations of RP data include
 - absence of transportation data
 - absence of time-dependent data and lack of variability
- Limitations like absence of transportation data in traditional RP can be remedied by supplementing RP data with dynamic characteristics of hurricane

Motivation

- Despite the supplementation, limitations continue to exist
- To overcome other limitations, traditional Stated Choice (SC) survey method can be adapted to collect time-dependent data.
- Past data collection efforts used were static in nature and used verbal descriptions to describe hypothetical scenarios.
- Verbal descriptions may not be adequate to elicit true responses from respondents. Audio-Visuals descriptions can be substituted for verbal descriptions to elicit truthful responses.



Objectives of the study

- Design a revealed preference questionnaire to collect evacuation behaviour data from hurricane Gustav
- Design a time-dependent, audio-visual, stated choice questionnaire to collect time-dependent stated choice data
- Jointly administer revealed preference and stated choice questionnaire using a mail out mail back survey

Design of Survey Instruments

- Design of Revealed Preference Survey Instrument
 - socio-economic data and evacuation behaviours data from Hurricane Gustav
- Design of Audio-Visual, Stated Choice Survey Instrument
 - Collect intended responses to various hypothetical storms

Design of Survey Instrument-Time-dependent, Audio-Visual, Stated Choice Instrument

- Instrument consisted of two parts
 - stated choice questionnaire/response sheet 
 - and a DVD 
- Hypothetical storms were presented as series of four forecasts, developed from archives of hurricane history available from National hurricane centre website
- Three hypothetical storms were compiled into one DVD

Time-dependent, Stated Choice Questionnaire

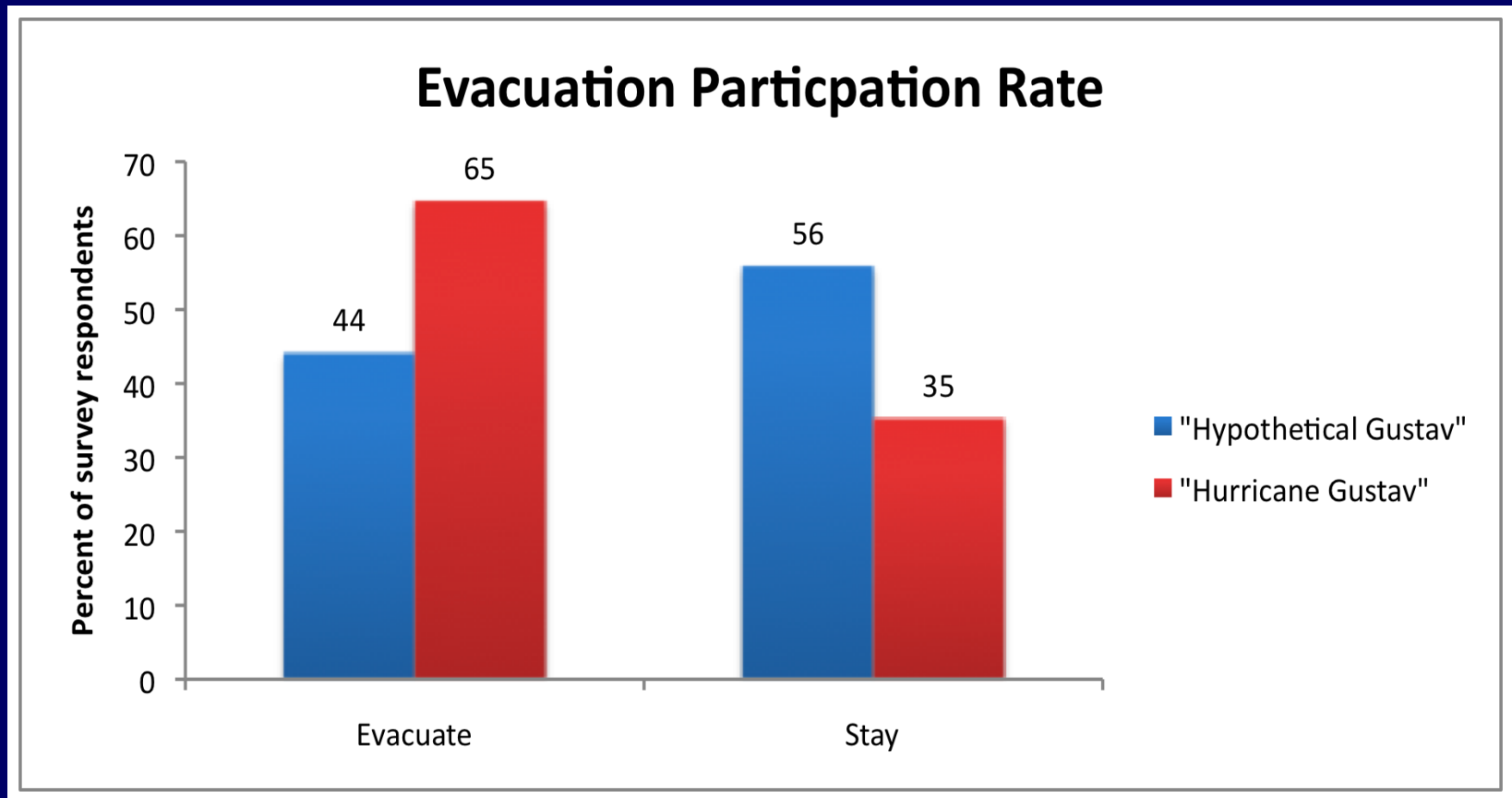
<i>Storm Number</i>	<i>I would evacuate on</i>		<i>Evacuate by (circle one)</i>	<i>Evacuate to (circle one)</i>	<i>Evacuation Destination</i>	<i>Route (circle one)</i>
	<i>Day (circle one)</i>	<i>Time (fill in time)</i>				
<i>Storm 1</i>	Wednesday	_____ a.m./p.m.	Private vehicle no. of vehicles____ no. of people____ Bus Train Walk Ride with friend Other (specify) _____	Motel Public shelter Friend/Relative Work Place Other (specify) _____	City/town _____ State_____	I-10 Airline hwy I-190 I-55 Other (specify) _____
	Thursday	_____ a.m./p.m.				
	Friday	_____ a.m./p.m.				
	Do not evacuate					
<i>Storm 2</i>	Monday	_____ a.m./p.m.	Private vehicle no. of vehicles____ no. of people____ Bus Train Walk Ride with friend Other (specify) _____	Motel Public shelter Friend/Relative Work Place Other (specify) _____	City/town _____ State_____	I-10 Airline hwy I-190 I-55 Other (specify) _____
	Tuesday	_____ a.m./p.m.				
	Wednesday	_____ a.m./p.m.				
	Thursday	_____ a.m./p.m.				
	Do not evacuate					
<i>Storm 3</i>	Saturday	_____ a.m./p.m.	Private vehicle no. of vehicles____ no. of people____ Bus Train Walk Ride with friend Other (specify) _____	Motel Public shelter Friend/Relative Work Place Other (specify) _____	City/town _____ State_____	I-10 Airline hwy I-190 I-55 Other(specify) _____
	Sunday	_____ a.m./p.m.				
	Monday	_____ a.m./p.m.				
	Do not evacuate					

Study area and Sample size

Parish	Sample size
Jefferson	75
Lafourche	16
St. Tammany	49
St. Charles	6
Orleans	21
Terrebonne	30
Tangipahoa	20
St. Bernard	3
Plaquemines	3
St. John the Baptist	9

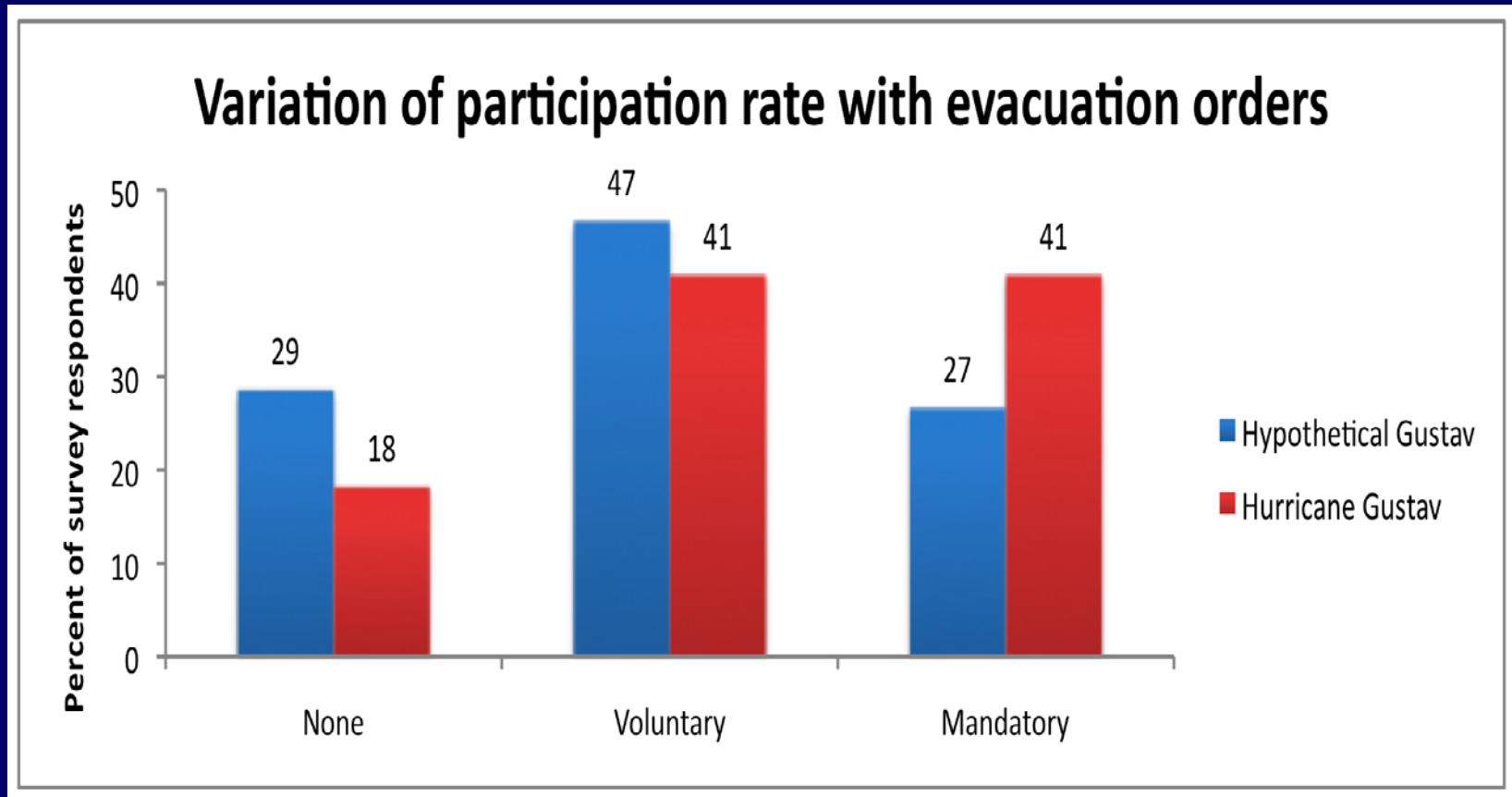
Results

Evacuation Behavior-Hypothetical Gustav vs. Hurricane Gustav



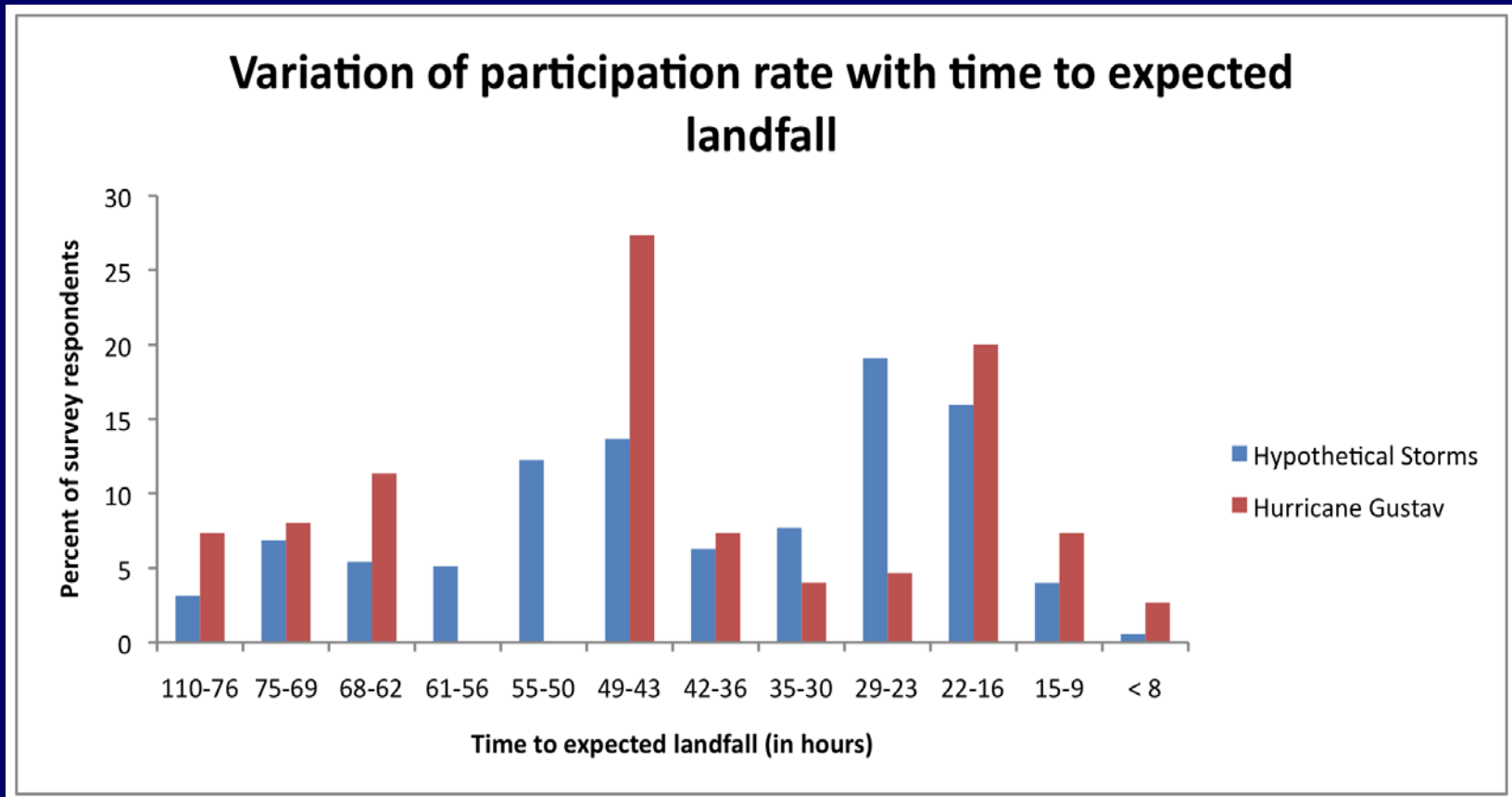
Results

Evacuation Behavior-Hypothetical Gustav vs. Hurricane Gustav



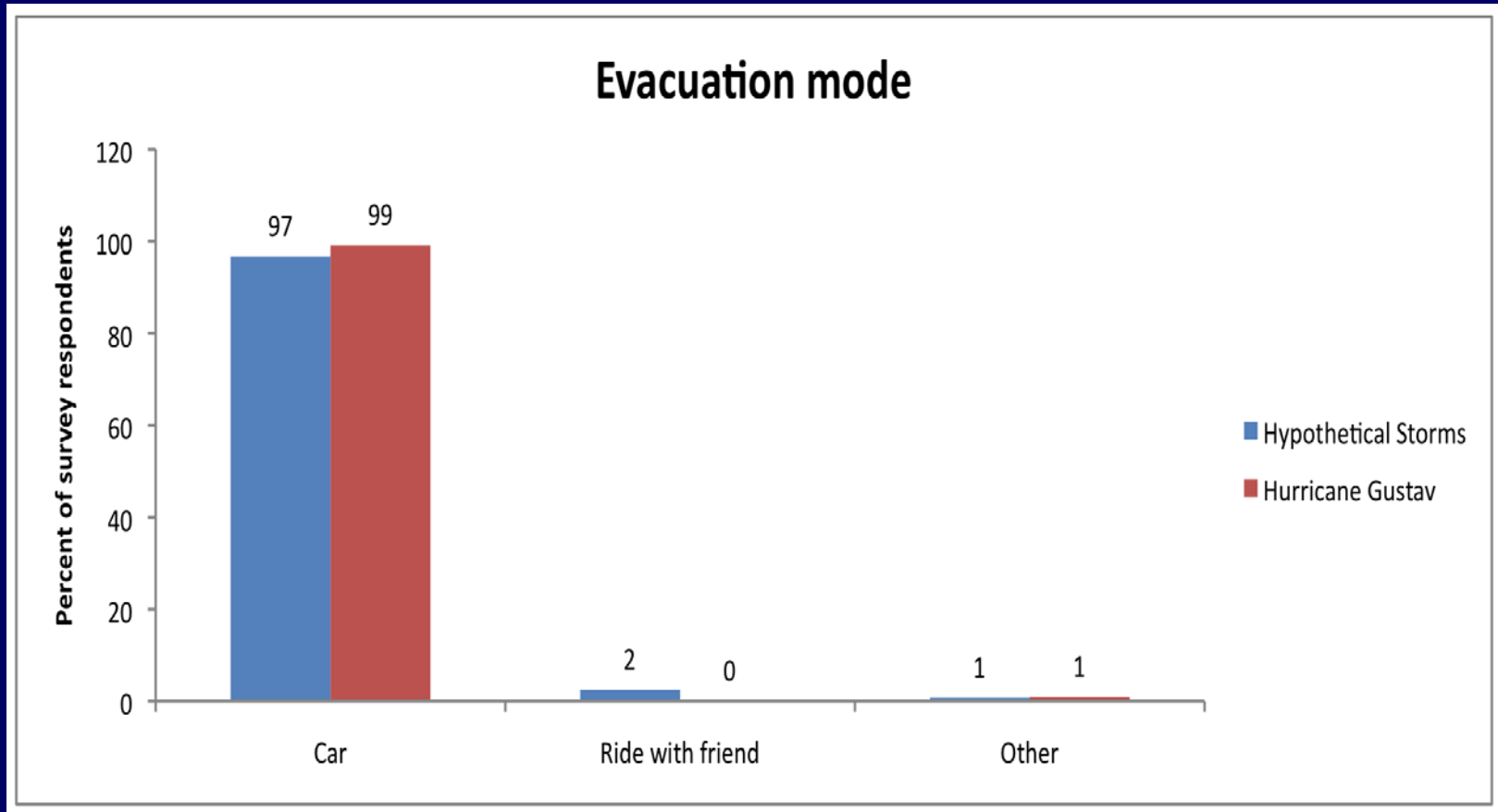
Results

Evacuation Behavior-Hypothetical Storms vs. Hurricane Gustav



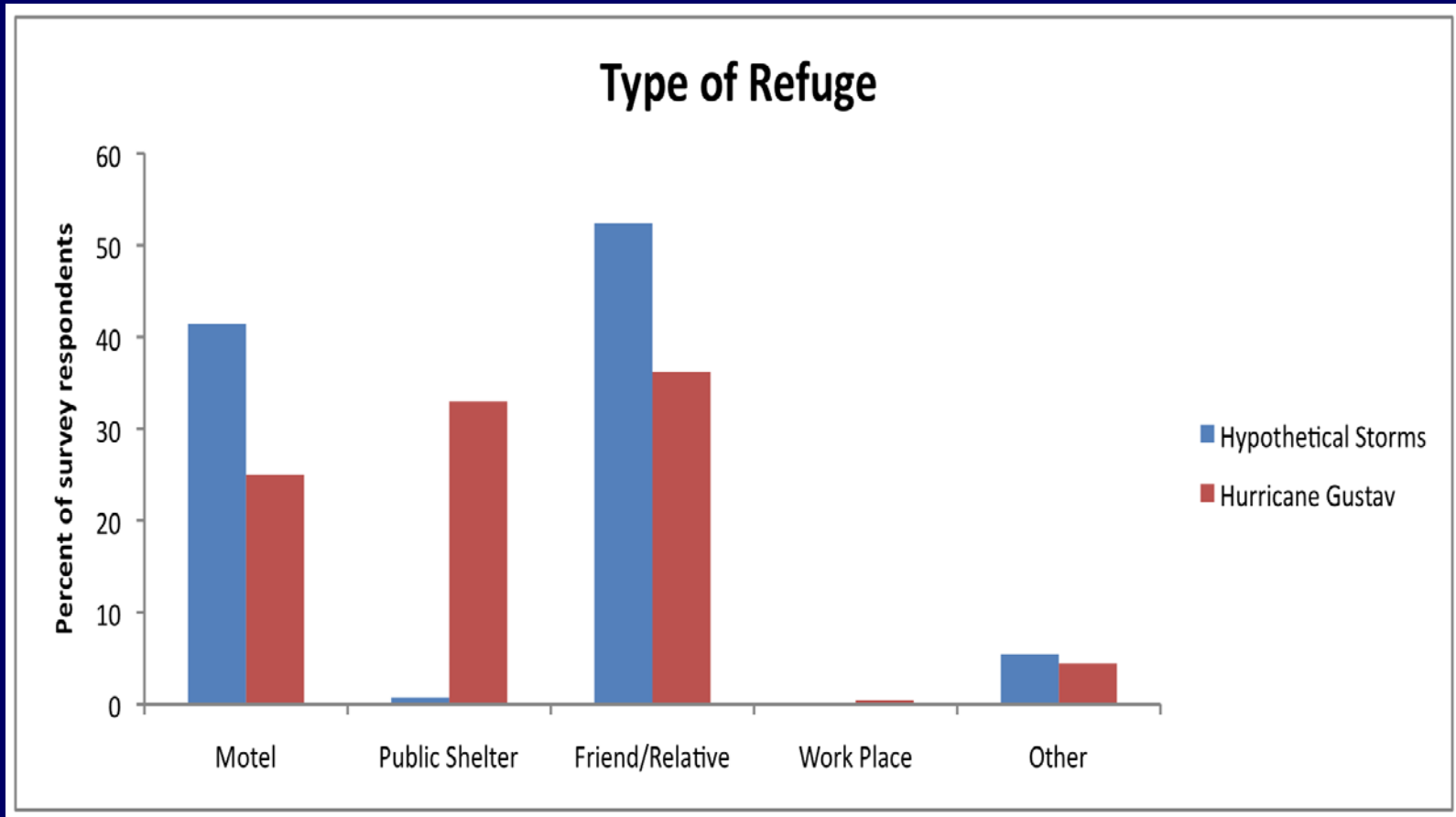
Results

Evacuation Behavior-Hypothetical Storms vs. Hurricane Gustav



Results

Evacuation Behavior-Hypothetical Storms vs. Hurricane Gustav



Data that can be collected using various survey instruments

	Tradition RP instrument used by non- transportation researchers/ practitioners	Traditional SC instrument used by non- transportation researchers/ practitioners	RP instrument used in this study	Time-Dependent, Audio-Visual, Stated Choice instrument used in this study
Day and Time of Departure	Yes	No	Yes	Yes
Mode of Evacuation	No	No	Yes	Yes
Evacuation orders given by emergency officials	No	Yes	No	Yes
Route taken	No	Yes	No	Yes
Type of Refuge	Yes	Yes	Yes	Yes
Day and time of arrival at refuge	No	No	Yes	No
Time-dependent characteristics of hurricane	No	Yes	No	Yes
Single or Multiple event	Single	Multiple	Single	Multiple
Dynamic	No	No	No	Yes

Conclusions

- People are receptive to the new data collection method
- The new survey method proved to be effective in overcoming limitations of traditional revealed preference data collection method
- Time-dependent stated choice method can serve as source of information for inputs like dynamic origin-destination matrix or evacuation response curve for modellers or simulators of hurricane evacuation

Conclusions

- Emergency management officials can use new method of data collection to estimate the potential demand for public shelters, mass transit, and other resources needed for future evacuations
- Time-dependent stated choice method along with revealed preference survey has the potential of evolving into new survey method to collect time-sensitive, policy-sensitive, behavioral response for wide variety of conditions