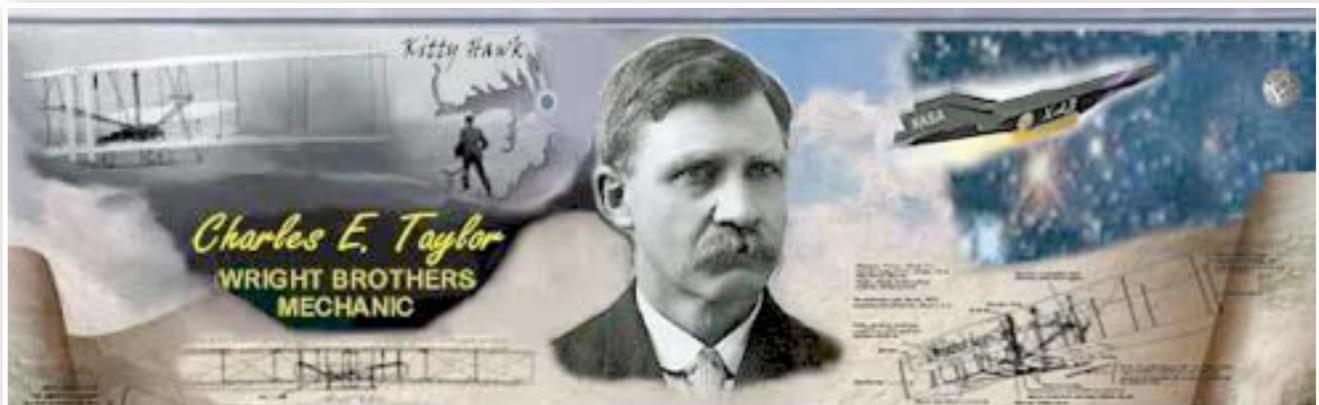


# Aviation Human Factors Industry News

*Volume VIII. Issue 39, October 05, 2012*



*From the sands of Kitty Hawk, the tradition lives on.*

Hello all,

To subscribe send an email to: [rhughes@humanfactorsedu.com](mailto:rhughes@humanfactorsedu.com)

In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:

★U.S. watchdog to review airline safety program

★Evolving the Safety Culture: Leading Indicators and Influencers

★Watch out for unhealthy responses to stress

★A Battle Plan for Jet Lag

★Metabolism in the Brain Fluctuates with Circadian Rhythm

## U.S. watchdog to review airline safety program

U.S. government auditors will review a program that allows airlines to avoid penalties for safety problems by self-disclosing them to the Federal Aviation Administration.

The Transportation Department's Office of Inspector General, a watchdog, said on Tuesday that it would examine the voluntary initiative [to ensure it is not being misused](#) as happened previously in the case of a major carrier. Congress has requested the review. The FAA established the program in 2006 to increase safety by allowing airlines to spend resources to fix safety problems rather than spending time trying to settle disputes with the agency. In a highly critical report two years later, the inspector general's office said FAA safety inspectors had grown too close with Southwest Airlines.



The report said inspectors had allowed the carrier to repeatedly self-disclose violations of FAA repair orders, absolving it of any penalty without ensuring that the company had come up with a solution for the safety issue.

The matter involved 46 Boeing 737s that had not been inspected for potential cracks, a problem that could have led to rapid cabin decompression and crashes.

When Southwest discovered the lapse, FAA inspectors encouraged the airline to formally self-disclose the problem and allowed it to operate those planes on 1,451 flights for eight days, the inspector general's report said.

Southwest later inspected the planes and found fuselage cracks on five, the report said.

The company later was assessed a heavy fine by the FAA.

[The Voluntary Disclosure Reporting Program](#) is one of at least four self-reporting efforts the FAA has adopted to monitor the industry and its own employees to identify problems and trends and prevent accidents.

Safety experts generally applaud voluntary approaches, saying they increase data available to researchers and can make systems safer if trends are found.

The inspector general's office said its review would look at whether the airlines are meeting FAA requirements when filing reports and whether regulators are evaluating the industry's corrective actions.

The FAA created a non-punitive reporting system for air traffic controllers in 2008 and expanded it this year to include employees who maintain radar installations and other systems. The FAA said that system has yielded enormous data and prompted corrective steps.

## Evolving the Safety Culture: Leading Indicators and Influencers

Success is measured by the ability to drive positive, needed change, create breakthrough performance, and sustain the results.

Sir Winston Churchill observed, "First we shape our dwellings, and afterwards our dwellings shape us." Like dwellings, an **organizational culture** is either a powerful tool or a hindrance to shaping progress. **Cultures influence**

the beliefs and behaviors of new members and should be managed for breakthrough in any operating category. Is your organization shaping the role culture plays in success, or are your dwellings determining this for you? Cultures can be understood, measured, and managed. The Safety Culture Excellence® Evolution Model has provided guidance for many complex organizations and has facilitated the transformation necessary for the acquisition of new performance. Many have written about the obvious role the beliefs and behaviors play in culture. The purpose of this article, however, is to provide some **initial direction on how to shape culture.**



### Perceptions Create Attitudes and Influence Decisions

When individuals join your organization, they have existing perceptions, such as "I believe it is a good idea to stop the job for a safety concern." Your existing culture has perceptions, as well, that often become culturally norming beliefs.

When someone holds a positive belief toward something, often what manifests is a **positive attitude**. The opposite is also true. If an employee believes leadership doesn't support safety improvement efforts due to a belief that production takes priority, it is likely that a **negative attitude towards safety** initiatives will be displayed.

If an employee perceives leadership will not support decisions to join safety efforts or stop the job for an identified safety concern and his peers feel similarly, it is doubtful that when the opportunity presents itself, he will take action. If, however, an employee feels that **near-miss data** is used effectively and reporting such information is "**the way we do things around here**," he will be strongly influenced to make the decision to report when an injury-free event occurs.

What an individual or group of individuals perceive will play a large role in nudging decisions.

### Decisions Create Expectations of Behavior

"All disappointment is based on a set level of expectations." It is important to remember this old adage. When an employee decides to intervene for a safety concern, report a near miss, or volunteer for a safety initiative, he establishes a degree of probability of what will occur following this behavior. Decisions are made with the anticipated consequences that will follow the behavior in mind. Unless the individuals are gluttons for punishment, **normal, rational humans do not make decisions knowing it will result in an undesirable consequence**. If decisions to help a new employee, conduct a job observation, or suggest an innovative new solution are believed to be supported and recognized by a supervisor, the desirable behaviors are likely.

### Behaviors Result in Experiences that Produce Stories

When someone takes action and behaves in a certain way resulting in a negative experience, stories are told to others throughout the organization that either confirm (+) or conflict (-) with the existing individual or shared perceptions. Moreover, negative experiences are known to be **spread more virally** than positive experiences. The worse the experience, the more people will know about it.

**Stories are the tribal characteristics of an organizational culture. Whether formal or informal, they are the most effective influence on decisions and behaviors.**

## Measuring and Managing

Through a proprietary mapping process, perceptions, decisions, behaviors, and stories have all been measured in many organizations. Remember, an imprecise measurement of the right things can often be of more value than a precise measurement of the wrong things. Leading indicators of culture change can be developed by beginning with answering the following questions.

This can be determined through conversations, post event, or during an observation of work practice.

1. What are the current perceptions?
2. What perceptions would be desirable?
3. What decisions are people currently making?
4. What experiences are shaping the current perceptions, decisions, behaviors, and stories in your organization?
5. What behaviors would be desirable, and what is their necessary vs. actual frequency of occurrence?
6. What behaviors do people need to display (situationally or by level) to create the experiences that shape the stories and perceptions?
7. What are the current stories? Rate them on a scale of negative to positive.
8. Who has the loudest voice -- the individuals shaping the organization with stories of positive experiences or the naysayers working hard to maintain the perception of status quo?

**Cultures are one of the primary reasons new initiatives succeed or fail.** High-performance organizations realize culture change is becoming the core responsibility of transformational senior leaders. An executive's career success will not be judged by individual contributions. Success is measured by the ability to drive positive, needed change, create breakthrough performance, and sustain the results. **Culture is the ultimate sustainability mechanism**, working hard to maintain status quo, or if influenced appropriately will be the best tool the executive has available.

## Watch out for unhealthy responses to stress

You probably have your own ways of dealing with stressful times. Some may be healthy, such as calling a friend, cooking a comforting dinner, or curling up in bed earlier than usual. Others may not be as harmless. All too often, [people self-medicate or turn to other unhealthy behaviors](#) in an attempt to relieve pressure they feel. They may do so in a variety of ways.

. For example:

- Watching endless hours of TV
- Withdrawing from friends or partners or, conversely jumping into a frenzied social life to avoid facing problems
- Overeating or weight gain
- Under-eating or weight loss
- Sleeping too much
- Drinking too much alcohol
- Lashing out at others in emotionally or physically violent outbursts
- Taking up smoking or smoking more than usual
- Taking prescription or over-the-counter drugs that promise some form of relief, such as sleeping pills, muscle relaxants, or anti-anxiety pills
- Taking illegal or unsafe drugs

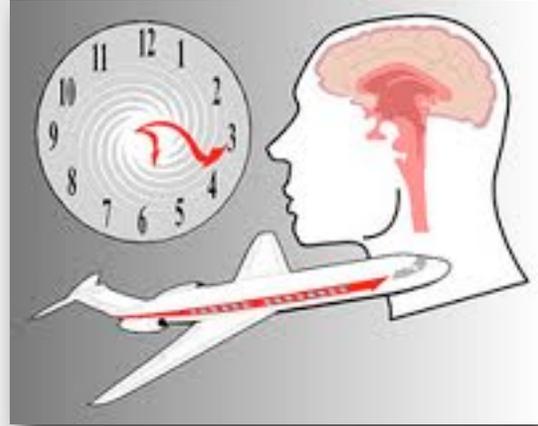
Becoming aware of how you typically handle stress can help you make healthy choices. If you normally reach for a sugary snack, for example, you might instead call a friend. Choosing to [connect rather than consume](#) can relieve your stress. Studies suggest that emphasizing social ties can provide definite health benefits – with no calories!



Because you can't avoid stress altogether, learn healthier ways to manage stressful situations with [the Special Health Report from Harvard Medical School, Stress Management.](#)

## A Battle Plan for Jet Lag

There are more so-called remedies for jet lag than there are time zones, from long-standing antidotes like No-Jet-Lag's homeopathic tablets to new innovations like the Valkee Brain Stimulation Headset, which was tested earlier this year by Finnair and purports to alleviate jet lag by channeling bright light into the brain through the ear canal. Yet some of the latest (and perhaps most effective) jet-lag solutions are being developed for people who fly to places most of us



never will. [The fatigue management team](#) at NASA Johnson Space Center in Houston helps astronauts — who, for training purposes, must fly frequently among international space agencies in Russia, Japan and Germany — overcome jet lag [two to three times faster](#) than other travelers. And while the anti-jet-lag plans that the team prescribes are highly individualized, the general principles can be simplified for the bleary-eyed rest of us.

As anyone who has ever flitted across multiple time zones knows, when your internal clock is unable to adapt to a rapid change in the light-dark cycle, the result is jet lag. Read: fatigue, moodiness, gastrointestinal unpleasantness. In a perfect world, everyone would take preventive measures — like preparing for a trip to Paris from Washington by going to sleep earlier and earlier each night a few days before the flight. But most of us spend the days before a vacation frantically trying to polish off work and make sure the plants and pets won't die while we're gone.

And so below are steps you can take to minimize jet lag, from the moment you board the plane through your first night in a far-flung destination.

### 1. [Understand that the direction you are traveling makes a difference.](#)

“It's only in the past 100 years that we've been able to jump time zones,” said Steven W. Lockley, a consulting member of NASA's fatigue management team, who is also a neuroscientist specializing in sleep medicine at Brigham and Women's Hospital and Harvard in Boston. “We haven't evolved a way to adapt yet.”

There are, however, ways to cope. Begin by determining whether you are traveling east or west. Most people (three quarters of us, according to Professor Lockley) have an internal body clock that makes it [harder for them to travel east](#). So, while most of Florence, Italy, is sleeping, a tourist from New York is wide awake and itching to climb the Duomo because it's barely time for dinner back on the East Coast.

Even within the United States, traveling east over just three time zones can be taxing: a study led by Dr. Lawrence D. Recht, a neurologist, of 19 Major League Baseball teams using season records from 1991 to 1993 showed that the team that had just completed eastward travel [would give up more than one run than usual in every game](#).

If you're traveling east and want to adapt to the new time, you will have to wake up earlier and go to bed earlier than you normally would. This is known as advancing your body clock. If you're traveling west, you'll have to adapt to the new time by waking up later than usual and going to bed later than usual, delaying your body clock. Easier said than done. So how does one do this as painlessly as possible?

## 2. [Schedule when to expose yourself to light and when to avoid it](#).

It takes [about a day](#) to shift one time zone, said Dr. Smith L. Johnston, a flight surgeon and the chief of the fatigue management team at NASA. To do it faster, you must [regulate your exposure to light](#) — both natural and artificial — and darkness. Yes, there are all kinds of jet-lag cure-alls on the market, but experts say that since light is the primary environmental cue telling your body's clock when to sleep and when to wake, controlling jet lag is fundamentally about controlling light and darkness.

With that in mind, here are the general guidelines: if you are traveling east, you must expose yourself to light early, advancing your body clock so that it will be in sync with the new time zone. Conversely, if traveling west, you should expose yourself to light at dusk and the early part of the evening, delaying your body clock so that it will be in sync with the new time zone.

This may be best understood with an example. Let's say that at 7 p.m. you board a plane in New York that is scheduled to arrive in London at 7 a.m. local time (when it's 2 a.m. in New York). You're traveling east, which means you need to advance your internal clock toward London time. To do that, avoid any kind of light during the flight because the exposure will delay your body clock rather than advance it. An obvious (albeit odd) way to accomplish this is to wear sunglasses in the plane. That's what Professor Lockley and his colleagues do despite the fact that they are flying at night. "People think you're a rock star," he said.

Typically, when travelers arrive in London at 7 a.m. they attempt to get on the new time zone right away. “Which is exactly the wrong thing,” Professor Lockley said, because your internal clock is still set to New York time, and trying to adjust too quickly will only exhaust you. What you need to do is to ease yourself into the new time zone by consciously manipulating your exposure to light. [So keep those sunglasses on.](#)

“I’m the only person wearing sunglasses at Heathrow,” said Professor Lockley, who, in the London example, would recommend wearing sunglasses for the entire flight, and once off the plane, until 11 a.m. London time (6 a.m. New York time). Throughout the rest of the day, seeing light will help you to be more alert and to reset your internal clock to local London time. (For those who want to get granular, the new book “Sleep: A Very Short Introduction,” which Professor Lockley co-authored, provides details about which hours of the day exposing yourself to light or darkness will be most beneficial to overcoming jet lag.)

If you are able to sleep during the flight, even better. Astronauts and mission-control personnel have [used eye masks, earplugs and sleep aids](#) like Ambien to help them doze, Dr. Johnston said. But he cautioned travelers who want to take a sleeping pill to check with their doctor first and to avoid taking any medication with alcohol. Many airline passengers “just get drunk and pass out,” he said, underscoring that a hangover does nothing to alleviate jet lag.

Those who want to take [synthetic melatonin](#) because it might induce sleepiness during a flight should also consult a doctor first to find out if it is safe for them. Furthermore, as the Centers for Disease Control and Prevention caution, synthetic melatonin is not regulated by the Food and Drug Administration.

Now, if you were to take a morning flight instead of an evening flight to London from New York, you would want to expose yourself to light throughout the flight (no need for sunglasses), as well as when you land in London, soaking up as much sun as possible all day. “You can have exactly the same trip but the advice is opposite depending on what time you’re taking the flight,” said Professor Lockley, who has also used these principles to help racehorses acclimate to new time zones. “Once you understand the timing issue you can go through that process for any trip.”

### [3. Survive the first night by eating right and preparing the hotel room for a good night’s sleep.](#)

Whatever you do on your first day, remember that the things capable of upsetting your body when you’re at home can be even more troublesome when traveling. For instance, some of us know that alcohol may help when it comes to falling asleep but that [it can interrupt later stages of sleep](#), which would only exacerbate jet lag. Large or spicy meals should also be avoided in the evening at your destination, Professor Lockley advised, because the body is not as efficient at metabolizing food at that time.

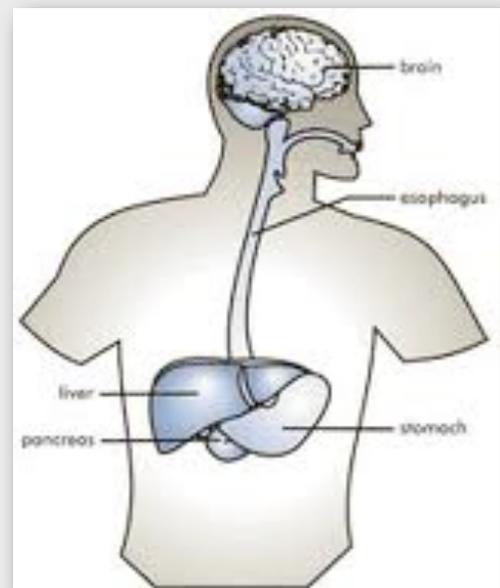
At night (and for each night of your London trip) about an hour or so before bed, keep the lights in your room as dim as possible. Close blinds or curtains and cover any light from a clock, computer, television, even your smartphone, because light can make you more alert and reset your internal clock to the wrong time, making you think the day has begun.

More tips on improving sleep at home or on the road are available at Harvard University's "healthy sleep" Web site, [healthysleep.med.harvard.edu/healthy/getting/overcoming/tips](http://healthysleep.med.harvard.edu/healthy/getting/overcoming/tips). Just don't log on before bedtime.

[http://topics.nytimes.com/top/reference/timestopics/organizations/n/national\\_aeronautics\\_and\\_space\\_administration/index.html?inline=nyt-org](http://topics.nytimes.com/top/reference/timestopics/organizations/n/national_aeronautics_and_space_administration/index.html?inline=nyt-org)

## **Metabolism in the Brain Fluctuates with Circadian Rhythm**

A new study reveals that the biological clock (suprachiasmatic nucleus, SCN) is driven, in part, by metabolism, the production and flow of chemical energy in cells. In order to draw this conclusion, researchers focused primarily on a phenomenon known as "redox" in tissues of the SCN from the brains of rats and mice. Redox represents the energy changes of cellular metabolism (usually through the transfer of electrons). When a molecule gains one or more electrons, scientists call it a reduction; when it loses electrons, they say it is oxidized. These reactions, the researchers found, oscillate on a 24-hour cycle in the brain clock, and **literally open and close channels of communication** in brain cells. "The language of the brain is electrical;



it determines what kind of signals one part of the brain sends to the other cells in its tissue, as well as the other parts of the brain nearby," said University of Illinois cell and developmental biology professor Martha Gillette, who led the study. "The fundamental discovery here is that there is an intrinsic oscillation in metabolism in the clock region of the brain that takes place without external intervention. And this change in metabolism determines the excitable state of that part of the brain."

The new findings, reported in the journal *Science*, alter basic assumptions about how the brain works, Gillette said.

"Basically, the idea has always been that metabolism is serving brain function. What we're showing is [metabolism is part of brain function](#)," she said. "Our study implies that changes in cellular metabolic state could be a cause, rather than a result, of neuronal activity."

<http://www.sciencemag.org/content/337/6096/839.full>



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