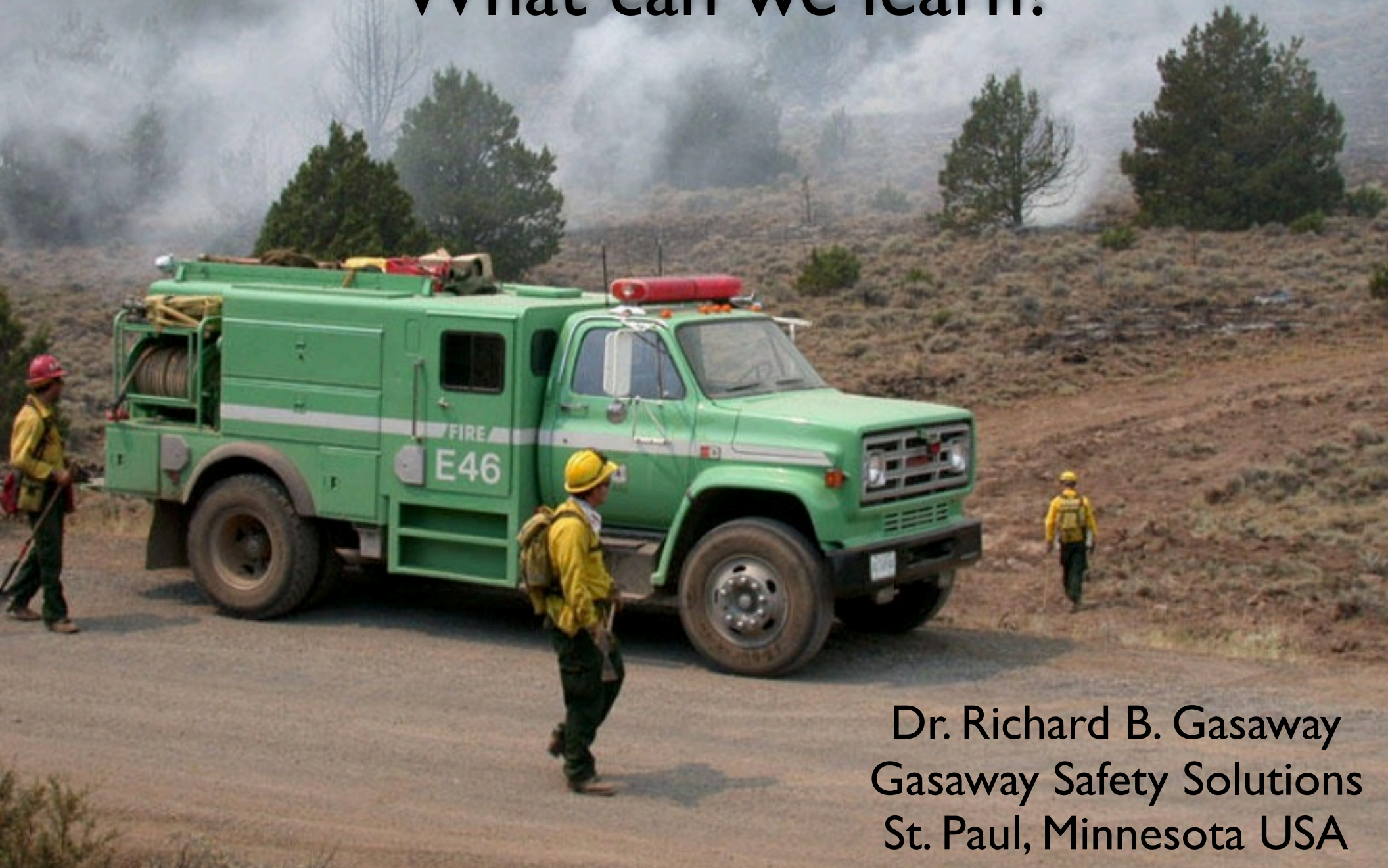


# When brain science meets public safety: What can we learn?



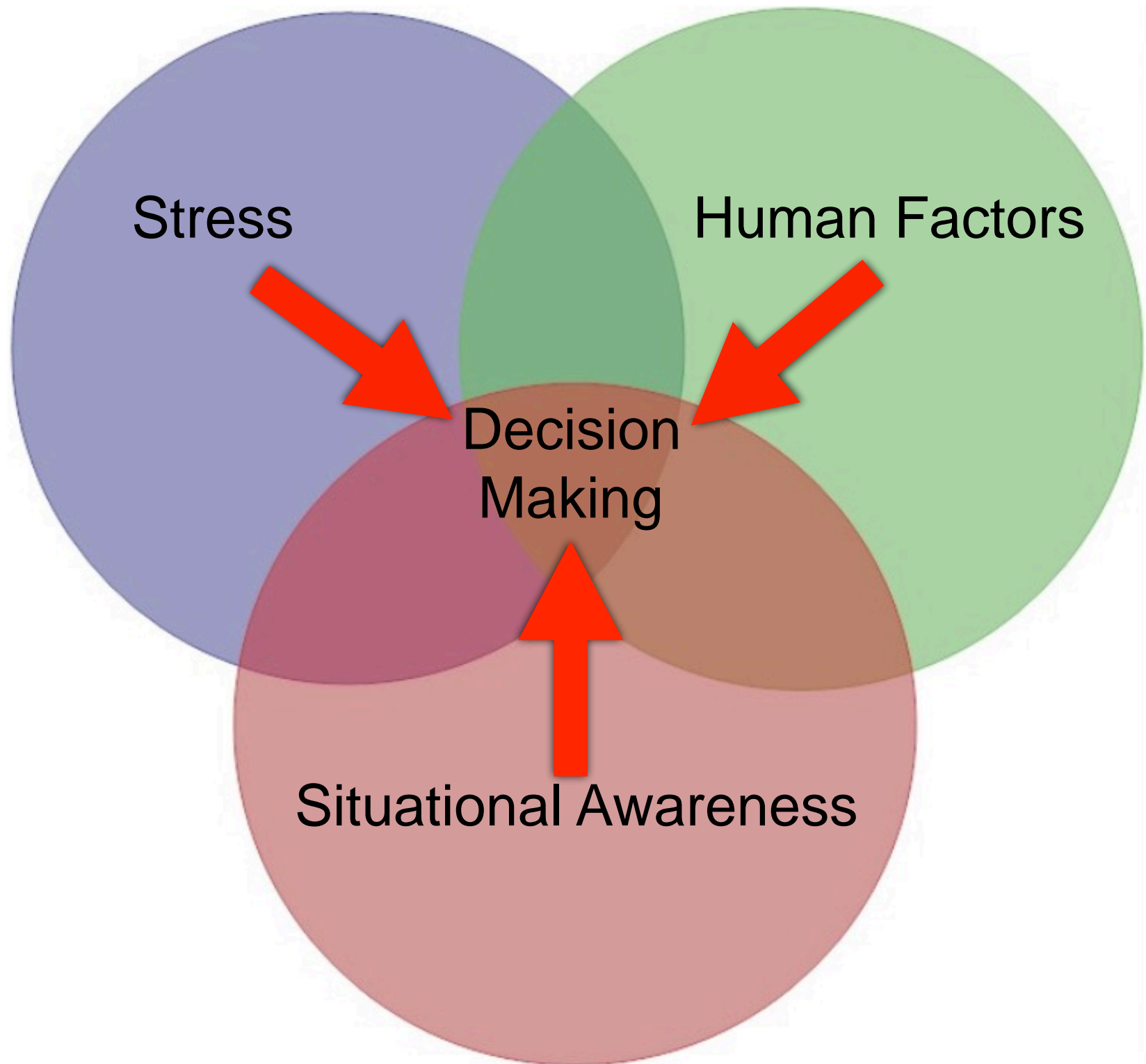
Dr. Richard B. Gasaway  
Gasaway Safety Solutions  
St. Paul, Minnesota USA



Improve your understanding of the challenges of high-risk decision making.

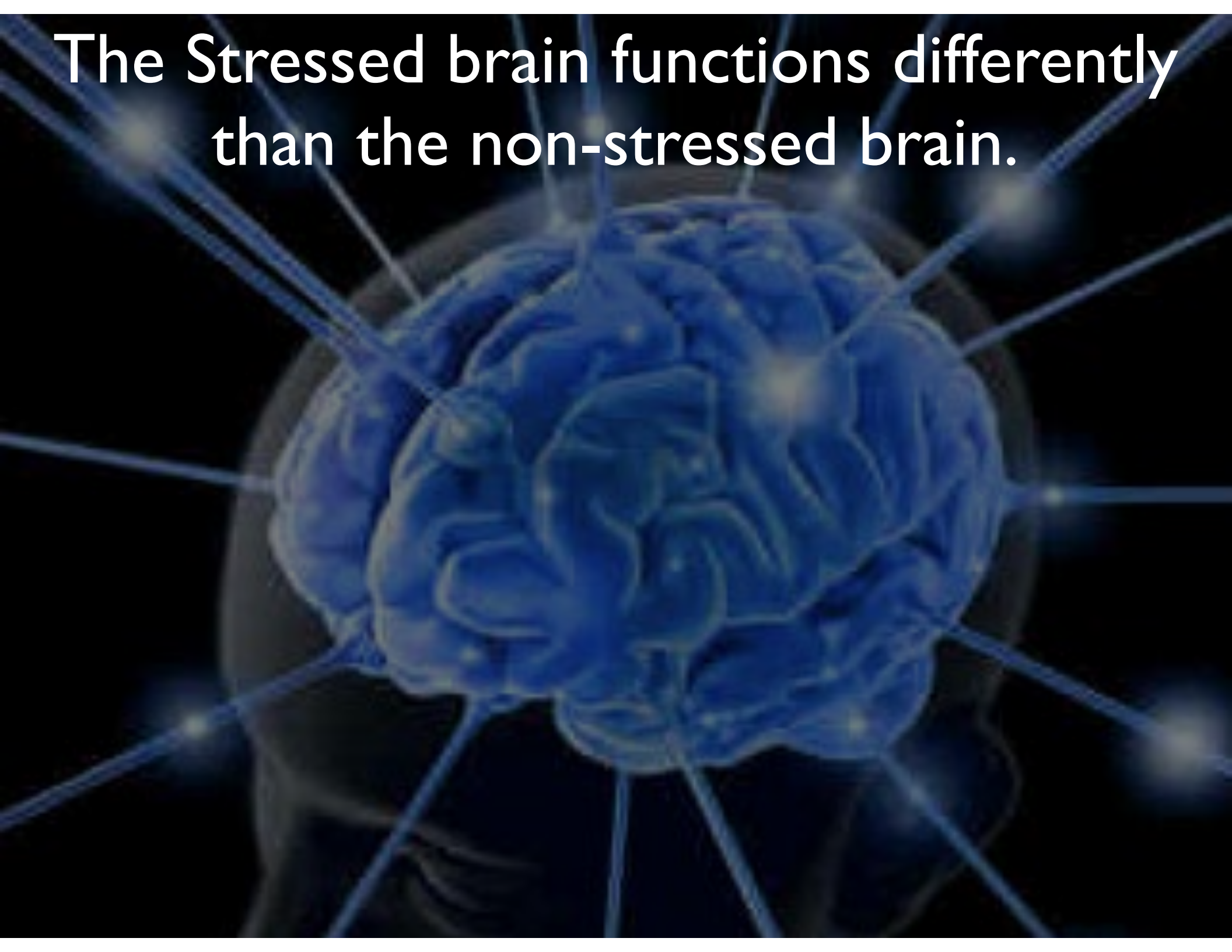
Three MAJOR factors  
that influence  
decision making:







The Stressed brain functions differently  
than the non-stressed brain.



Under stress...

Your brain  
is on drugs!

Under stress...

Hereditary  
instincts  
kick in.







# FIGHT or FLIGHT





# Freeze!





Under stress...

**Rational**  
**(Conscious)**  
**judgment**  
**can be challenging.**

Under stress...

**Intuitive**  
(subconscious)  
**judgment**  
**can dominate.**

# Long Term Memory





Fact

The capacity of long-term memory:

10 times all the information  
on the Internet.

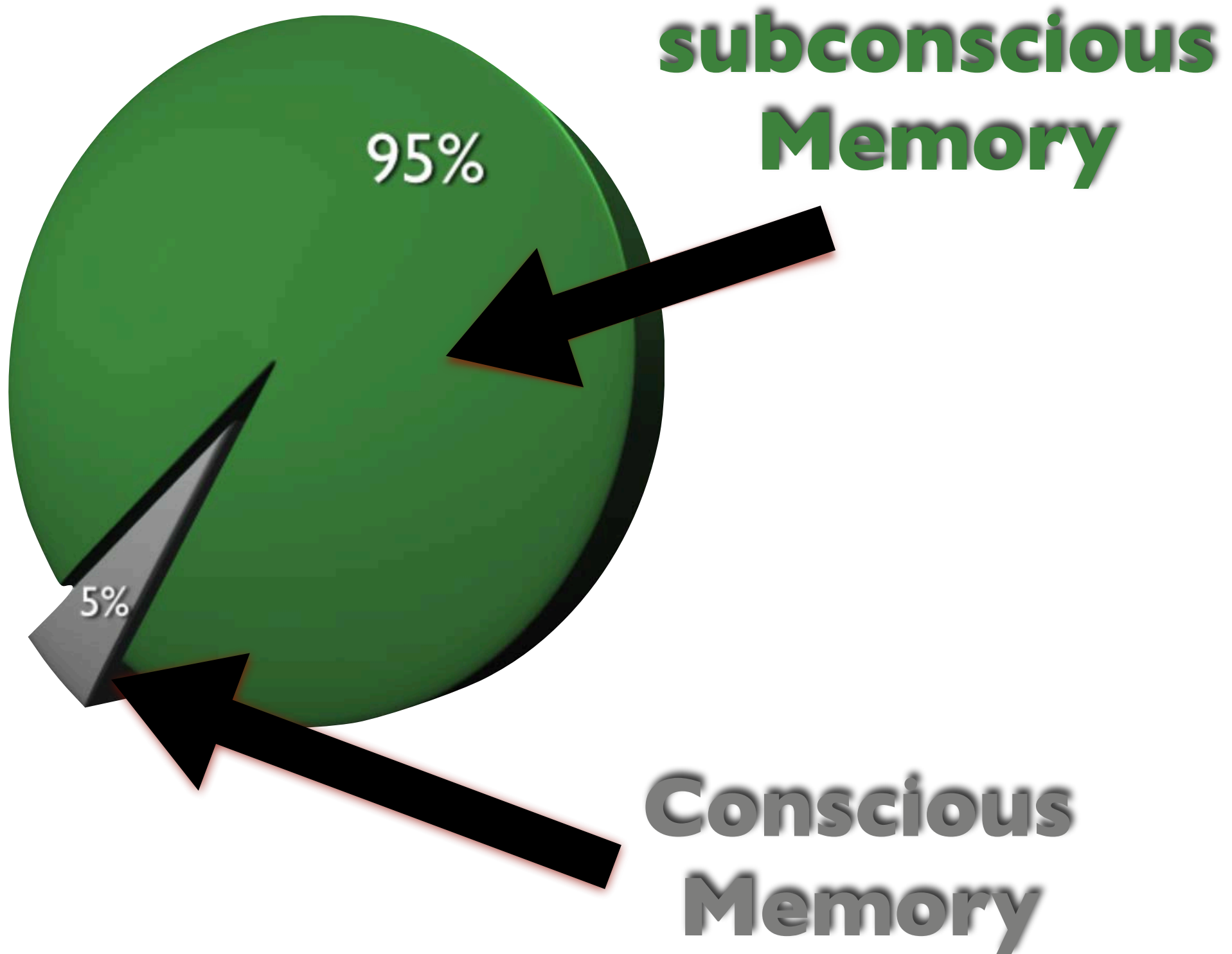




Fact

You can only consciously access:

5% of your long-term  
memory data base.





Memory  
**RECALL**

**Memorization**



Memorized

vs.

Novel Task

Task Performance



# Recall from subconscious memory



Can trigger the  
6th sense.

# Intuition

Knowing...

Without knowing...

How you  
know.



How do we know...

If we don't know...

How we  
know?



Hair stands up on the  
back of your neck.

Voices in your  
head talk to you.

Impending feeling  
of doom.



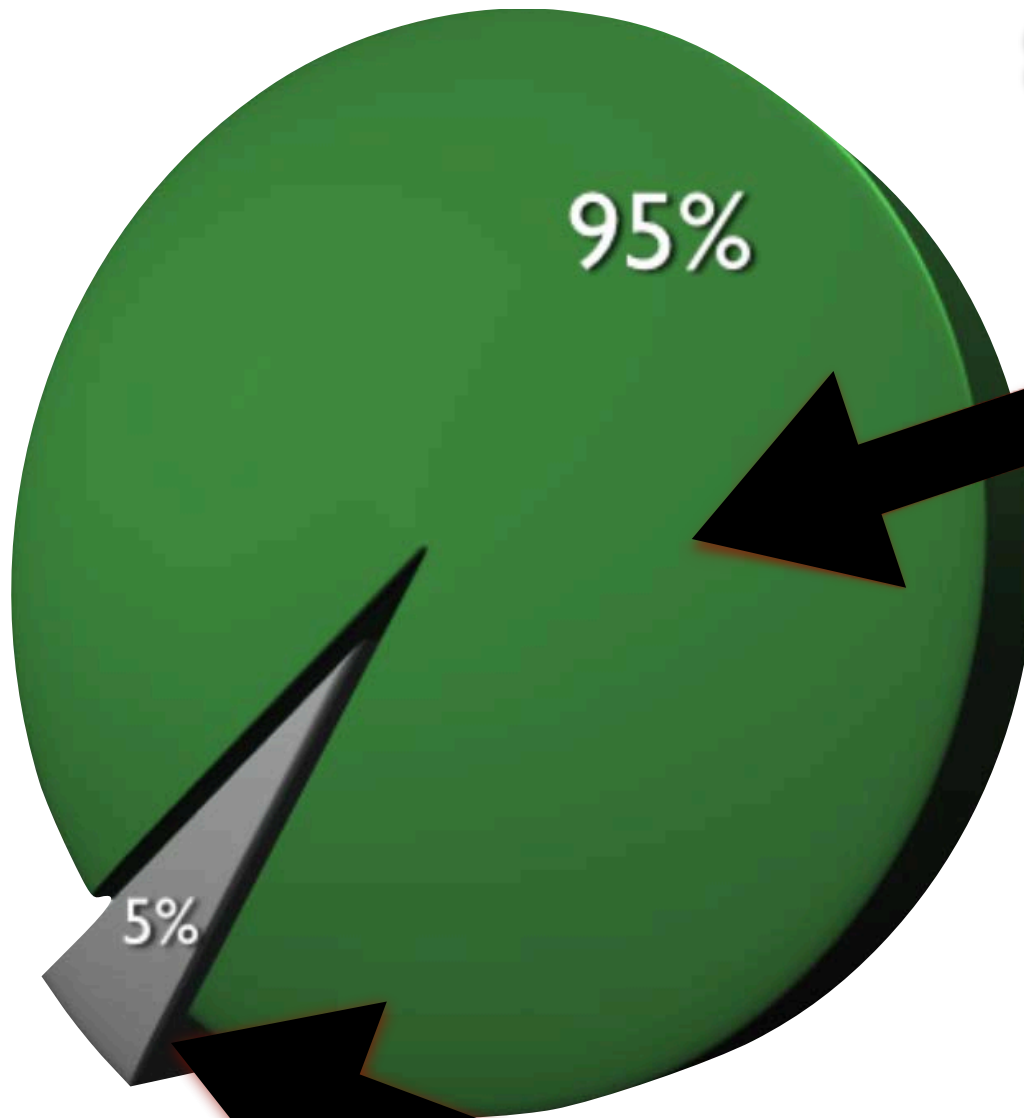
# Gut Feeling



# Your Red Flag Warning System

*Intuition*

**subconscious  
Memory**



**Conscious  
Memory**



A prehistoric scene with a river, a man with a spear, and dinosaurs. The scene is set in a lush, green environment with a river flowing through it. In the foreground, a man with a spear and a woman are walking along the riverbank. The man is holding a long spear, and the woman is carrying a basket. In the background, there are dinosaurs, including a T-Rex and a Stegosaurus. The overall tone is dramatic and emphasizes the dangers of the prehistoric world.

Your brain evolved and is adapted for survival.

Your brain is exquisitely designed to sense danger. It uses primal “trip wires” (Alarm Bells)

**Attention is drawn toward  
perceived threats:**

**Loud**

**Bright**

**Moving**

**Proximal**



Under stress...

**Hyper vigilant.**

Under stress...

Struggle with complex  
problem solving.

# Human Factors:



Predictable  
physical and psychological  
impacts of stress.

# Heuristics

We can create rules and shortcuts to ease the cognitive load and stress of making decisions.

Your brain can be a stubborn.



Once it locks on to something  
like an action plan (or .99 cents)

it can be very difficult to change  
direction or see alternate solutions.



# Shared Awareness

When two or more people have the same understanding about what is going on.

# Under stress...

Revert to behaviors based on:

Training

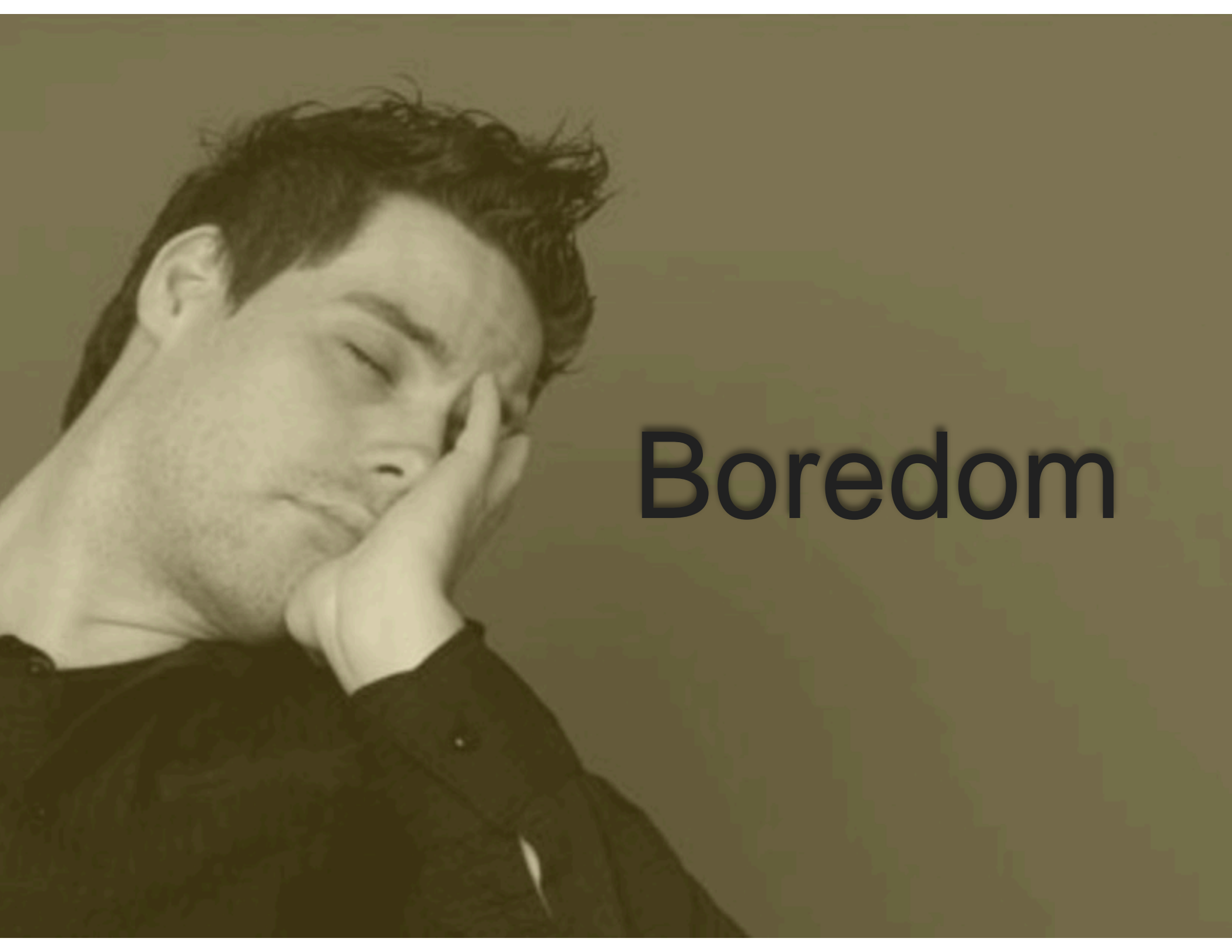
Routines

Muscle Memory

Habits.

# Automaticity (robotic action)





Boredom



Under boredom...

Hyper vigilant.

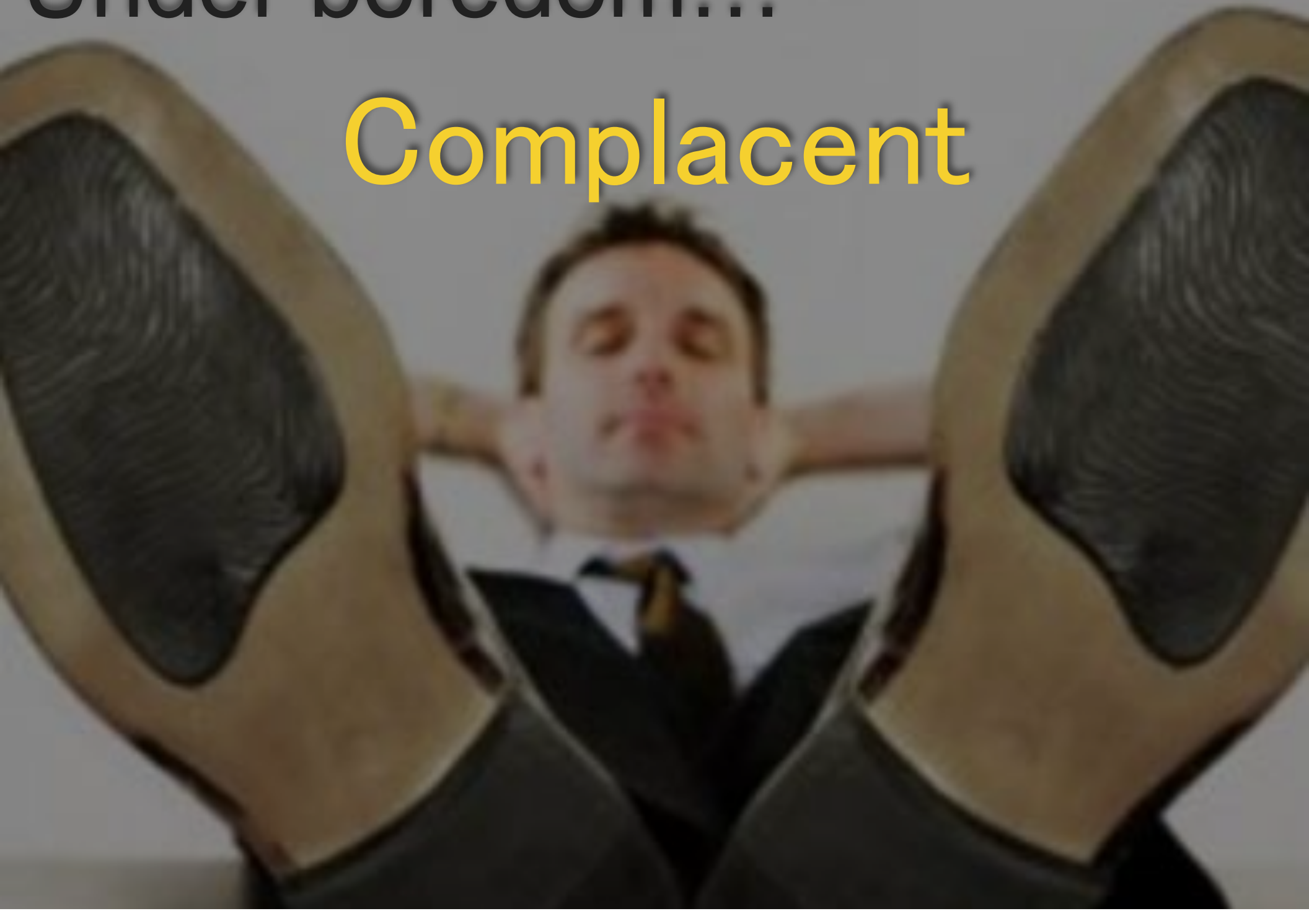
Under boredom...

Mind Drift



Under boredom...

Complacent





A complex, multi-layered illustration of a face. The face has a third eye on the forehead, multiple eyes, and a wide, toothy grin. The skin is covered in a network of red and blue lines, resembling a map or a circuit. The face is surrounded by green leaves and white flowers. The background is a dark blue sky with yellow sun rays.

# Hallucination

# Reverse Hallucination



Your perceptions may  
not match reality.

And you may not know it.

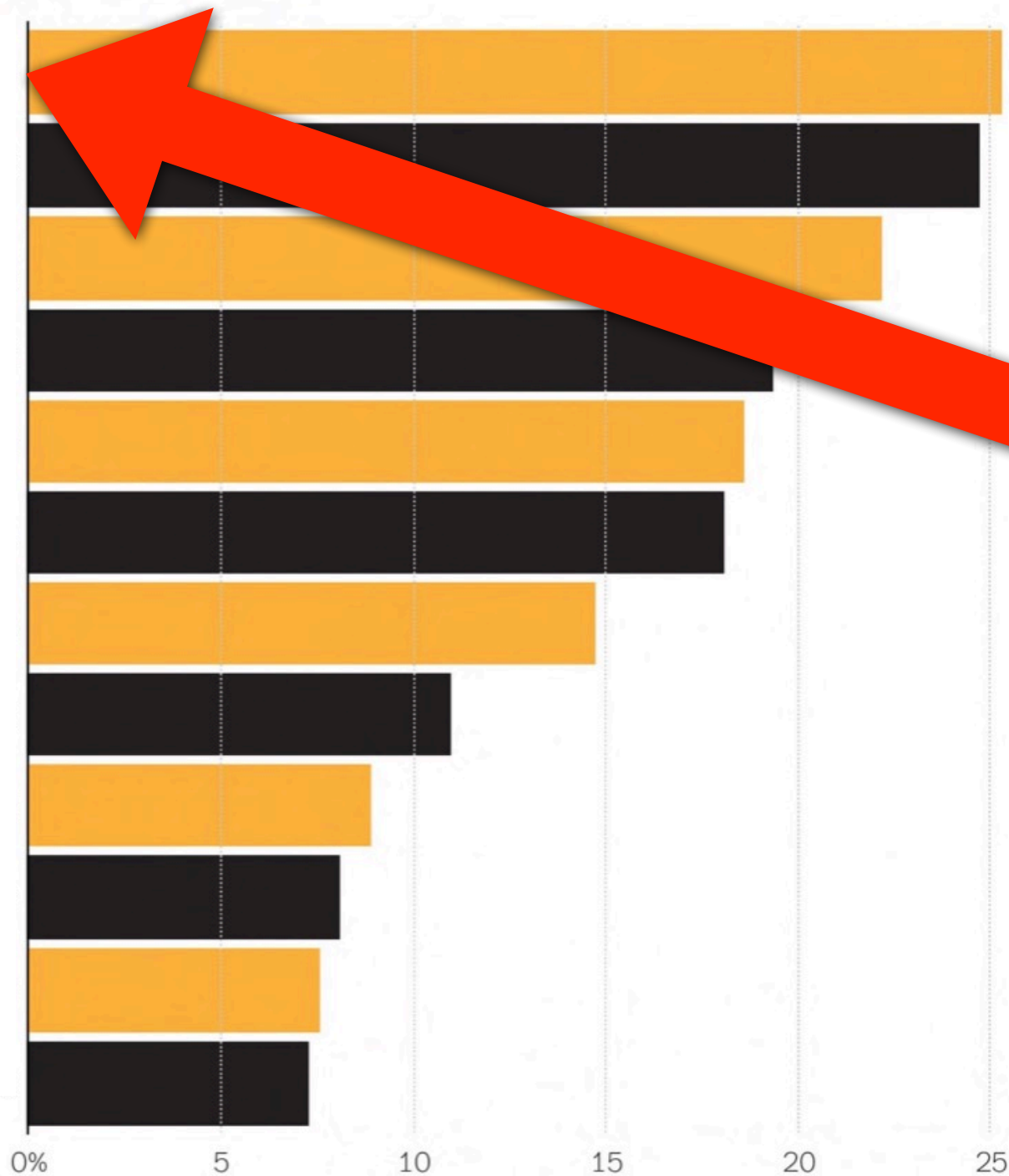


# Motion Induced Blindness





What do people  
fear most?



Public  
Speaking



Embarrassment

Ridicule

Consequence

Judgment

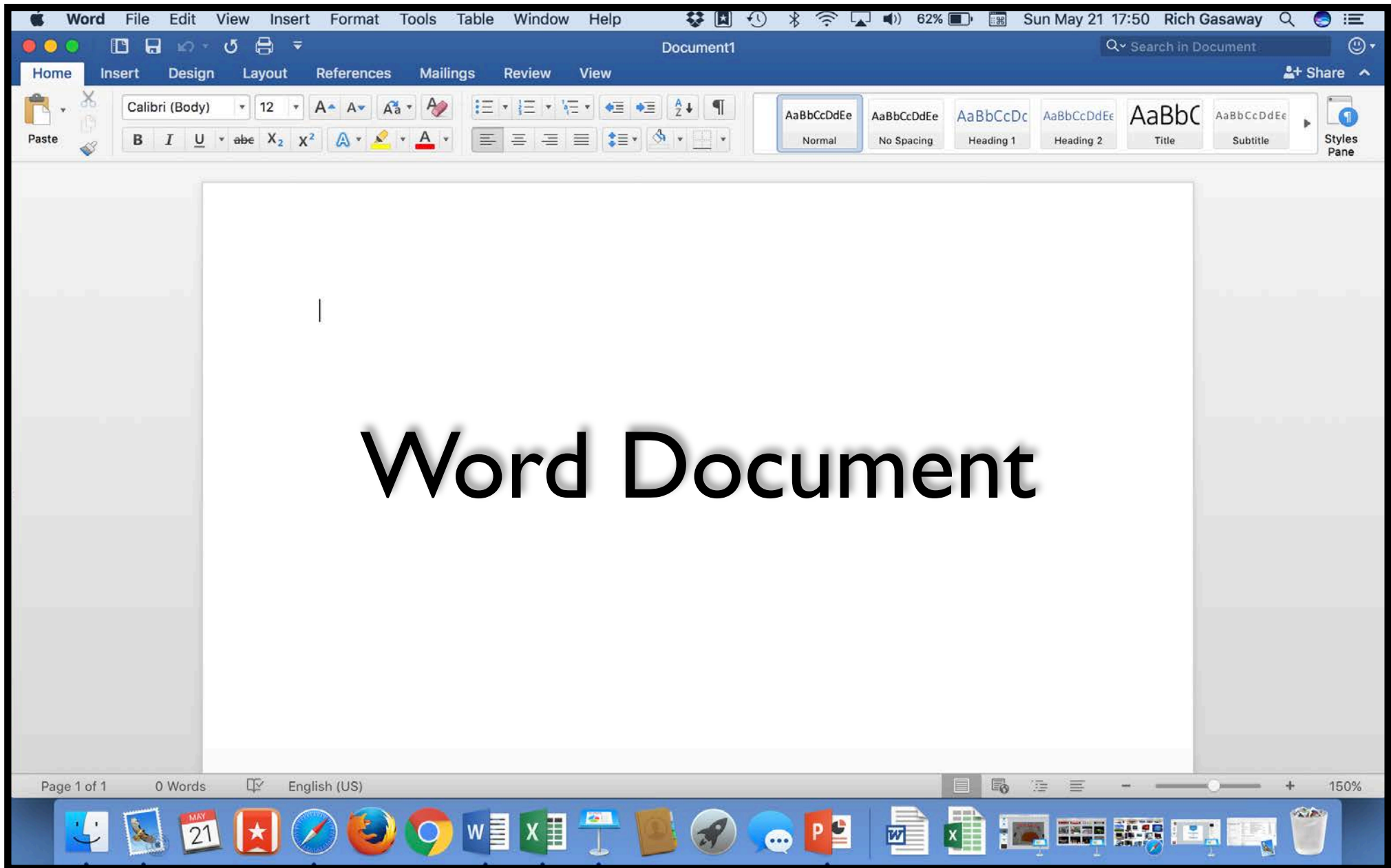
# Multitasking



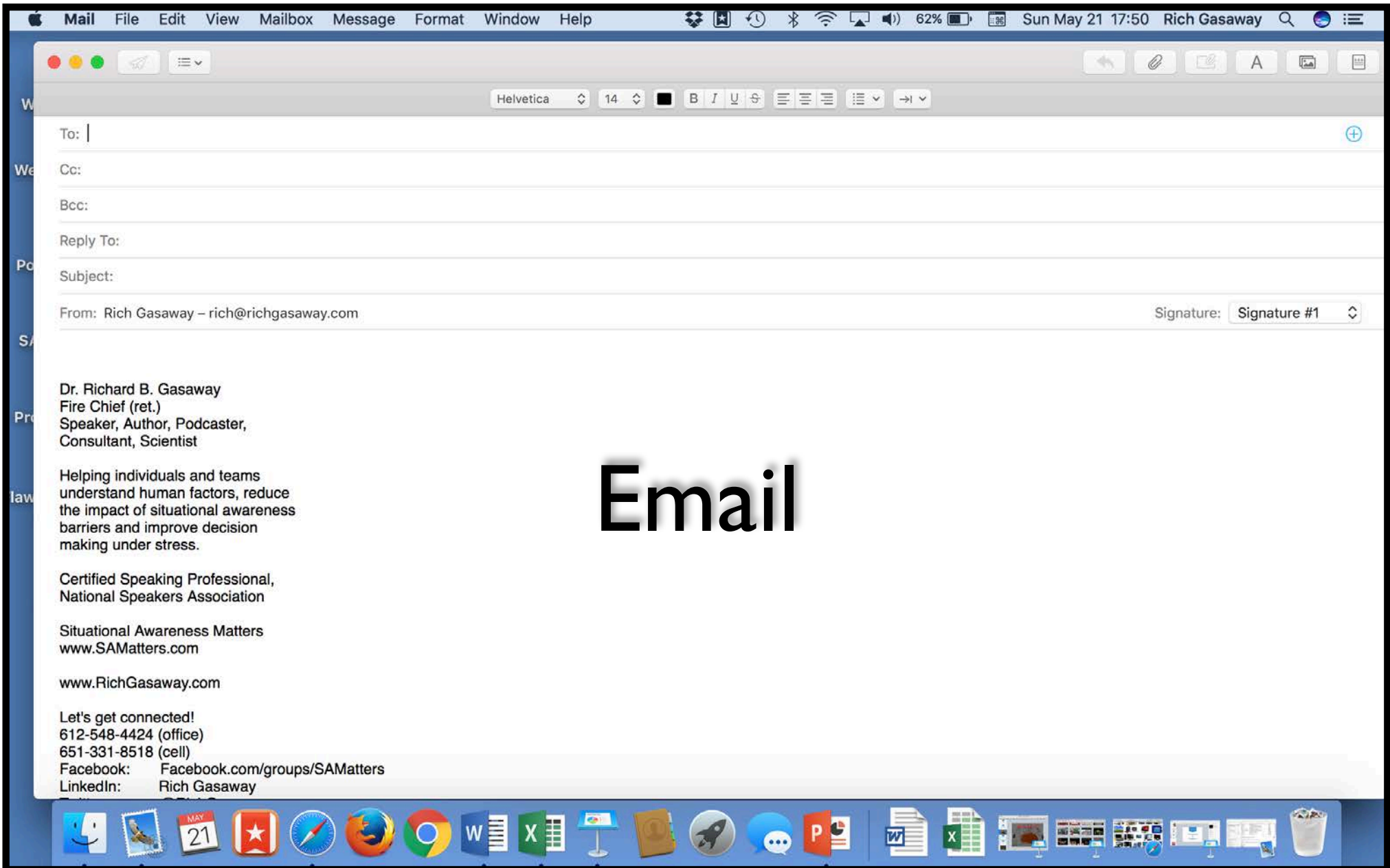


The conscious brain cannot multitask.

This includes paying attention in a dynamically changing environment.



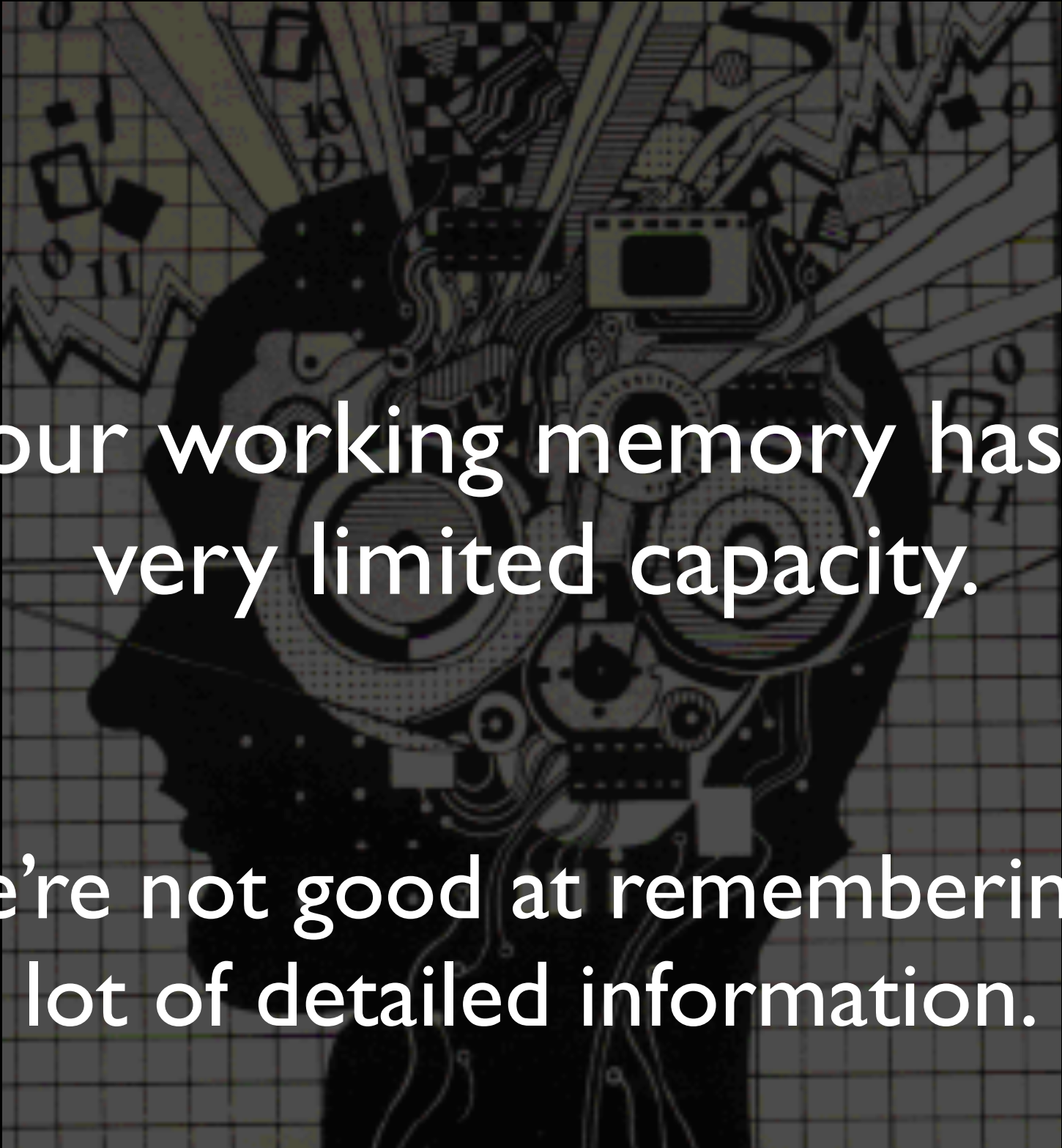




Email

# Short-Term Memory Overload





Your working memory has a  
very limited capacity.

We're not good at remembering a  
lot of detailed information.

# Your brain prioritizes incoming information.

And for the most part,  
you cannot control what it  
keeps and what it dumps.



**HIGH PRIORITY**



# The information overload exercise





# Confabulation



# Situational awareness

Ability to **perceive**      What is happening  
AND **understand**      around you...

In relation to how time is passing.

And then

Be able to accurately      In time to avoid  
**predict** future events...      bad outcomes.



# Human Factors







# Task Fixation (Attentional)

# Auditory Exclusion





# Consequence of Multitasking



# Time Distortion





# Short-Term Memory Overload



# Confabulation



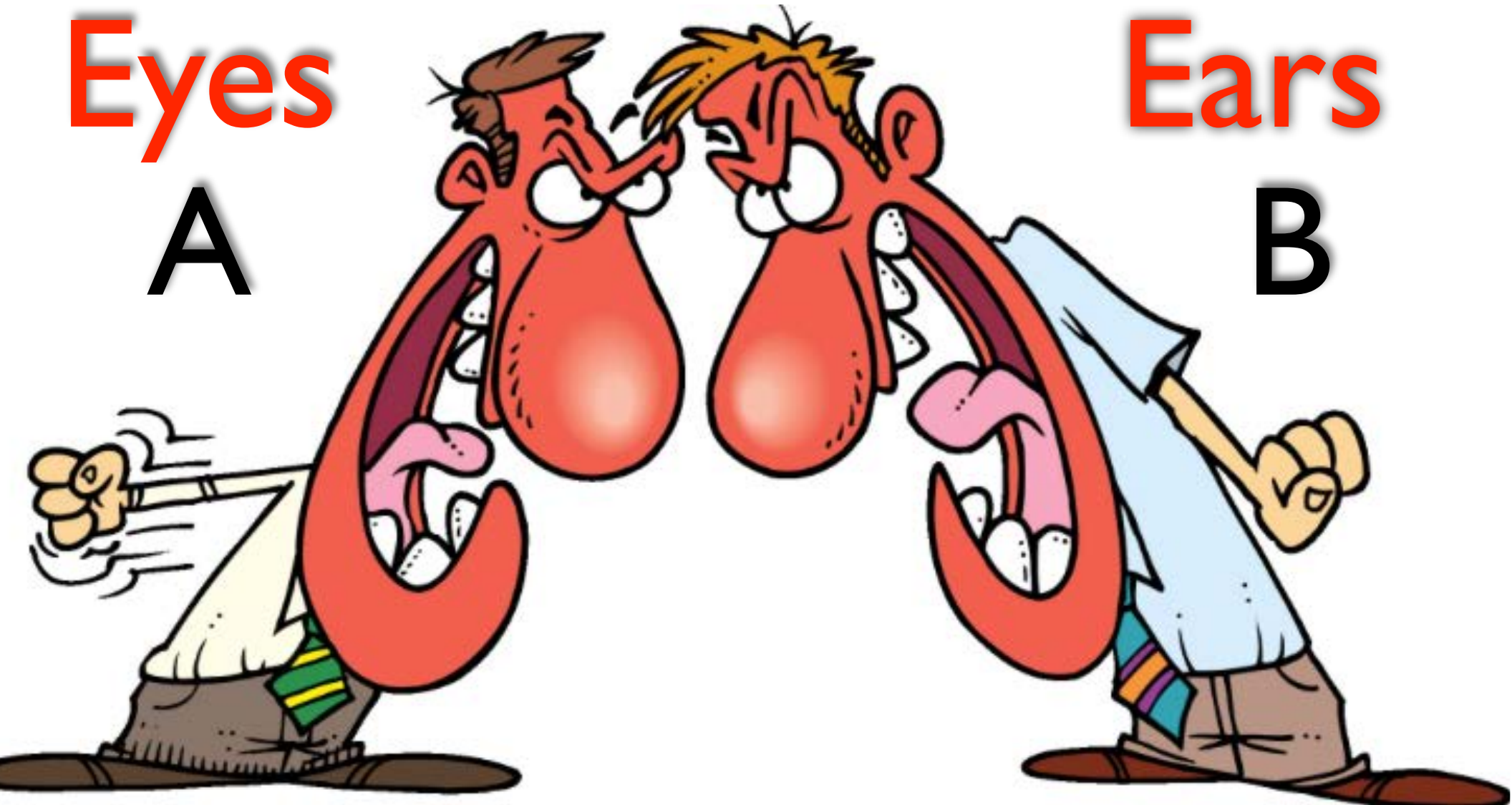
# Sensory Conflict

Eyes

A

Ears

B





A complex, multi-layered illustration of a face. The face has a third eye on the forehead, multiple eyes, and a wide, toothy grin. The skin is covered in a network of red and blue lines, resembling a map or a circuit. The face is surrounded by green leaves and white flowers. The background is a dark blue sky with yellow sun rays.

# Hallucination

# Reverse Hallucination



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**Helping your team see the bad things coming...  
in time to avoid bad outcomes.**

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