

# **Systems and Choices: They're All We Have**

David Marx, BSE, JD  
CEO, Outcome Engenuity  
[www.outcome-eng.com](http://www.outcome-eng.com)

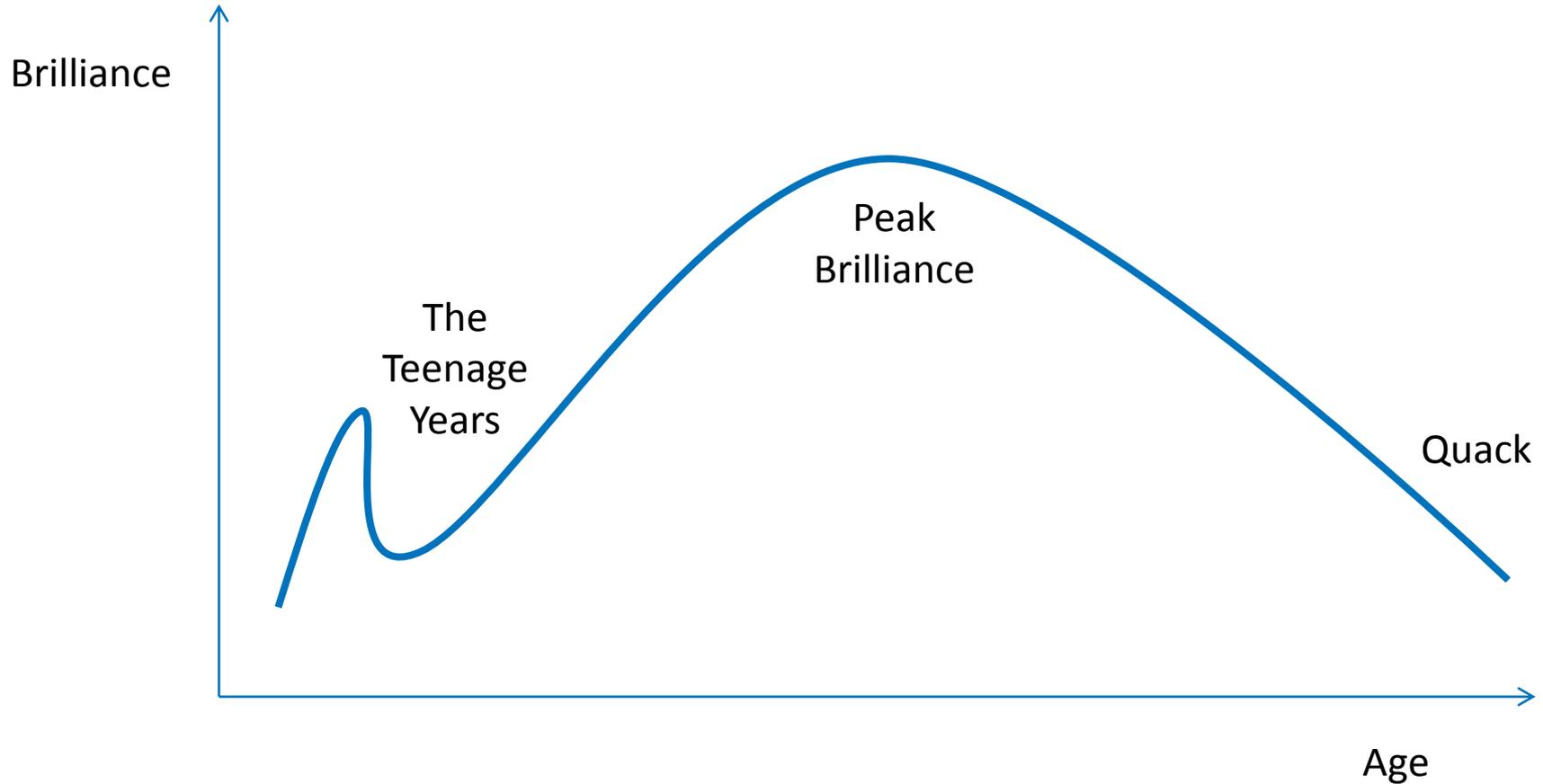
June 19, 2018

Machines are  
fast, accurate, and dumb.

Humans are  
slow, sloppy, and brilliant.

Tony Muschara

# Brilliance - Explored



# Who am I?

I am an inherently self-serving, occasionally altruistic, happiness-seeking, inescapably fallible, pack animal blessed (or cursed) with free will and a mis-tuned ability to see and avoid hazards in the world around me

# My Presentation

I want to talk about  
errors and accidents.

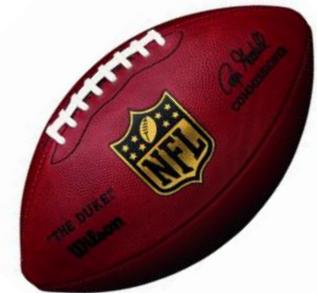
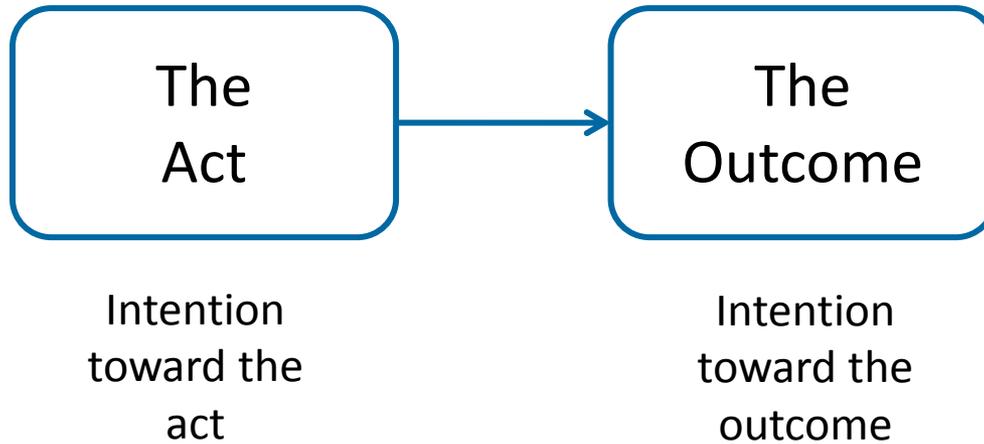
I want to get to  
systems and choices.

# Errors and Accidents

- Pilot Error
- Medication Error
- Production Error
- Driver Error
- Employee Mistake
- Accident
- Incident
- Mishap
- Misadventure
- Near miss



# Important to Note: We Always Carry Two Intentions



# Filling in the Picture

## Human Error

Unintended  
conduct: where  
the actor should  
have done other  
than what they  
did

# School Shootings

## 17 killed in mass shooting at high school in Parkland, Florida

by Elizabeth Chuck, Alex Johnson and Corky Siemaszko / Feb.14.2018 / 2:18 PM ET / Updated Feb.15.2018 / 9:20 AM ET



# Filling in the Picture

## Human Error

Unintended conduct: where the actor should have done other than what they did

## Purpose

A purpose to cause harm (never justified)

# So which is it?

A nurse goes into a patient room to kill the patient in bed A, and by mistake kills the patient in bed B.

**Is this human error?**

**Or, a purpose to harm?**

# The Casting Couch

Harvey Weinstein  
accidentally assaults  
hundreds of young  
actresses?

A purpose to harm?



# Filling in the Picture

## Human Error

Unintended conduct: where the actor should have done other than what they did

## Knowledge

Knowingly causing harm (sometimes justified)

## Purpose

A purpose to cause harm (never justified)

# The FBI Back Flip

## Off-duty FBI agent accidentally shoots man after handgun falls off at Denver night club, police say



**BY:** [Oscar Contreras](#)

**POSTED:** 1:14 PM, Jun 2, 2018

**UPDATED:** 2:41 PM, Jun 3, 2018



# Filling in the Picture

## Human Error

Unintended conduct: where the actor should have done other than what they did

## Reckless

Conscious disregard of a substantial and unjustifiable risk of harm

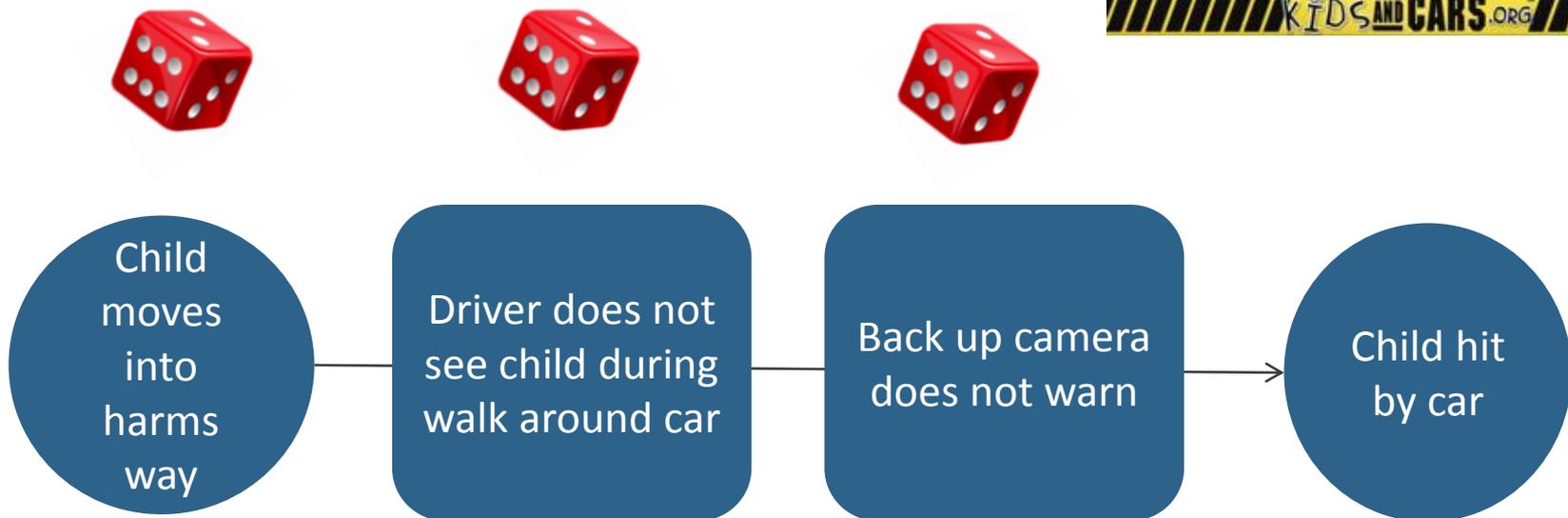
## Knowledge

Knowingly causing harm (sometimes justified)

## Purpose

A purpose to cause harm (never justified)

# One last block



# Filling in the Picture

## Human Error

Unintended conduct: where the actor should have done other than what they did

## At-Risk Behavior

A choice where risk is not recognized, or is mistakenly believed to be justified

## Reckless

Conscious disregard of a substantial and unjustifiable risk of harm

## Knowledge

Knowingly causing harm (sometimes justified)

## Purpose

A purpose to cause harm (never justified)

# Back to Errors and Accidents

# An Accidental Death?

**Diana Killed in a Car Accident in Paris**

**In Flight From Paparazzi — Friend Dies**

By CRANI R. WHITNEY

PARIS, Sunday, Aug. 31 — Diana, the Princess of Wales, was killed shortly after midnight today in an automobile accident in a tunnel by the Seine. The accident also killed friend Mohammed al-Fayed, the Kuwaiti heir, and their driver, the police said.

Diana's death was announced this morning by the Interior Minister, Jean-Pierre Chevènement. She died after being hospitalized in intensive care at the Pitié-Salpêtrière Hospital in southwest Paris.

A bodyguard was seriously injured, according to a police spokesman.

"The car was being chased by photographers on motorcycles, which could have caused the accident," a spokesman for the Prefecture of Police said. Several motorcycles were detained for questioning after the crash, Reuters reported, quoting police officials.

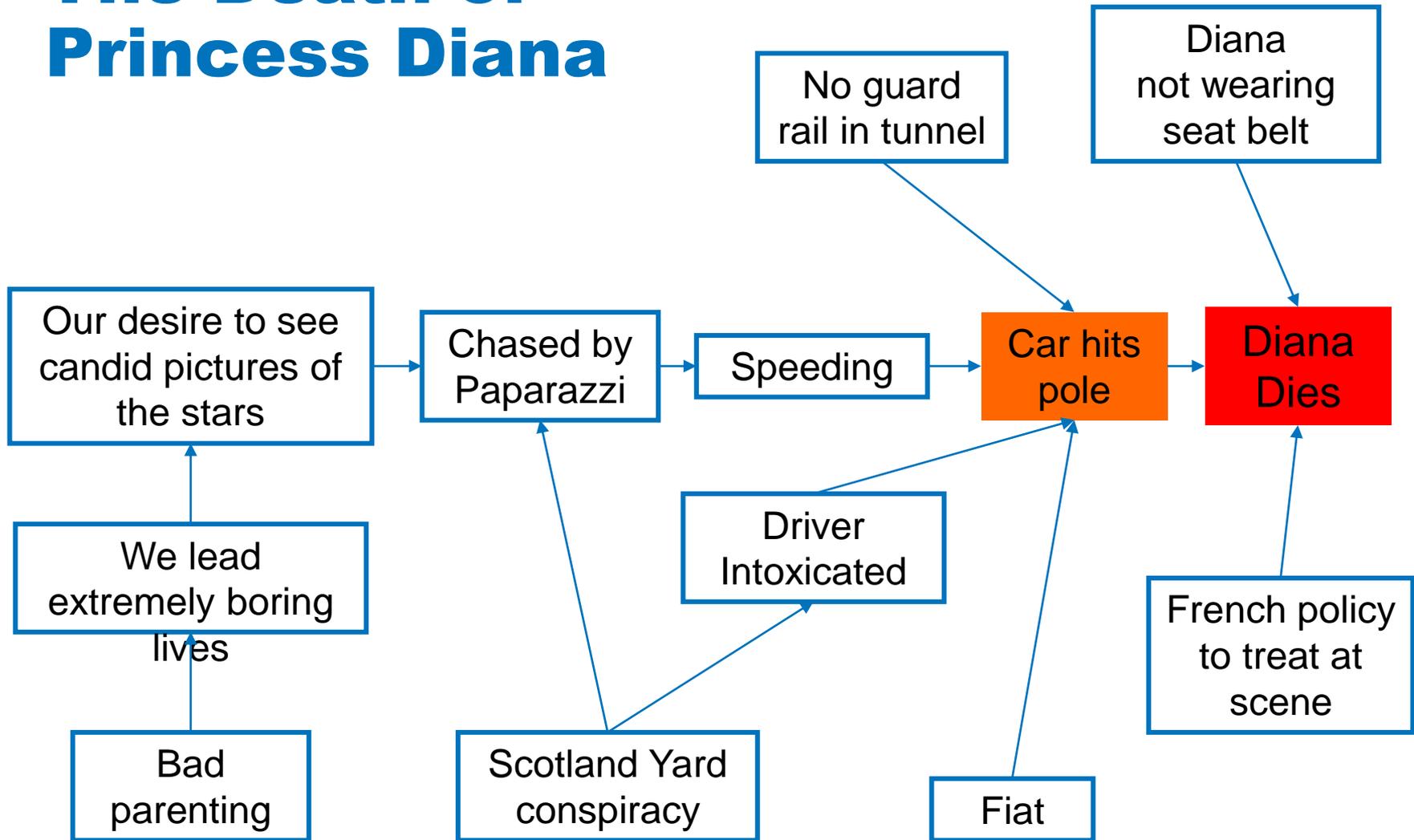
The Princess, 34, was divorced from Prince Charles, the Prince of Wales and heir to the British throne, last year. She had vacationed with Mr. al-Fayed, 41, the son of Harrold's owner, Mohammed al-Fayed, on the French Riviera earlier this month and had been expected to return to London today to be with her two sons, the Princes William and



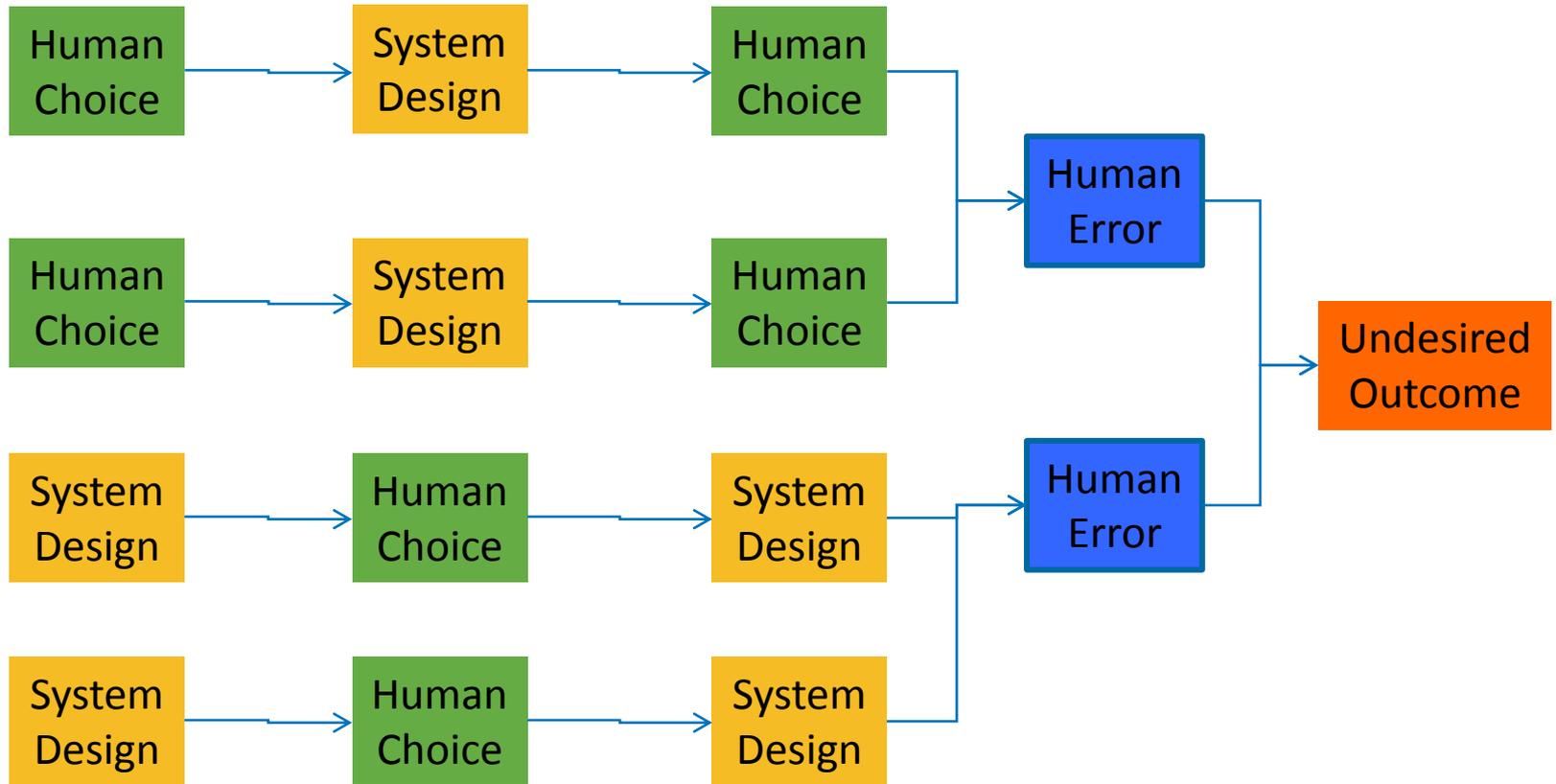
Photo by AP/WIDE WORLD

Diana in May, at the opening of an art center in Leicester.

# The Death of Princess Diana



# Systems and Choices



Language: **English** ▾

## Risky Driving

NHTSA works to eliminate risky behaviors on our nation's roads.

<a href="#">Drunk Driving</a>	<a href="#">Distracted Driving</a>	<a href="#">Seat Belts</a>
<a href="#">Drug-Impaired Driving</a>	<a href="#">Speeding</a>	<a href="#">Drowsy Driving</a>

And given it's choice, SANCTION appears the response of choice

**We've created a very  
punitive society**

# Aviation Regulation

No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.

*Federal Aviation Regulations  
§ 91.13 Careless or Reckless Operation*

# Aviation Regulation

“As far as I am concerned, when I say ‘careless’ I am not talking about any kind of ‘reckless’ operation of an aircraft, but simply the most basic form of simple human error or omission that the Board has used in these cases in its definition of ‘carelessness.’ In other words, a simple absence of the due care required under the circumstances, that is, a simple act of omission, or simply **‘ordinary negligence,’ a human mistake.**”

*National Transportation Safety Board  
Administrative Law Judge  
Engen v. Chambers and Langford*

# The Florida Criminal Code

## The 2017 Florida Statutes

---

<u>Title</u> <u>XLVI</u> CRIMES	<u>Chapter 860</u> OFFENSES CONCERNING AIRCRAFT, MOTOR VEHICLES, VESSELS, AND RAILROADS	<u>View Entire</u> <u>Chapter</u>
---------------------------------------	---	--------------------------------------

### **860.13 Operation of aircraft while intoxicated or in careless or reckless manner; penalty.—**

(1) It shall be unlawful for any person:

(a) To operate an aircraft in the air or on the ground or water while under the influence of:

1. Alcoholic beverages;
2. Any substance controlled under chapter 893;
3. Any chemical substance set forth in s. 877.111; or

(b) To operate an aircraft in the air or on the ground or water in a careless or reckless manner so as to endanger the life or property of another.

(2) In any prosecution charging careless or reckless operation of aircraft in violation of this section, the court, in determining whether the operation was careless or reckless, shall consider the standards for safe operation of aircraft as prescribed by federal statutes or regulations governing aeronautics.

(3) Violation of this section shall constitute a felony of the third degree, punishable as provided in s. 775.082, s. 775.083, or s. 775.084.

# Lawmakers at work

## Human Error

Unintended conduct: where the actor should have done other than what they did

## At-Risk Behavior

A choice where risk is not recognized, or is mistakenly believed to be justified

## Reckless

Conscious disregard of a substantial and unjustifiable risk of harm

## Knowledge

Knowingly causing harm (sometimes justified)

## Purpose

A purpose to cause harm (never justified)

**In 2018, ALL are Criminal Conduct**

# A Better Model for Choice?

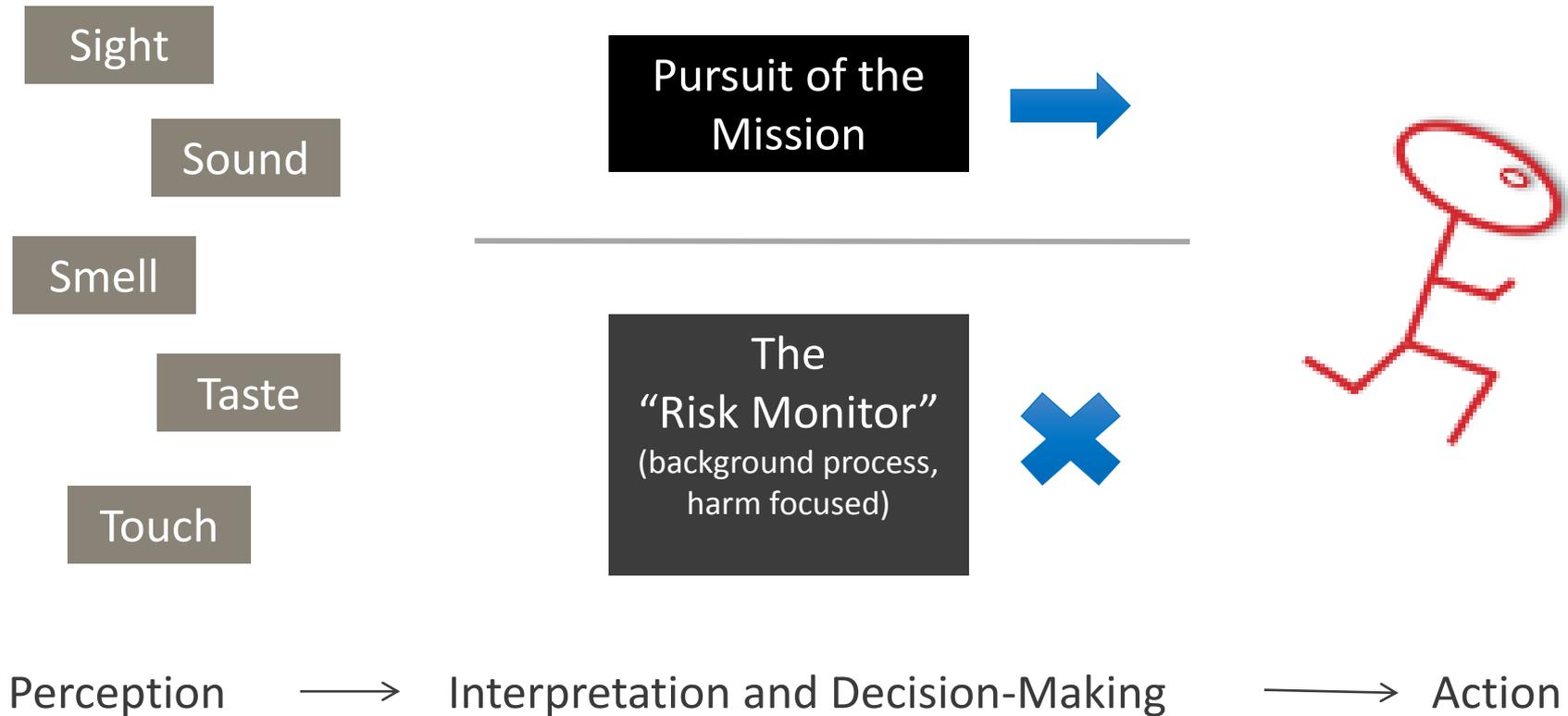
# Choice

I know, I know.  
I cannot reach the top. Hey, do  
we have a third ladder?

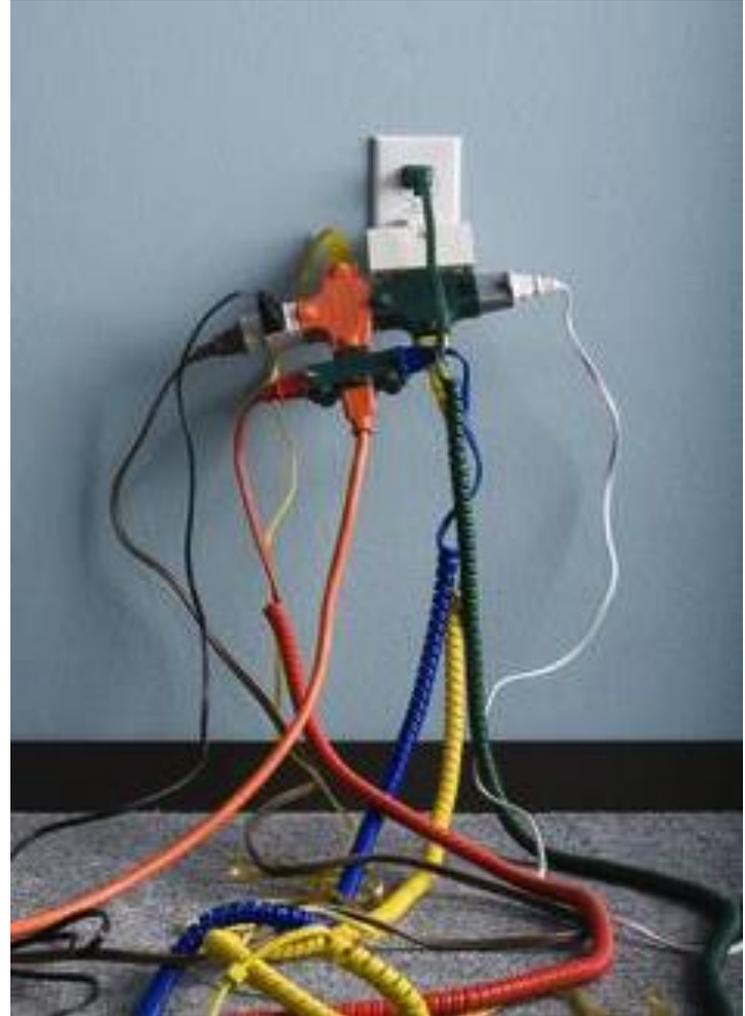
Hurry, Bob, the game is going to  
start in 10 minutes



# A Simple Mental Model



# Our Risk Monitors



# Our Risk Monitors



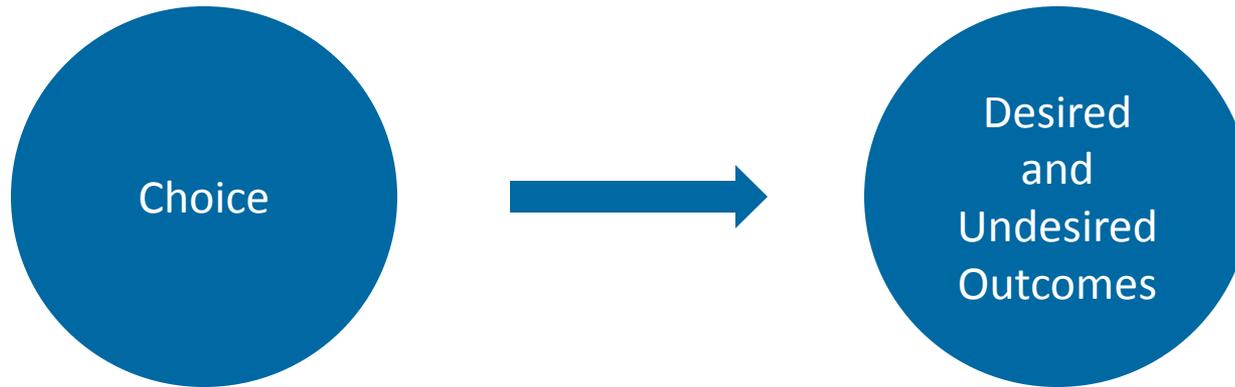
# Our Risk Monitors



# Our Risk Monitors



# The Limits of Natural Consequences



The less likely the undesired outcome, the more distant the undesired outcome, the harder it is to see the link between a risky choice and the undesired outcome it may cause.

# How We Make Choices

- “Life, Liberty, and the Pursuit of Happiness”
- Pursue our individual mission, while trying to respect our shared values
- We are **NOT** inherently rule followers (we take them under advisement)
- We **ARE** hazard and threat avoiders
  - Natural and man-made hazards
  - Values-based threats
  - Engineered threats

# We Respond to Hazards and Threats



**Man-Made  
Hazard**



**Values-Based  
Threat**

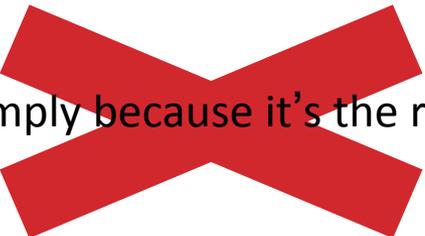


**Engineered  
Threat**

# Compliance with a rule? An order of preference?

1. I comply because I see the link between my deviation and the potential harm being managed by the rule.
2. I comply because it's a cultural expectation (peer condemnation).
3. I comply to avoid organizational sanction.

I comply because it's the rule



# Getting Past the Punitive Culture to Better Systems and Better Choices

~~How bad was the outcome?~~

~~Who did it?~~

# The Just Culture

A system of substantive justice (disciplinary and enforcement action) that reflects what we now know of socio-technical system design, free will, and our inescapable human fallibility.

# Back to the Big Picture

Human  
Error

Unintended  
conduct: where  
the actor should  
have done other  
than what they  
did

Outcome

At-Risk  
Behavior

A choice where  
risk is not  
recognized, or is  
mistakenly  
believed to be  
justified

Choice

Reckless

Conscious  
disregard of a  
substantial and  
unjustifiable risk  
of harm

Choice

Knowledge

Knowingly  
causing harm  
(sometimes  
justified)

Choice

Purpose

A purpose to  
cause harm  
(never justified)

Choice

All Shaped by System Design

# THE THREE CORE BEHAVIORS

## Human Error

*Inadvertent action: slip, lapse, mistake*

Manage through changes in:

- Processes
- Procedures
- Training
- Design
- Environment
- Behavioral Choices

**Accept / Console**

## At-Risk Behavior

*A choice: risk not recognized or believed justified*

Manage through:

- Removing incentives for at-risk behaviors
- Creating incentives for healthy behaviors
- Increasing situational awareness

**Coach**

## Reckless Behavior

*Conscious disregard of a substantial and unjustifiable risk*

Manage through:

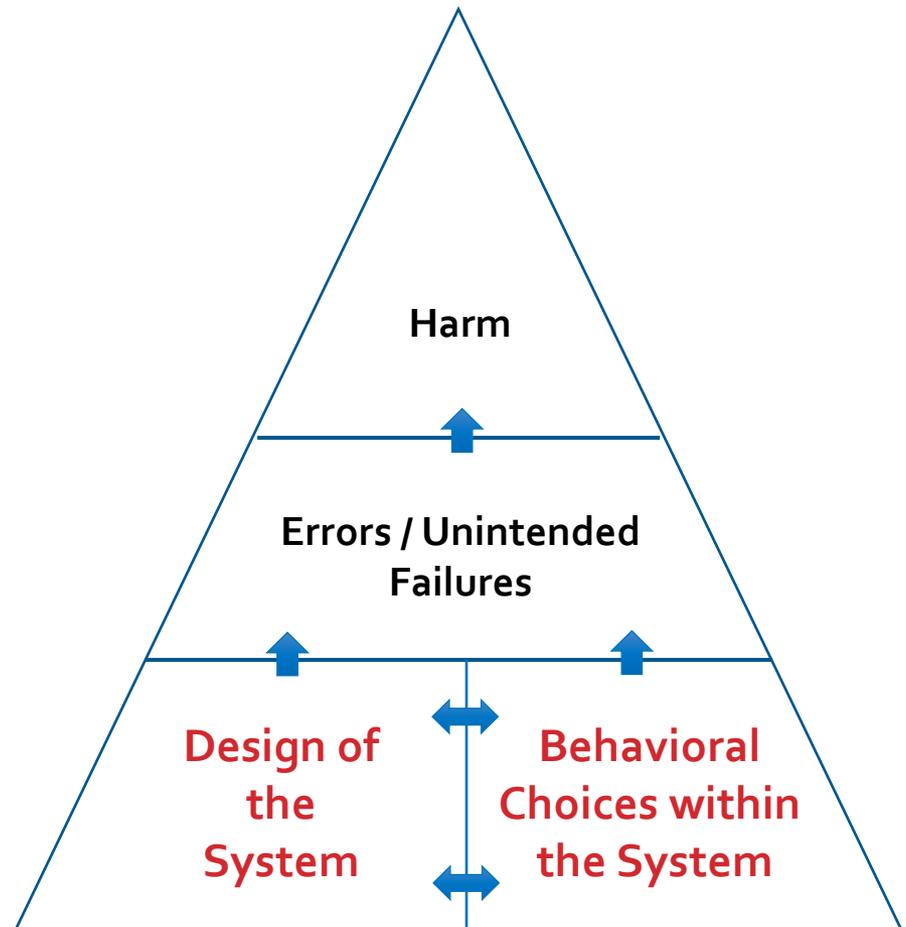
- Remedial action
- Disciplinary action

**Sanction**

**In the End...**

# We Must Focus on the Right Things

- Monitor it all
- But actively manage:
  - **System Design**
  - **Safety Culture**



# Systems and Choices

Systems + Choices = Outcomes

Reliable Systems + Good Choices = Good Outcomes

# My Journey

I started by career fascinated by **errors and accidents.**

I sit at the  $\frac{3}{4}$  mark of my career focused on **systems and choices.**

**Thank You**