

Sustained Attention Training: Strategies for Fighting Distractions

APTA Conference – October 15, 2014

Today's Plan

- **Ron Hartman- Transdev's commitment**
- **Ron Robusto- The Scientific Study of Distraction**
- **Don Saunders- Testing the Theories & Collaboration**
- **Anita Skotnicki- The Transdev Training & Business Strategy**
- **Mitun Seguin- Building a Culture**



Passion



Commitment



Performance



Partnership

Sustained Attention – A Transdev Priority

“We are creating and encouraging a culture of distraction where we are increasingly disconnected from the people and events around us”

--Joe Kraus, Google Ventures

- It is making us less productive
- It is making us less involved
- It is making us less SAFE
- That's why Transdev engaged in this project

Why we are committed

- Operating a train is not easy
- The consequences of a lapse are enormous
- Instances of distraction are an unacceptable proportion of human factor incidents
- We are out to change the world of railroading and not stop there

What is our commitment?

- To make everyone understand
- To train all of our rail operating personnel
- To reinforce and continually test
- To bring this program to the rail industry and then beyond
- To make it available at minimum cost and to assist with putting it into place
- We are believers



Passion



Commitment



Performance



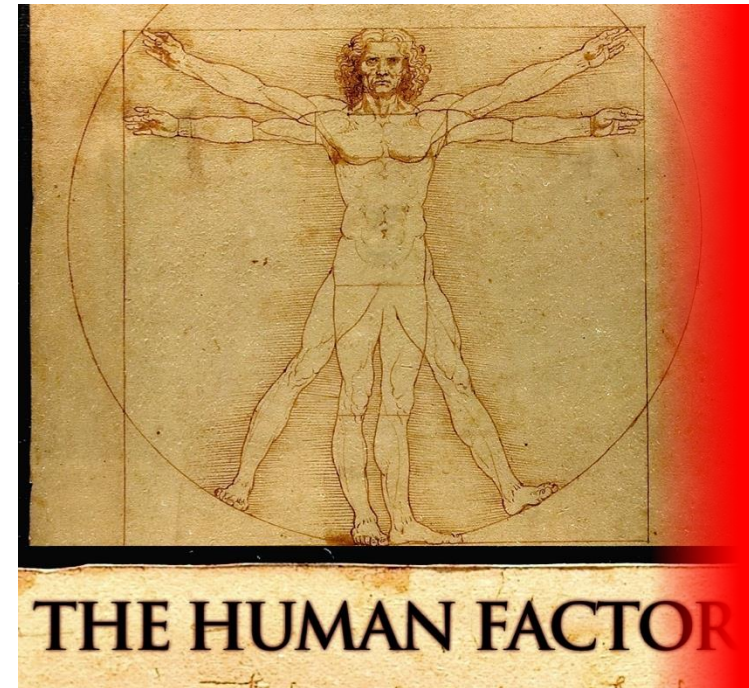
Partnership

Topics Today

- **Human Factor Caused Accidents**
- **Study and Results**
- **How it Fits into Safety Culture**
- **Stages**
- **Training Highlights**
- **Long Term Commitment**
- **Further Validation of Effectiveness of Training**
- **Next Steps**

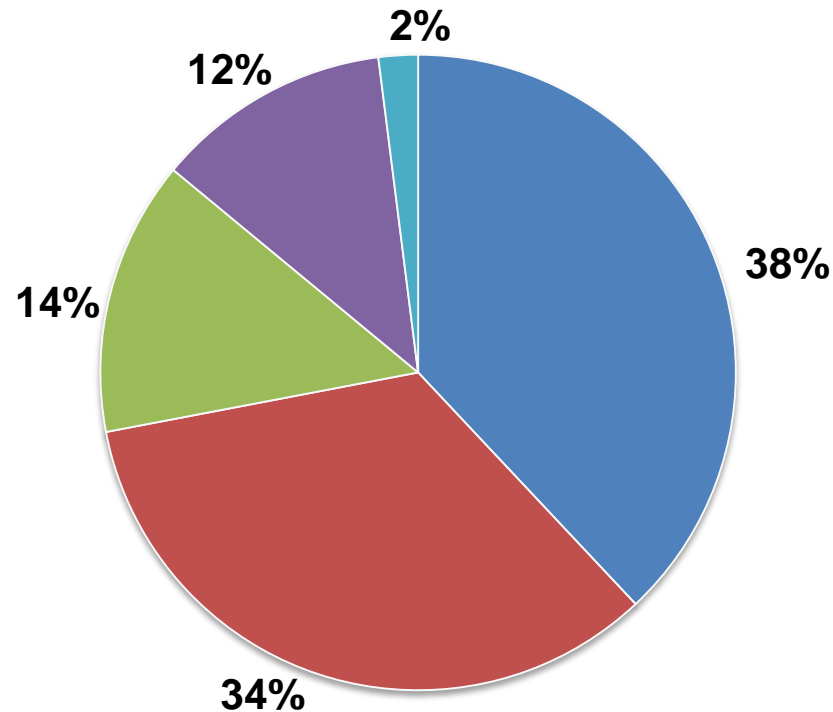
Human Factor Accidents

- Trends
- Partnership with FRA
- 2011
- Purpose
- Why?
- Where?
- How?



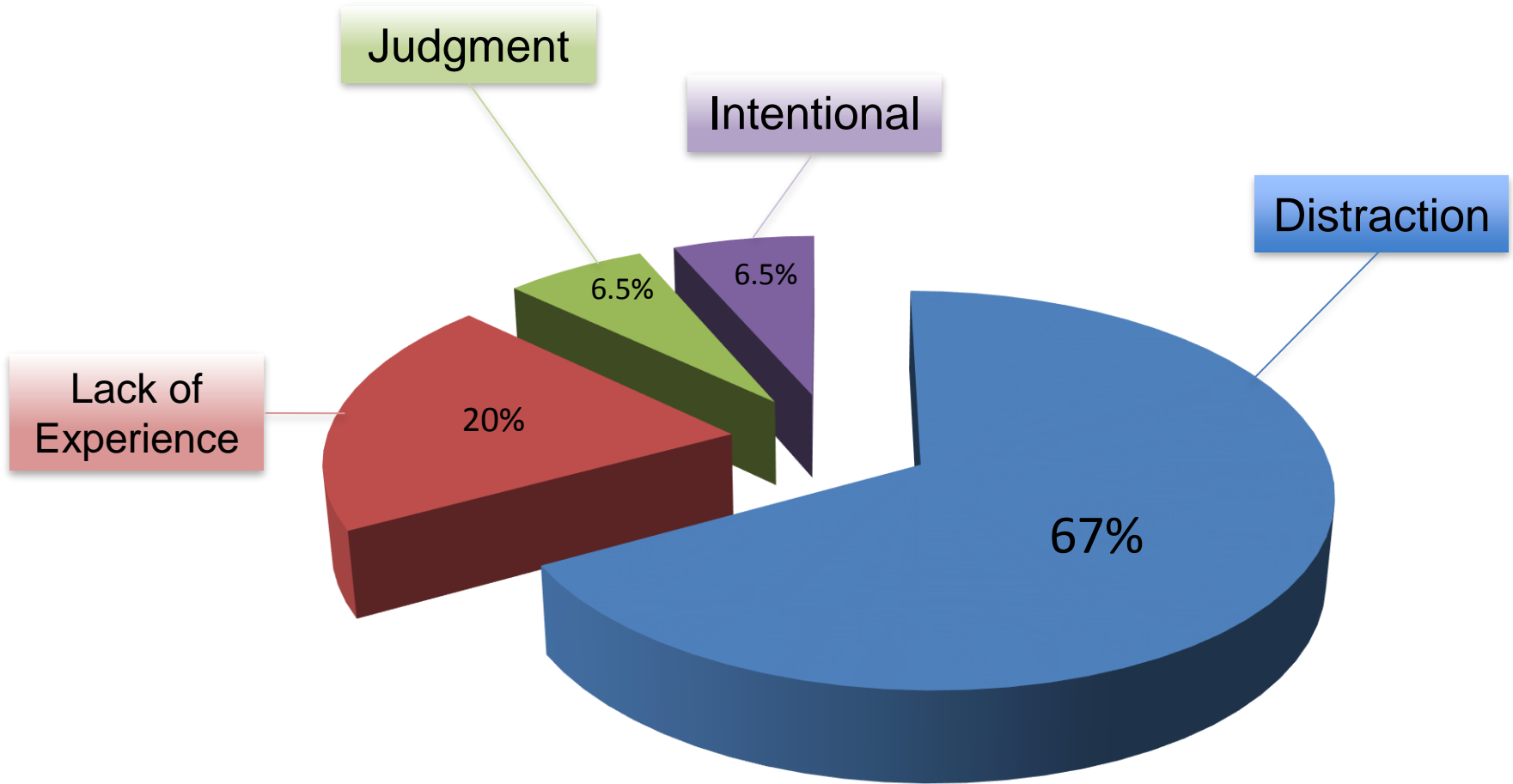
Study Background

2002 – 2011 Accident/Incident Average by Cause
(Per Million Train Miles)



■ Human Factor ■ Track ■ Misc ■ Equipment ■ Signals

Causes of Major Rule Violations





Passion



Commitment



Performance



Partnership

Simulator



Engineers view from the inside of simulator

Simulator



CITL Laboratory Simulator View of Track



Overall Approach

Study and Results

- CITL
- Two Parts of Study
- Over 36 Locomotive Engineers
- Delays
- Share Findings
- Development of Training Program and Share with Industry

Experimental Data Collection



Out-of-window view Study I



Out-of-window view Study II

Study 1 Approach



Study 1 Methods

- **Participants: 12 locomotive engineers**
 - Ages: 28-62 years
 - Experience: 4-30 years
- **Following practice each performed 3 scenarios in counterbalanced order**
 - Baseline (scenario 1)
 - Low task load (scenario 2)
 - High task load (scenario 3)

Study 2 Approach



Study 2 Methods

- **Participants: 24 locomotive engineers**
 - Ages: 23-67 years
 - Experience: 4-38 years
- **Following practice 12 were randomly assigned to Sustained Attention Training (SAT) Test group and 12 were assigned to the Control Group**
- **Each group performed 2 scenarios**
 - Low task load
 - High task load

Study 2 Methodology

- **Control Group: Tutorial on Crew Resource Management (CRM)**
- **Test (SAT) Group: Training on components of distraction- 3 Hours**
 - Video presentations
 - Slide deck
 - Oral lecture
 - Discussion in a one-on-one fashion

Experimental Data Collection





Passion



Commitment



Performance



Partnership

Study 1 Conclusions

- **3 scenarios confirmed to be graded in task load and operational difficulty**
 - Subjective measures
 - Objective measures (working memory)
- **Speed restriction compliance**
 - Less than industry standard (100%)
 - Lower for temporary than permanent
- **Unusual events compliance**
 - < 100%
- **Although errors occurred, there was no statistically significant effects of task load**

Study 2 Conclusions

- **Confirmed Study 1 results that scenarios varied in operational difficulty**
- **No statistically significant differences between SAT and control groups restriction compliance**
 - Relatively low sample size
 - Relatively short training time (3 hours)
- **However, consistent trends in SAT effectiveness in *low task load***

Summary of Study 2 Trends in Low Task Condition

Metric	Amount of Improvement due to SAT
Subjective Mental Workload	10.5%
Objective Mental Workload	7.1%
Compliance with procedures for dealing with unusual events	11.2%

Development of Training

- Transdev Development Team
- Executive Training
- Internal Training - Introductory 4 hours



Stages

- Introduction to Industry at APTA Conference
- Roll-out at Transdev
- Executive Training and Commitment
- Partnership with Industry
- Marketing and Communication Tools
- Additional Research and Validation

Training Highlights

- **Four Key Modules**
- **Four “S”s**
 - Safety
 - Science
 - Signs
 - Solutions



Training Highlights

Safety

- Six Principles of Safety
- Human Factor Failures
- Stay Focused, Stay Safe Campaign
- Personal Commitment



A

Preventing injuries and accidents is **my responsibility**, and that of all employees.

B

Training is essential for safety compliance and performance. **I will fully engage** in training programs offered to me.

C

Safety is a condition of my employment. **I am responsible** to act safely at all times.

D

All injuries can be prevented. **I will do my best** to prevent injury to myself and others.

E

Exposures to unsafe conditions can be safe guarded. **I will do my best to prevent** and repair unsafe conditions.

F

Safety is good business and the right thing to do. **I am personally committed** to safe practices.

Training Highlights

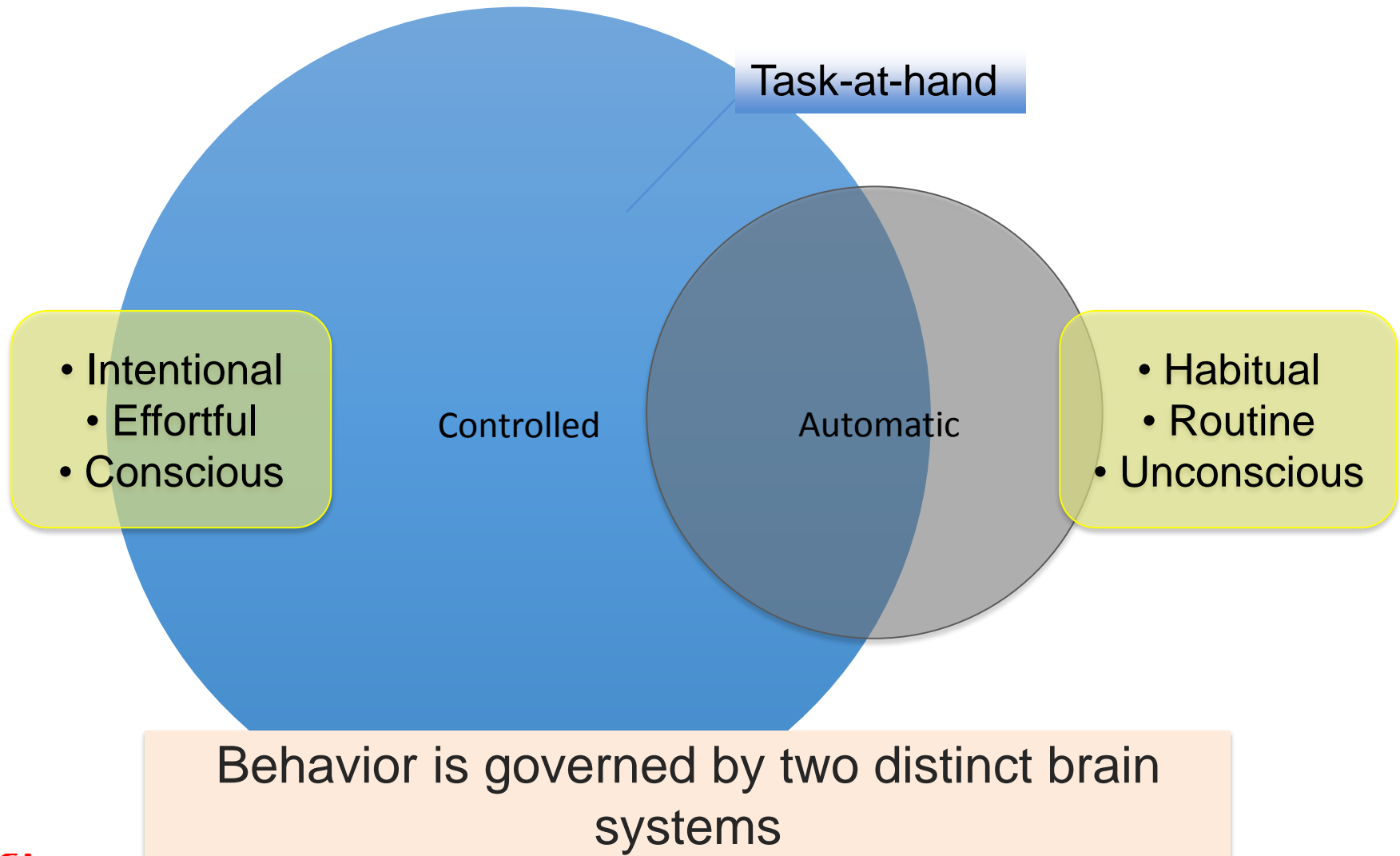
Science

- **Definitions**
- **Two Parts of the Brain**
- **Four Types of Distraction**
 - Multi-Tasking
 - Mind Wandering/Rumination
 - Perceptual Blindness
 - Expectation Bias

Research of Distraction and Loss of Attention Leading to Errors

- The two parts of the brain and how they work together
- The limitations of our attentiveness
- How multi-tasking can actually contribute to losing our focus
- Mind wandering and mental rumination
- How our perception is formed and how it can contribute to loss of attentiveness and focus
- How your expectations can bias reality

Attention: A Limited Resource



Four Types of Distraction

- 1. Multi-Tasking**
- 2. Mind Wandering/Rumination**
- 3. Perception Blindness**
- 4. Expectation Bias**

Multi-tasking Locomotive Engineer

Operational Conditions:

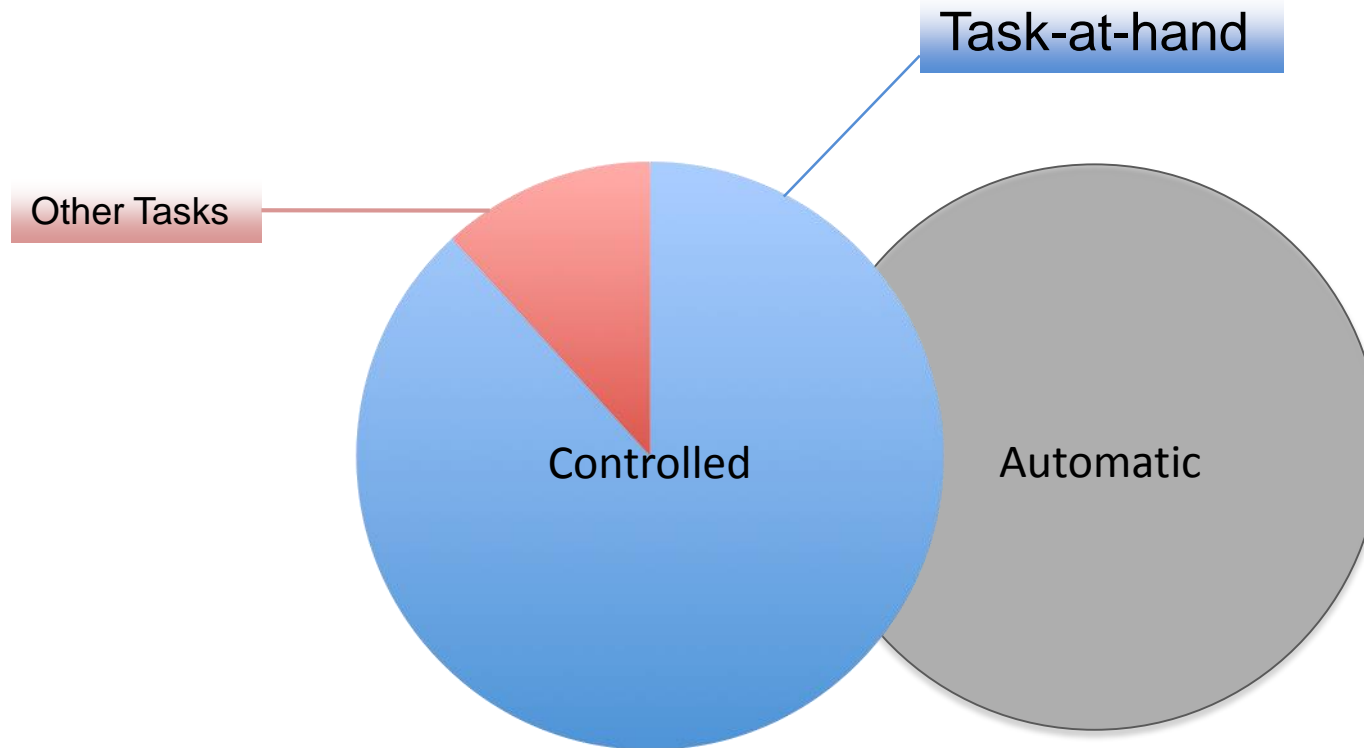
- **The locomotive operator approaching a highway grade crossing must maintain focus on the following:**
 - Sound the horn and bell at the appropriate distance in advance
 - Ensure automatic grade crossing warning devices are activated and functional
 - Monitor highway/pedestrian traffic
 - Receive radio calls from crew/train dispatcher
 - Respond to equipment mechanical faults
 - Brake for a speed or signal requirement

Multi-tasking Conductor

Operational Conditions:

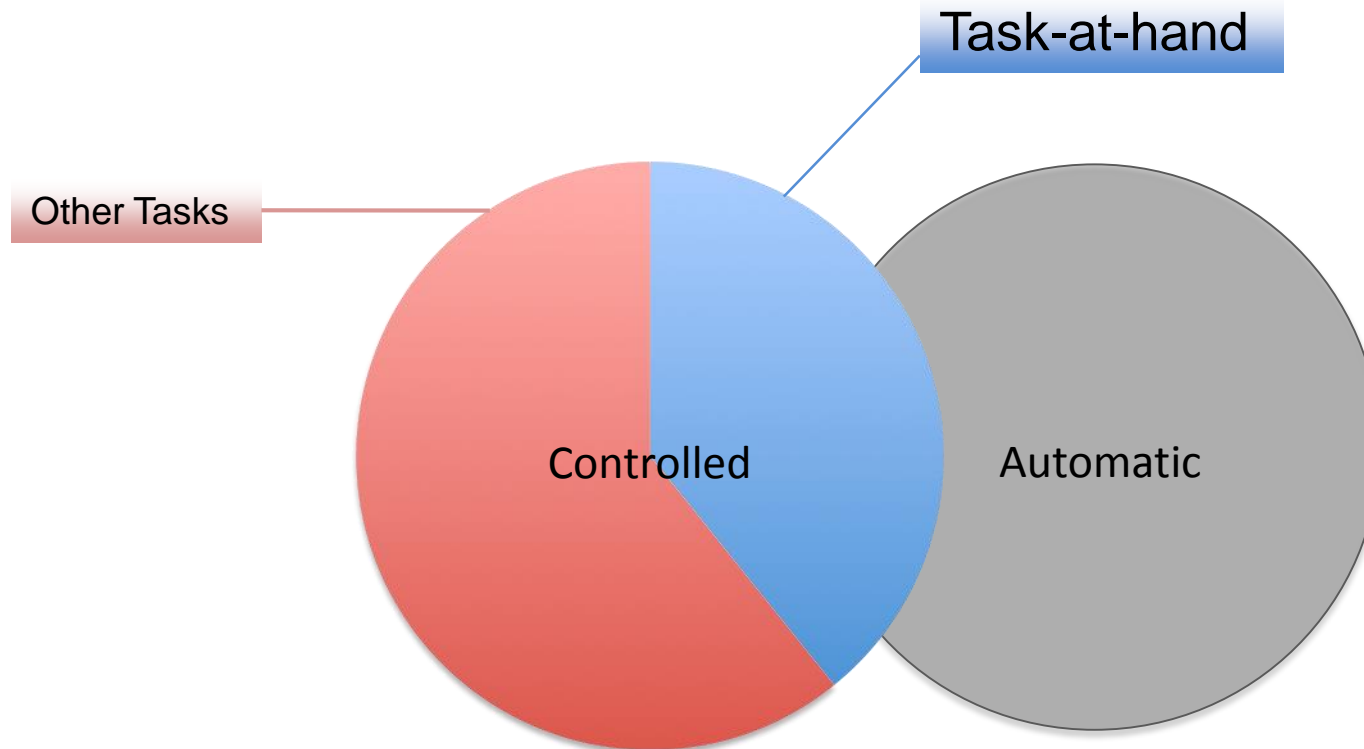
- Count passengers
- Collect fares
- Maintain awareness of train location
- Remind engineer of upcoming restrictions
- Receive and respond to radio calls from dispatch

Attention: A Limited Resource



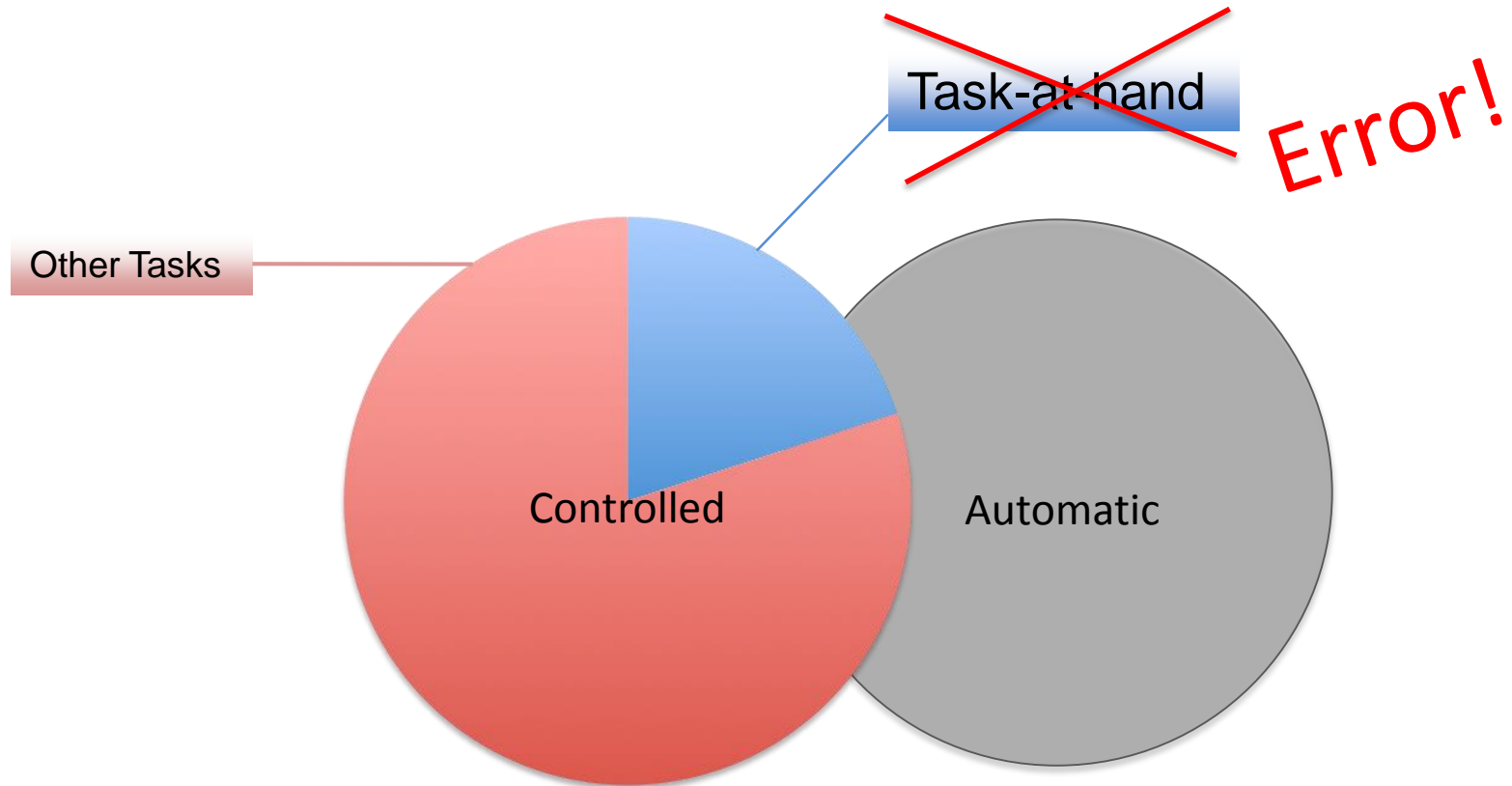
Other tasks take attentional resources away

Attention: A Limited Resource



Other tasks take attentional resources away

Attention: A Limited Resource



Other tasks can consume too much attention



Multi Tasking is Worse than a Lie

An Exercise

Four Types of Distraction

1. Multi-Tasking



2. Mind Wandering/Rumination

3. Perception Blindness

4. Expectation Bias

Mental Rumination

Operational Conditions:

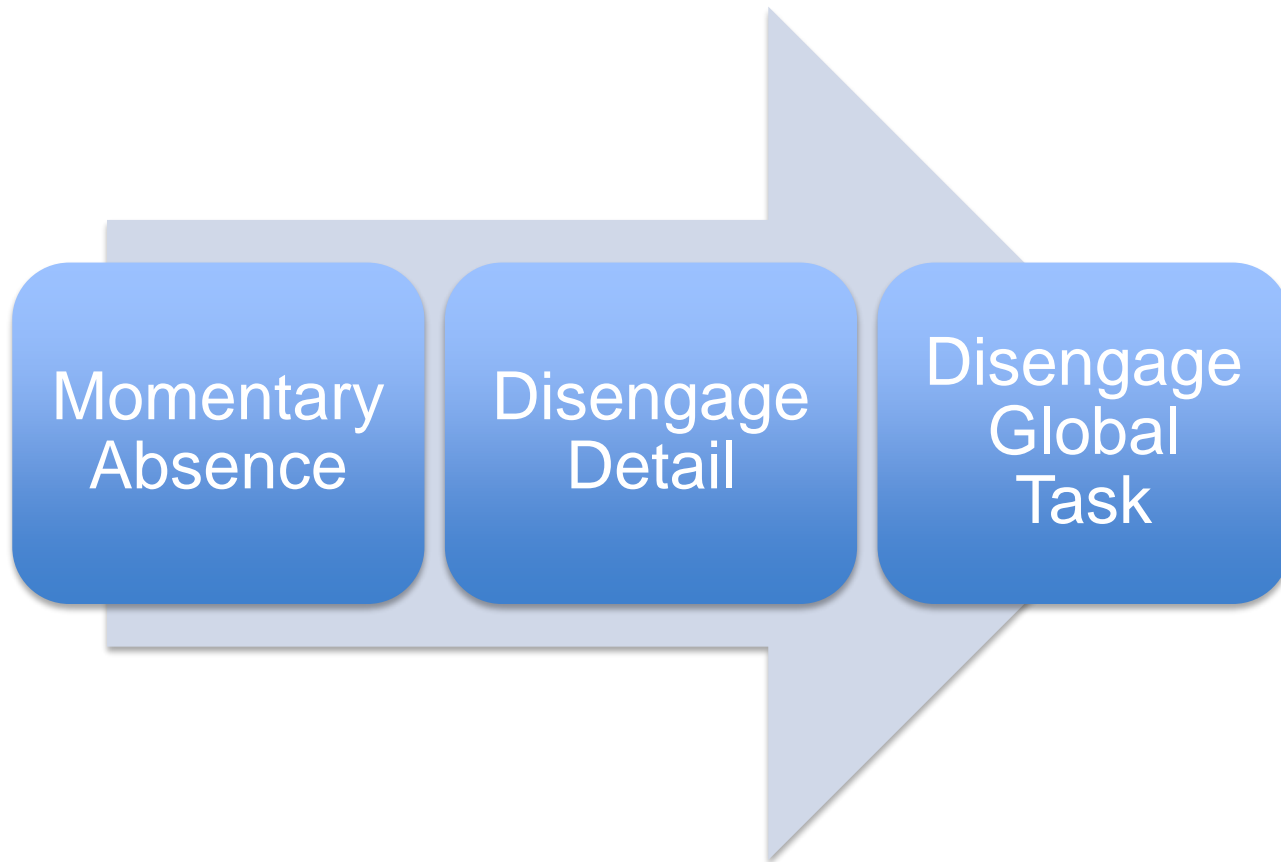
- **Unlike mind wandering, which typically occurs in conditions of under load, mental rumination can manifest under a variety of situations, regardless of the task load involved.**
- **Some examples:**
 - A verbal reprimand during work duty from a supervisor regarding a procedural mistake
 - Automobile break-down on the way to work
 - A locomotive mechanical failure resulting in extended work hours that impact prearranged personal plans
 - A verbal altercation with a co-worker concerning work duties
 - Arriving for work after receiving information that a close family member has a serious medical condition.

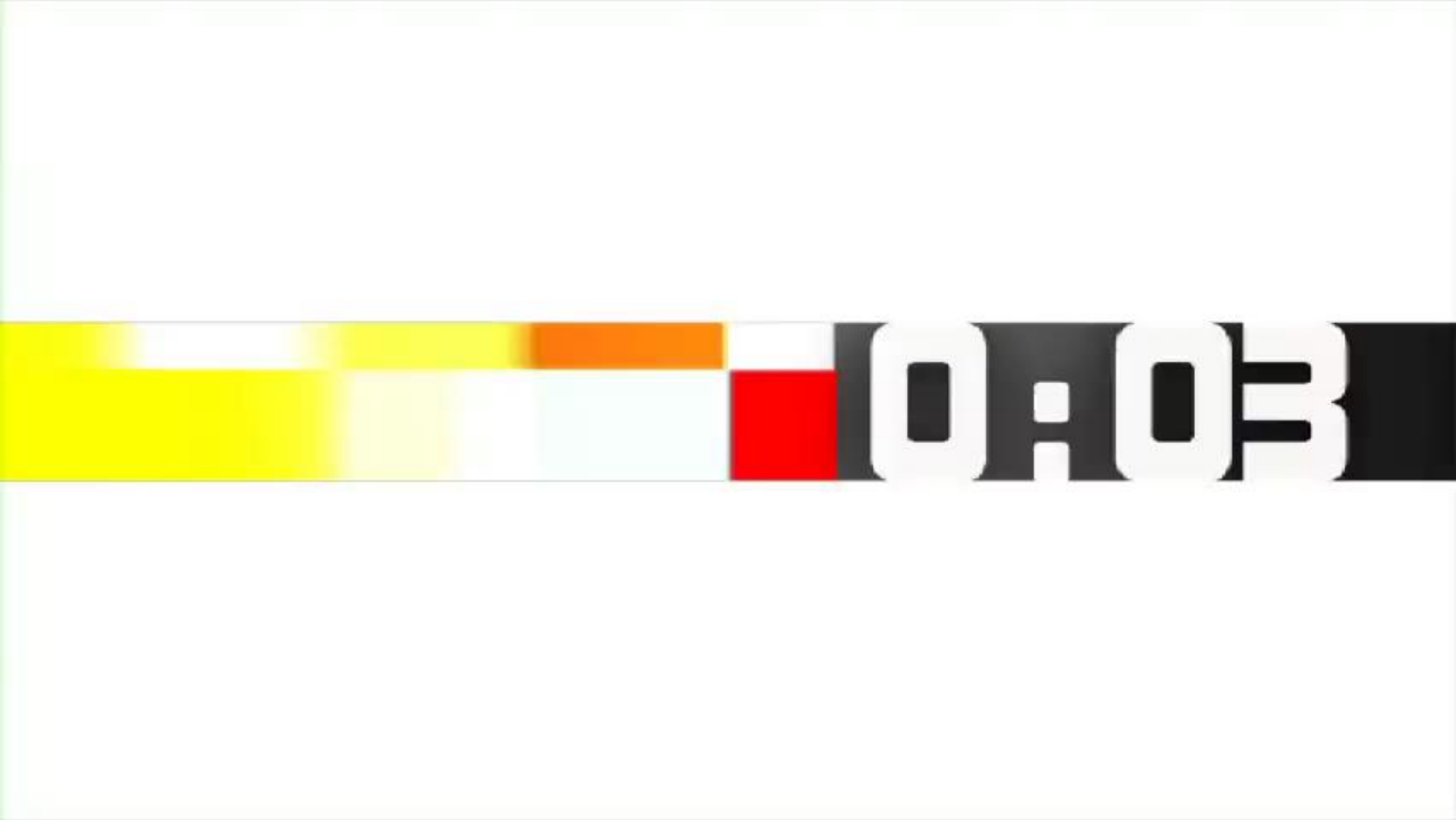
Mind Wandering

Operational Conditions:

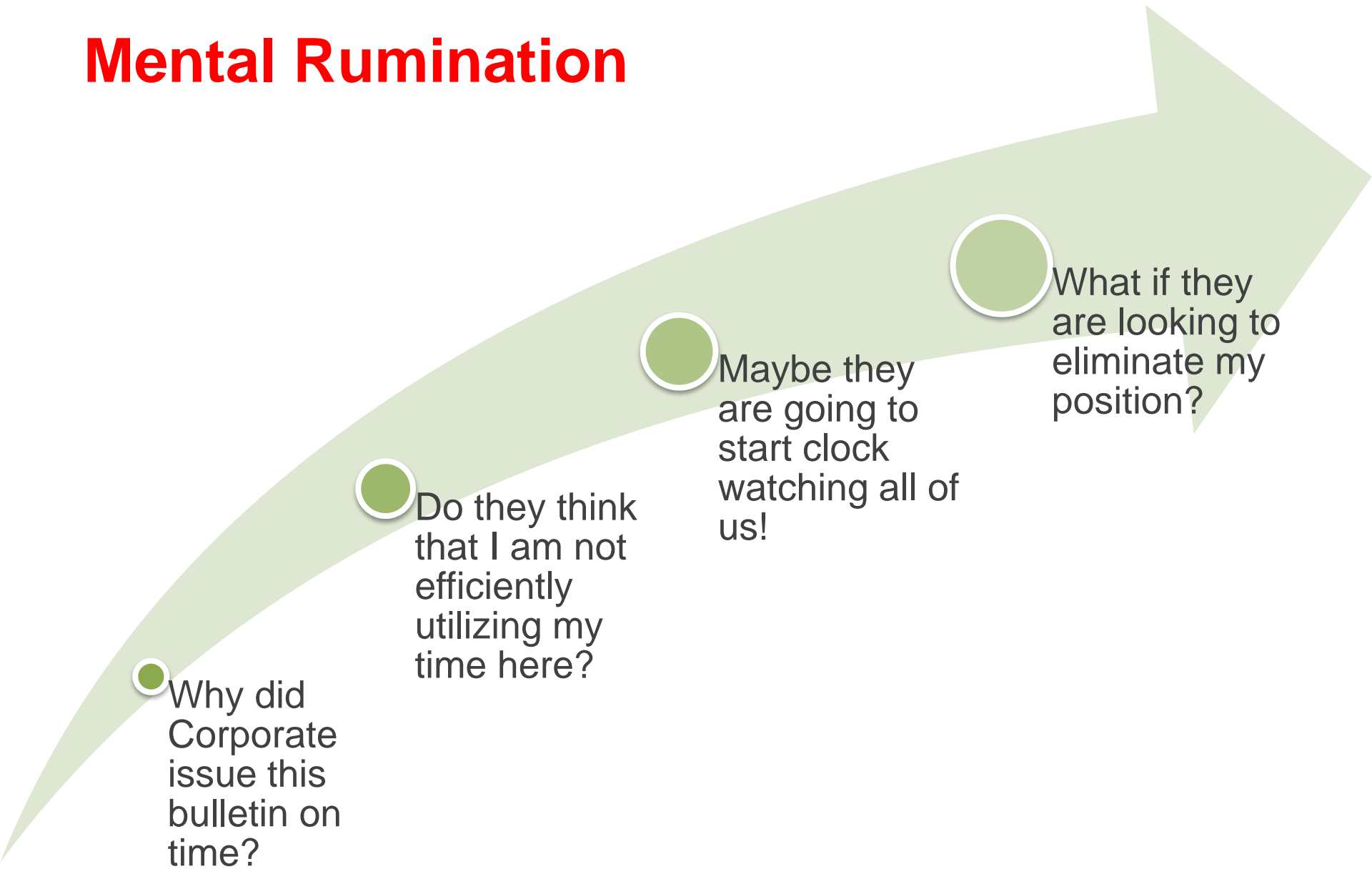
- **Mind wandering typically occurs in conditions characterized by low task load and repetitive, routine operations.**
- **Examples:**
 - Operation of a train at a slow speed up a grade
 - Operation of a train at a slow speed over a speed restricted area
 - Control of a train while stopped for a red signal, on a siding or at a station
 - Extended periods of uninterrupted solitary operations
 - Operation while fatigued or impaired

Three States of Mind Wandering and Mental Rumination





Mental Rumination



Four Types of Distraction

1. Multi-Tasking

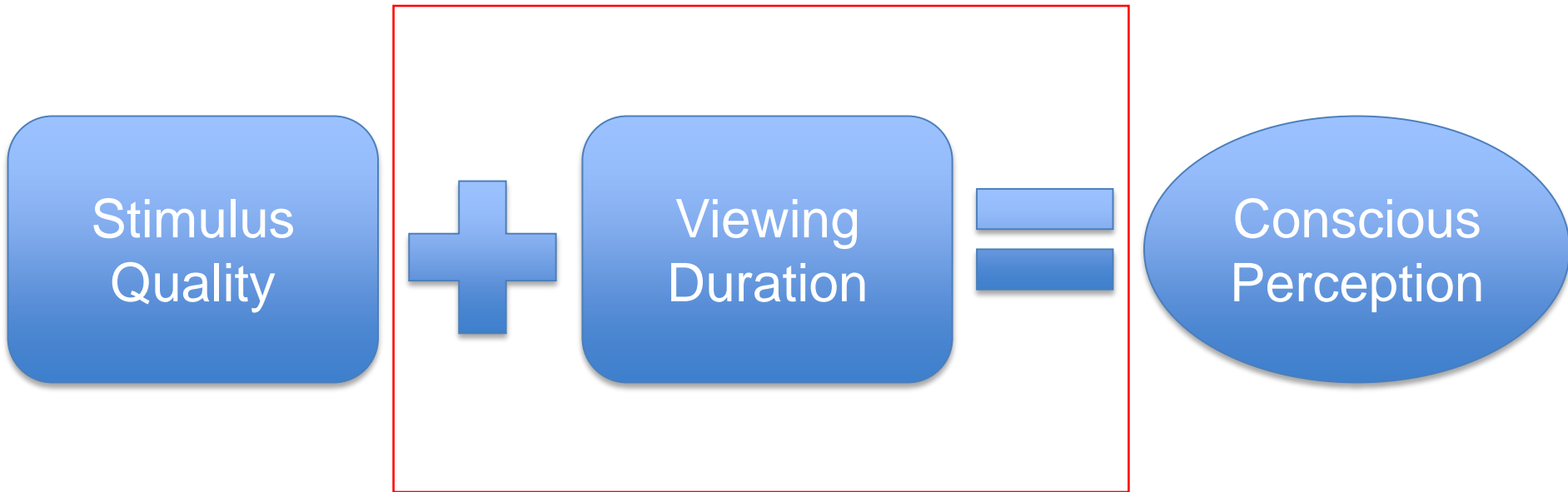


2. Mind Wandering/Rumination



3. Perception Blindness

4. Expectation Bias



Perceptual Blindness

Two important facts to keep in mind when thinking of our perception:

1. Conscious perception of objects requires attention
2. We can consciously perceive only a few objects at a time

Quirkology Channel

THE COLOUR CHANGING CARD TRICK

www.RichardWiseman.com

Four Types of Distraction

1. Multi-Tasking



2. Mind Wandering/Rumination



3. Perception Blindness



4. Expectation Bias

Expectation Bias

- When an individual gets used to seeing the same thing, at the same location, day in and day out, they come to expect that it will always display the same thing.
- **This bias becomes stronger over time.**

Expectation Bias



... or when we act automatically based on past experience regardless of the present circumstances”

Expectation Bias

- Expectation Bias refers to the human tendency to expect a previous experienced event to occur again in the future at a particular time or place. The bias occurs because frequently experienced events lead to a strong memory, which tends to guide future actions.
- The greater number of times the situation is experienced, the stronger the memory imprint becomes
- The Automatic side of the brain takes over as we encounter these expected events.

Expectation Bias

Operational Conditions:

Expectation bias is most likely to be prevalent under operational conditions that appear to be the same as those encountered numerous times before by the operator/crew member

Examples include:

- An intermediate signal in advance of a seldom used side-track which normally displays a “green” (proceed) aspect unexpectedly displays a red (stop) aspect
- A Maintenance of Way (MOW) Stop bulletin at the same milepost location for the past 14 days suddenly changes to a location 1.5 miles away
- A long-standing rule describing procedures at an interlocking changes

Four Types of Distraction

1. Multi-Tasking



2. Mind Wandering/Rumination



3. Perception Blindness



4. Expectation Bias



Training Highlights

Signs

- 10 Signs of Distractions
- Local Issues



10 Observable Signs

1. A still or “frozen” body posture
2. Unchanging facial expression (poker face)
3. Eye movement activity: invariable gaze fixation
4. Eye movement activity: reduced visual monitoring of the environment
5. Disengagement from or a delayed/missing response to a verbal commentary

10 Observable Signs

6. Noticeable errors in operational procedures
7. Observable inappropriate response to questions
8. Noticeable agitation (task overloading/multi-tasking)
9. No interaction or response to visible and or auditory cues such as:
 - Noteworthy landmarks on the right of way
 - Intrusions or objects such as trespassers or animals on the right of way (momentary global disengagement-inattentional blindness)
10. Talking to themselves and/or display and gestures as they relive their part in rumination

Practical Signs at the Workplace

As a train operator or crew member there are certain signs that generally reflect a loss of attentiveness to the task at hand:

- Engineer unexplainably overshoots the proper spot on a passenger platform
- Operator fails to react in the expected fashion to a trespasser on the ROW
- While stopped the operator fails to act upon a signal that changes from red to green
- Operator activates incorrect locomotive control functions
- Operator fails to dim headlights while meeting an opposing train

Training Highlights

Solutions

- **Strategies**
- **Countermeasures**
- **Solutions**
- **Management**



Countermeasures to Distraction

- Training, Training, Training
 - Provide initial introductory training
 - Regularly scheduled periodic
 - Reinforcement with job briefings, posters, laminated cards
 - Long term commitment

Countermeasures to Distraction

- Discuss with all employees how they can personally identify the 10 signs and symptoms of distraction both in themselves and co-workers.
- Instruct employees to note whenever they may experience one or more of these signs that they should implement or share effective rescue strategies to return their attention to the task at hand.

Focus Strategy

- Request a personal check-in with on-board member
- If you tend to become tired when the work environment gets too warm you should open a window (if possible), lower the temperature (if possible)
- Stand up, put cold water on your face

Focus Strategy

- During each CRM job briefing, crews should discuss the fundamental causes of attention loss due to distraction and the effective countermeasures
- Crews should identify locations and/or situations they expect to encounter that will increase vulnerability to mind wandering and agree on a pre-arranged focus strategy

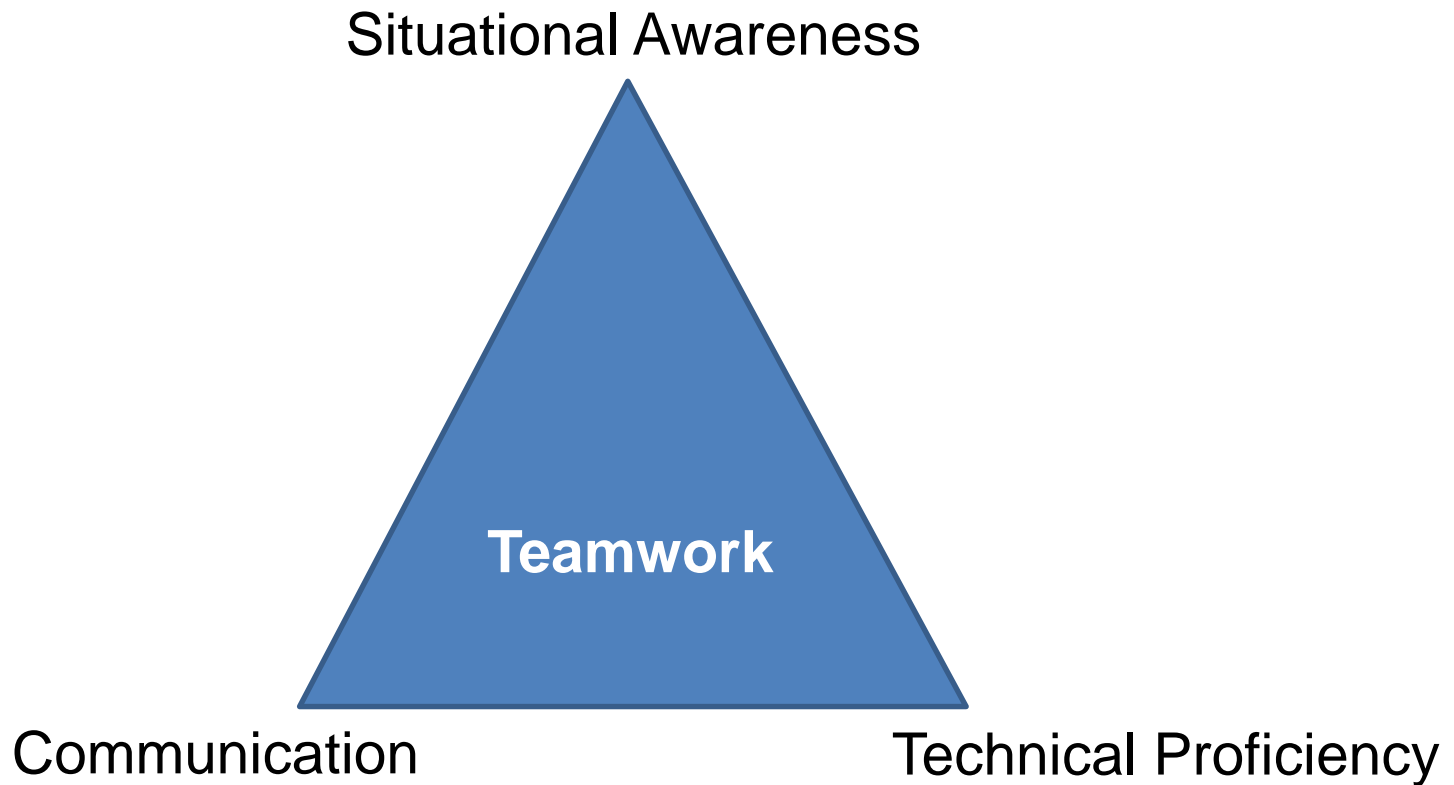
Manager and Supervisory Role

Maintaining Focus

- Have regular conversations with your employees in an effort to strengthen your relationship-“trust building”
- Recognize when something is “wrong” with an employee. Observe and listen.....
- Establish policies and procedures to assist employees with serious personal issues to seek help from EAP with minimal social and economic consequences.
- Carefully implement change and re-organizations

CRM – Crew Resource Management

Elements of a CRM



Mindfulness Training

- Has been around for a long time
- US Military has program-Mindfulness-based Mind Fitness Training MMFT (M-Fit) 7 days
- **Mindfulness Training :**
 - Improves sustained attention
 - Reduces mind-wandering
 - Enhances working memory
 - Increases stress resilience
 - Improves mood
 - Enhances the connectivity between brain regions that control attention

Looking For Solutions

Team Exercises

- During this very important part of the training program, we will work as teams to further identify distractions as we perform our tasks.
- The first part of the solutions portion of the program involves reviewing distraction scenarios and discussing potential ways to eliminate or at least reduce these distractions.

Personal Safety Challenge

Doing Things Differently

- Take the next few moments to think about what you learned in today's distraction training program.
- Think about distraction and loss of focus in your workplace. What will you do differently that could eliminate a loss of attention by you or a team member?
- Prepare to share your personal commitment with the other participants.



Passion



Commitment



Performance



Partnership

Our Promises to Our Clients and Passengers

1. **Uncompromising Safety**
2. Superior Performance in Operations
3. Excellent Fleet Maintenance
4. Quality Customer Experience
5. **High-Performance Culture**
6. Value for Money



Connected to our Quest for a High Performance Culture is our Learning & Development Strategy

- Majority of training expense is focused on safety
- Supervisor and leadership competencies include coaching and mentoring
- Sustained Awareness will be incorporated into our culture at all levels



Our Policies Support our Commitment

COMMUNICATION & ELECTRONIC DEVICE POLICY

Effective Date: March , 2012

POLICY: This policy defines the standards, procedures and restrictions on the use of use of personal cellular phones, personal communications devices and personal other electronic devices on Company time and/or in transit or company provided vehicles. In certain circumstances, the Company issues certain employees in key positions communication equipment to be used for Company purposes. This policy also defines the standards, procedures and restrictions for the procurement and use of Company-provided cellular telephones and other Company provided communication devices

DEFINITIONS:

Cellular telephones and other communication devices – To include, without limitation, cellular telephones with or without hands-free devices (e.g. Bluetooth, Blackberries, Smart Phones, pads, tablets, pagers and text messaging devices).

Other electronic device includes any device that has an on-off switch, including but not limited to MP3 and other music players, electronic games and GPS devices

POLICY SPECIFICS:

When seated at the wheel of a transit or Company vehicle, at any time, the use of cellular phones, other communication devices (Bluetooth, hands free and ear buds), and or other electronic device is limited to the following situations:

- (a) Cellular phone or other communication device use while seated at the wheel of a motor vehicle is prohibited in any jurisdiction that prohibits said use by law or in any location (for example, a school zone) at which the use of such devices is prohibited . Any local restriction or regulation regarding the means of cellular phone usage (for example, restriction to use only with a hands free device) must be complied with.
- (b) The use of personal cellular phones, personal other communication devices, and personal other electronic devices while seated at the wheel of a transit or company provided vehicle (including rental cars) is prohibited. Personal cellular phones and other personal communications and personal other electronic devices must be powered off at all times when an employee is seated at the wheel, regardless of whether the vehicle is powered on or off.
- (c) Paratransit and other on-demand transportation Operators: Company furnished cellular phones, Company furnished personal communications devices, and Company furnished other electronic devices may not be used



Our experience has proven that awareness & training are most effective when treated as a campaign --

- Established with top down approach for strong ownership
- Delivered to all employees
- Enveloped with coaching, rewards & recognition



Passion



Commitment



Performance



Partnership

***A Single Training Event is
Not a Going to Change a
Culture***

A long-term, sustained effort

- Making Sustained Attention Training truly work at your location means embedding it into your safety culture and values
- Content that came out of this study was rich
- Needs to be an ongoing effort – not a one-time training effort

A long-term, sustained effort

- First-class professional training product
- Reinforced with engagement and communication efforts including posters, newsletters, refreshers, etc.
- Long-term effort for Transdev!



Passion



Commitment



Performance



Partnership

Further Validation of Effectiveness of Training

- More Partnerships (Labor, Government, Industry)
- More Research and Analysis

Questions?

Thank you!