The Human Factor in Emergency Management: What Neuroscience Teaches Us About Behavior

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Housekeeping

- Cellphones on vibrate or silent
- Access to the presentation
- Q&A Session at end
- Evaluations
- Social Media

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About this Session

Session Takeaways

• Understand the neuroscience of stress and how autonomic nervous system responses affect cognitive function during a critical incident.
• Identify common myths and misconceptions about human behavior during critical incidents.
• Learn new ways to apply this knowledge to campus preparedness planning, including resource creation, exercise development and competency training for responders.
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Emergency Management
The Human Factor in Emergency Management: What Neuroscience Teaches Us About Behavior
Why Bother?
“In order to react successfully to a disaster, you must understand human behavior better than anyone else in your community.” (McEntire, 2006)
Whose behavior?
Whose brains?
Understanding Human Behavior

Lewin’s* Equation

$B = f(P,E)$
Structural Constraints (the person)

Task Constraints

Environmental Constraints
Environment
(what is happening around me)

Structure
(how does my brain work)

Task(s)
(what has to be done)
Cognition = processing information + using that information to make a judgement

Structural Constraints (the person)
STRESS
Threat

1. Assess the Demands
2. Assess the Resources available
3. If sufficient → challenge (“eustress”)
4. If insufficient → threat (“distress”)
5. If distress → Anxiety, etc
Emotions

Short Term memory

Limbic system

Survival behaviors

Cognitive functions

1. Problem Solving
2. Decision making
3. Judgement
4. Logic
5. Reasoning
6. Impulse Control
7. Verbal Processing
1. Limbic system – relationship with ANS
2. ANS $\rightarrow$ SNS + PNS
3. Aroused in states of stress
4. SNS $\rightarrow$ Fight or Flight
5. PNS $\rightarrow$ Freeze (when death may be imminent or the threat is prolonged)
6. Freeze $\rightarrow$ dissociation
Crisis Managers
What do we expect our people to be able to do?
• Handle a **high volume of information**
• **Distill information** & identify most important details
• Adapt to **dynamic and changing** situations
• **Multi-task** & prioritize tasks effectively
• Tolerate **ambiguity**
• Quickly analyze problems & identify root causes
• Develop and implement **solutions to problems**
• Stay Calm
• Handle **high-pressure environment**
• Make sound **decisions**
• Identify **critical issues** accurately
Yerkes–Dodson law is an empirical relationship between arousal and performance (1908).
Multi-tasking

Interleaving: Single tasking in rapid succession

Subconscious Tasks

Conscious Tasks
Task Saturation

- Too much to do
- Not enough time
- Not enough tools
- Not enough resources
Rising expectations + flatlined resources = task saturation & stress
Error Alert

Emergency Alert
There is no missile threat or danger to the State of Hawaii. Repeat. False Alarm.
Slide for more
Signs

• **Shutting Down** ➔ you simply stop performing.

• **Cognitive Lock-In** ➔ sticking with your first decision, no matter what.

• **Compartamentalizing/Target Fixation** ➔ an intense focus on one thing to the exclusion of all else

• **Channelizing** ➔ acting busy, but just organizing & reorganizing lists or small tasks & not actually producing effective results
Overwork
Stressor \(\rightarrow\) Cognitive state (attitude) \(\rightarrow\) Illness & Burnout
SOLUTIONS
Duty of Care
Culture
Delegate
Rest
Breaks
Learn + Apply
1. Practice
2. Use Tools
Adding possible outcomes to the tree (note: circles represent uncertain outcomes)

1. Choice / Option 1
   - Outcome A
   - Outcome B

2. Choice / Option 2
   - Outcome A
   - Outcome B
   - Do nothing

Leaf Node

Square [decision to be made]

Decision Node

Decision Node

Sub-Tree

Leaf Node
Tech Dashboards

Energy Dashboard

COST PREDICTED
Total $214

CHANGE IN COST
$203 $214
May Jun

5.42% INCREASE IN COST

USAGE ESTIMATE

ACTIVE APPLIANCES

ENERGY INTENSITY

47 kWh/Sqft

CARBON FOOTPRINT

Emission

36.4 Kg of CO2

Green Energy Generated

Goal
3. Consider Behavior
Active Shooter Ex 2017
Active Shooter Ex 2017
Advantage
Reminders

• Access to the presentation
• Evaluations
• Social Media

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