

# **The Mind-Body Link in Personal Error**

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# The Water Advantage

- ☑ Aviators are at a higher risk
- ☑ Requires conscious monitoring
- ☑ Thirst = Dumber

# Water Functions

- ☑ Temperature regulation
- ☑ Transports glucose, minerals, vitamins, hormones, enzymes and other neurotransmission substances
- ☑ Digestion and waste removal
- ☑ Shock absorber for eyes and spinal cord, lubricates joints, eyes, intestines

# Why Thirst Doesn't Work

- ☑ Lags behind physiological need
- ☑ Triggers large (yet ineffective) intake of water at one time
- ☑ Reactive response with limited window of effectiveness

# Other Reasons to Sip

- ☑ Five glasses per day decrease the risk of
  - ☑ Colon cancer by 45% (men)
  - ☑ Breast cancer by 79% (women)
  - ☑ Bladder cancer by 50% (both)
- ☑ Bottom line – H<sub>2</sub>O intake has significant short and long term implications – get smart and do it with discipline

# Key Points, Techniques & Tools

- ✓ Pre-hydrate, lead turn high demand and thirst
- ✓ 8-12 ounces thirty minutes before eating
- ✓ 6-8 ounces of cool water at 20-30 minute intervals in heat stress conditions
- ✓ More quickly if you begin to feel thirsty – drink slightly “through your thirst”
- ✓ Be certain to replenish fully after or between events
- ✓ Sports drinks good for electrolyte and glucose replacement, keep an eye on the carbohydrate and sugar levels (energy management)

# Energy Management

## Nutrition, Performance and Human Error

# Nutrition and Error

Day to day, meal to meal food intake plays a vital role in optimal mental functioning, including memory formation/retrieval, attention and processing speed through:



# Four Keys

- ☑ Adequate supply of fuel (glucose)
  - ☑ To keep the brain powered
- ☑ Chemical and hormonal balance
  - ☑ Stability & pre-arm key survival systems
- ☑ Nutrients (vitamins and minerals) in correct amounts
  - ☑ Maintenance of neural activity and other brain and CNS functions
- ☑ Oxygen transfer capacity – affected by fats in bloodstream

# High Octane Fuel Hog

- ☑ 2% of body weight
- ☑ 25% of energy requirements (glucose)

“Brain tissue differs in its composition from others of the body. It is high in fat and cholesterol and is more specific in terms of its energy requirements than other organ tissues. So perhaps it is not surprising that the brain cells’ demands for certain nutrients are higher and more specific than those of other body cells.”

- Dr. Ann Walker

# Long Term Effects of Poor Nutrition on Mental and Physical Performance

- ☑ Hypoglycemic habituation: Dumbing down of the brain to accept and operate at lower blood sugar levels as a matter of routine
- ☑ Adrenaline tolerance
- ☑ If other genetic and environmental factors are present – Type II diabetes

# Key Points, Techniques & Tools

☑ Eat healthy

☑ Don't over-do

☑ Sugar

☑ Caffeine

☑ Alcohol

☑ Fat

# High Risk – Low Frequency Events and Time Compression

# Public Enemy Number 2 (17X)

High Risk – Low  
Frequency Event

# Elements of the EPC

- HR/LF events almost always catch us by surprise; negates existing habit patterns
- As events unfold, stress increases beyond the point of optimal performance
- Reduces value of experience base

# Recognition and Prevention

- Simulate or mentally rehearse responses to these events if actual training to is not an option
- Recognize potential for HR/LF events within any major change in a planned sequence
- Verbalize HR/LF events as they occur to increase vigilance & risk awareness



# Public Enemy #3 (11X)

## Time Compression

Time compression often leads to procedural shortcuts and attention management problems caused by multi-tasking beyond mental or physical capacity.

# Time Compression (11X)

- Causes unplanned scheduling shift and negates preparations
- Results in the perceived necessity to abandon checklist or procedures
- Negates normal habit patterns & routines
- *Creates novel situations from routine*

# Public Enemy Number 4 (10X)

## LOW SIGNAL to NOISE RATIO (LSNR)

- LSNR occurs when important cues are lost in the “background noise” of events.
- Unless the signal is repeated and perceived, lost situational awareness typically occurs.

## Elements of the Error Producing Condition

- High and low workload can both contribute
  - High workload raises mental “noise level”
  - Low workload (complacency) reduces sensitivity
- Signal recognition is dependent on both focus & “mental bandwidth”
- Engineers try to amplify the signal & reduce the associated noise levels
- Individuals can do the same

# Recognition and Prevention

- ID specific high/low workload areas where LSNR might cause you to miss an important cue
- Discuss countermeasures
- Consider alternatives for signal “amplification” during critical operational phases; i.e., verbalizing key events and requiring a response
- Time compression often raises the noise level & compounds the problem

# Stress and Error

Awareness

Recognition

Management

# The Chemical Soup

- Brain function (and learning) is highly dependent on the presence and balance of chemicals
- Natural changes
- Un-natural changes

That's nice, but why does it  
matter?



Dumb has reasons

# Stress and Brain Function

- ☑ Chemicals combine to put us on physiological afterburner
- ☑ After a short period, causes decline in key minerals needed for brain function
- ☑ Stress breeds error and the reaction masks personal vulnerability

# Recognizing Overload

- Poor performance
- Uncertainty/confusion
- Lose normal scan
- Fixation
- Temporal distortion
- Difficulty speaking

# Causes of Overload

- Unplanned events
  - Schedule changes
  - Equipment problems
  - Unplanned loss of resource
- Poor planning
- Weather
- Distraction

# Stress is a Good Thing

- Causes new growth
- Expands capabilities
- Increases strength and stamina

# Stress Source 1: Personality

- Goal directed, hard type  
“A” personalities are at  
highest risk
- Change managers
- Introverts vs. extroverts

# Stress Source 2: Family & Partner

“When \_\_\_\_\_’s not  
happy, ain’t nobody  
happy.”

“When you’re not happy  
. . . nobody cares.”

# Stress Source 3: Organization

- Schedule
- Pay
- Promotion



# Stress

## Source 4:

## Situation

# Yogi Berra on SOPs

“A full head means an empty bat.”

“If you think too much, you hit too little.”

# Protect yourself from yourself

- Hard wire
- “Overlearn” key rule based skills
- Techniques to relax/recover

# Improving Your Peak Performance Zone

- Training
  - Mental
  - Physical
  - Emotional
- Recovery

*“What is the most intelligent response that is consistent with my deepest values and beliefs? ... No excuses. No cursing the playing field. Just fight with everything you have; and keep fighting.”*

*- Jim Loehr*

# Countering Stress

- Breathing
- Relax muscles
- Proximate focus
- View problem as a challenge
- Visualize the solution

# Stay on the Correct Side of the Curve

- Maintain proficiency
- Prioritize actions and delegate efficiently
- Get away from the ground! Climb!  
(or land!)
- Buy time
- Verbalize breaks in checklist or routine

# Underload / Complacency

*“When a pilot gets overconfident, or the crew gets complacent -- that’s when the airplane bites hardest.”*

*-- Chuck Yeager*



**Thank you for your time and  
attention**

