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The Wharton School, University of Pennsylvania
Calverton Airport, LI, Dec. 2012
EYE-YI! WATCH IT, N.Y.

'Cane expected to deal a blow
Why this matters
Why preparedness has not improved:

Most modern philosophies for risk management assume that people are, at their core, rational in how they make decisions in the face of risk. Given complete information about a prospective risk, people will:

a. Understand its personal consequences;
b. Undertake appropriate preventive action
Why preparedness has not improved:

Unfortunately, this assumption is rarely true. If we want to improve preparedness, we first need to understand how people *actually* think about risk, and then design risk-management schemes that acknowledge and conform to these cognitive limitations, NOT compete with them.
Today

• A brief (but necessary) primer on disaster psychology
• A new approach to assessing and designing preparedness plans---the behavioral risk audit
How we think: a confluence of two systems

System 1:
Fast,
Automated,
Reflexive.

Requires
Training

System 2:
Slower,
Deliberative

Requires
Accurate
“Mental
Models”
Pierre-Cedric Bonin
Missed approach (Go around)

- Procedure

1. Timely Decision to Make Go-Around
2. Apply Max Power
3. Adjust Pitch Attitude
4. Allow Airspeed to Increase
5. Assume Climb Attitude
6. Flaps to Intermediate
7. Positive Rate of Climb, Retract Gear; Climb at $V_Y$
8. Retract Remaining Flaps
9. 500' Cruise Climb
How might we better prevent such disasters?

- Predicting hazardous event and having tools to mitigate losses is only half the solution. Predicting how people will respond to these predictions and use these tools is, in many cases, even more important.
The Key

• Because of the rarity of extreme events, it will fruitless to try to correct biases. The best risk-management strategies will be those that acknowledge biases and design systems that are resilient to them.
# The Behavioral Risk Audit

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<tr>
<th>Bias</th>
<th>Manifestation</th>
<th>Consequence</th>
<th>Remedy</th>
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The Core biases

- Optimism
- Myopia
- Amnesia
- Herding
- Inertia
- Simplification
Example 1: Excessive Optimism

• Disasters are unlikely
• Disasters ARE likely---but they won’t happen to me
• My preparations will be enough
• I have enough time to prepare
The “it won’t happen to me” bias: Perceived versus actual probabilities of hurricane-force winds, Hurricane Sandy
...yet few were particularly worried about it
The consequence: lots of light-weight preparation
How we think of likelihood

Perceived Risk: 1/10

Actual Risk: 2/3

Way the disaster could occur

Way the disaster could NOT occur

“Are you worried?”

“No, not all all!”

Perceived Risk: 1/10
Why so many people lost their cars in Sandy
Why so many people lost their cars in Sandy

Perceptions of greatest Storm Risk, Coastal Residents, 1-2 days before landfall
Remedy: nudge the mental sampling

• Geo-targeting warnings
• Describe likely specific effects and actions
• Use vivid imagery
...Scare tactics can sometimes work
...But sometimes backfire
Example 2: Simplification

- The “single action” bias
HURRICANE PREPAREDNESS CHECKLIST

HURRICANE SURVIVAL MATERIALS
- Water (7 gallons per person)
- Nonperishable foods; canned meat, fish, fruit and vegetables
- Bread in moisture-proof packaging, cookies, candy, dried fruit
- Canned soups, juices, milk
- Powdered or evaporated milk
- Cereal bars, peanut butter
- Instant coffee and tea
- Pet Food, Pet Meds, Leashes, Carriers, etc.
- Flashlights and spare batteries*
- Weather Radio
- Battery-operated TV/radio/ alarm clock
- Portable cooler and ice
- Waterproof lighter & Butane lighter

COOKING EQUIPMENT
- Sterno Fuel
- Portable camp stove or grill, and an extra propane tank
- Charcoal, lighter fluid
- Manual can opener
- Paper plates and cups
- Plastic eating utensils
- Napkins and paper towels
- Aluminum foil
- Oven mitts

* If the electricity is off, use flashlights ONLY. Candles and oil lamps may cause a fire. Fire crews WILL NOT respond during a hurricane.

DOCUMENTS
- Photocopies of prescriptions
- Photo identification
- Proof of occupancy of Residence (utility bills)
- Medical history and information
- Water and fireproof container for document storage
- Backup disks of your home computer files
- Camera and film

BABIES
- Disposable diapers/wipes
- Formula, food and medication

MEDICAL EMERGENCY SUPPLIES
- First Aid Kit including pain meds, antibiotic cream, antacids
- Prescriptions (one month’s supply)
- Mosquito Repellent
- Sunscreen
- Mosquito netting
- Fire extinguisher
- Cash
- Bleach or water purification tablets

PERSONAL SUPPLIES
- Toilet paper
- Entertainment: books, magazines, cards, etc.
- Soap and detergent
- Toiletries
- Bedding: pillows, blankets, sleeping bag
- Change of clothing
- Rain gear and work gloves
- Extra glasses or contact lenses
- Extra sets of keys
- Ice Chest

OTHER NECESSITIES
- Tools: hammer, wrenches, screwdrivers, nails, saw
- Lumber
- Rope
- Trash bags
- Cleaning supplies
- Plastic drop cloth
- Masking or duct tape
- Outdoor extension cords

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Example 2: Inertia

A common decision heuristic: when in doubt, choose the default or status quo.

*Effective consent rates, by country.* Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).
Making Safety the Default

• Provide residents with “free” annual preparedness kits paid for with local taxes that they can opt-out of for a refund

• Make flood insurance opt-out rather than opt-in in high-risk areas (e.g., part of property taxes for which you can request a refund)

• Health club model: design long-term insurance policies where renewal is automatic and committed to ex-ante; des)
## Behavioral Risk Audit: Flood Preparedness

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<tr>
<td>Optimism</td>
<td>Belief that probability of a flood is remote</td>
<td>Tendency to see flood insurance as too expensive</td>
<td>Hope-specific assessment of risk and annualized expected losses</td>
</tr>
<tr>
<td>Myopia</td>
<td>Tendency to see better immediate uses for premium money</td>
<td>Procrastination of purchasing polices</td>
<td>Time-sensitive promotions on policies; e.g., early-purchase discounts</td>
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<tr>
<td>Amnesia</td>
<td>Poor memory for past floods</td>
<td>Failure to renew flood policy</td>
<td>Long-term policies were renewal is automatic</td>
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<tr>
<td>Herding</td>
<td>Tendency to base insurance decision on whether neighbors have polices</td>
<td>Imitation of community reluctance to adopt policies</td>
<td>Communication programs that emphasize social norms of safety</td>
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Conclusions

• All signs suggest that we are in for some rough sledding ahead, hence preparedness and resilience are no longer back-burner issues.

• Meeting this challenge will require a fundamental change in the mindset of how we think about strategies for risk management. Good engineering and information is not enough; we need to develop strategies that take into account the psychology of how people utilize and process these inputs
Thank you!