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# TIME

FROM THE MAGAZINE

Sunday, Nov. 26, 2006

## Why We Worry About The Things We Shouldn't... ...And Ignore The Things We Should

By JEFFREY KLUGER

*Correction Appended: November 27, 2006*

It would be a lot easier to enjoy your life if there weren't so many things trying to kill you every day. The problems start even before you're fully awake. There's the fall out of bed that kills 600 Americans each year. There's the early-morning heart attack, which is 40% more common than those that strike later in the day. There's the fatal plunge down the stairs, the bite of sausage that gets lodged in your throat, the tumble on the slippery sidewalk as you leave the house, the high-speed automotive pinball game that is your daily commute.

Other dangers stalk you all day long. Will a cabbie's brakes fail when you're in the crosswalk? Will you have a violent reaction to bad food? And what about the risks you carry with you all your life? The father and grandfather who died of coronaries in their 50s probably passed the same cardiac weakness on to you. The tendency to take chances on the highway that has twice landed you in traffic court could just as easily land you in the morgue.

Shadowed by peril as we are, you would think we'd get pretty good at distinguishing the risks likeliest to do us in from the ones that are statistical long shots. But you would be wrong. We agonize over avian flu, which to date has killed precisely no one in the U.S., but have to be cajoled into getting vaccinated for the common flu, which contributes to the deaths of 36,000 Americans each year. We wring our hands over the mad cow pathogen that might be (but almost certainly isn't) in our hamburger and worry far less about the cholesterol that contributes to the heart disease that kills 700,000 of us annually.

We pride ourselves on being the only species that understands the concept of risk, yet we have a confounding habit of worrying about mere possibilities while ignoring probabilities, building barricades against

perceived dangers while leaving ourselves exposed to real ones. Six Muslims traveling from a religious conference were thrown off a plane last week in Minneapolis, Minn., even as unscreened cargo continues to stream into ports on both coasts. Shoppers still look askance at a bag of spinach for fear of E. coli bacteria while filling their carts with fat-sodden French fries and salt-crusted nachos. We put filters on faucets, install air ionizers in our homes and lather ourselves with antibacterial soap. "We used to measure contaminants down to the parts per million," says Dan McGinn, a former Capitol Hill staff member and now a private risk consultant. "Now it's parts per billion."

At the same time, 20% of all adults still smoke; nearly 20% of drivers and more than 30% of backseat passengers don't use seat belts; two-thirds of us are overweight or obese. We dash across the street against the light and build our homes in hurricane-prone areas--and when they're demolished by a storm, we rebuild in the same spot. Sensible calculation of real-world risks is a multidimensional math problem that sometimes seems entirely beyond us. And while it may be true that it's something we'll never do exceptionally well, it's almost certainly something we can learn to do better.

## AN OLD BRAIN IN A NEW WORLD

Part of the problem we have with evaluating risk, scientists say, is that we're moving through the modern world with what is, in many respects, a prehistoric brain. We may think we've grown accustomed to living in a predator-free environment in which most of the dangers of the wild have been driven away or fenced off, but our central nervous system--evolving at a glacial pace--hasn't got the message.

To probe the risk-assessment mechanisms of the human mind, Joseph LeDoux, a professor of neuroscience at New York University and the author of *The Emotional Brain*, studies fear pathways in laboratory animals. He explains that the jumpiest part of the brain--of mouse and man--is the amygdala, a primitive, almond-shaped clump of tissue that sits just above the brainstem. When you spot potential danger--a stick in the grass that may be a snake, a shadow around a corner that could be a mugger--it's the amygdala that reacts the most dramatically, triggering the fight-or-flight reaction that pumps adrenaline and other hormones into your bloodstream.

It's not until a fraction of a second later that the higher regions of the brain get the signal and begin to sort out whether the danger is real. But that fraction of a second causes us to experience the fear far more vividly than we do the rational response--an advantage that doesn't disappear with time. The brain is wired in such a way that nerve signals travel more readily from the amygdala to the upper regions than from the upper regions back down. Setting off your internal alarm is quite easy, but shutting it down takes some doing.

"There are two systems for analyzing risk: an automatic, intuitive system and a more thoughtful analysis," says Paul Slovic, professor of psychology at the University of Oregon. "Our perception of risk lives largely in our

feelings, so most of the time we're operating on system No. 1."

There's clearly an evolutionary advantage to this natural timorousness. If we're mindful of real dangers and flee when they arise, we're more likely to live long enough to pass on our genes. But evolutionary rewards also come to those who stand and fight, those willing to take risks--and even suffer injury--in pursuit of prey or a mate. Our ancestors hunted mastodons and stampeded buffalo, risking getting trampled for the possible payoff of meat and pelt. Males advertised their reproductive fitness by fighting other males, willingly engaging in a contest that could mean death for one and offspring for the other.

These two impulses--to engage danger or run from it--are constantly at war and have left us with a well-tuned ability to evaluate the costs and payoffs of short-term risk, say Slovic and others. That, however, is not the kind we tend to face in contemporary society, where threats don't necessarily spring from behind a bush. They're much more likely to come to us in the form of rumors or news broadcasts or an escalation of the federal terrorism-threat level from orange to red. It's when the risk and the consequences of our response unfold more slowly, experts say, that our analytic system kicks in. This gives us plenty of opportunity to overthink--or underthink--the problem, and this is where we start to bollix things up.

#### WHY WE GUESS WRONG

Which risks get excessive attention and which get overlooked depends on a hierarchy of factors. Perhaps the most important is dread. For most creatures, all death is created pretty much equal. Whether you're eaten by a lion or drowned in a river, your time on the savanna is over. That's not the way humans see things. The more pain or suffering something causes, the more we tend to fear it; the cleaner or at least quicker the death, the less it troubles us. "We dread anything that poses a greater risk for cancer more than the things that injure us in a traditional way, like an auto crash," says Slovic. "That's the dread factor." In other words, the more we dread, the more anxious we get, and the more anxious we get, the less precisely we calculate the odds of the thing actually happening. "It's called probability neglect," says Cass Sunstein, a University of Chicago professor of law specializing in risk regulation.

The same is true for, say, AIDS, which takes you slowly, compared with a heart attack, which can kill you in seconds, despite the fact that heart disease claims nearly 50 times as many Americans than AIDS each year. We also dread catastrophic risks, those that cause the deaths of a lot of people in a single stroke, as opposed to those that kill in a chronic, distributed way. "Terrorism lends itself to excessive reactions because it's vivid and there's an available incident," says Sunstein. "Compare that to climate change, which is gradual and abstract."

Unfamiliar threats are similarly scarier than familiar ones. The next E. coli outbreak is unlikely to shake you up as much as the previous one, and any that follow will trouble you even less. In some respects, this is a good thing,

particularly if the initial reaction was excessive. But it's also unavoidable given our tendency to habituate to any unpleasant stimulus, from pain and sorrow to a persistent car alarm.

The problem with habituation is that it can also lead us to go to the other extreme, worrying not too much but too little. Sept. 11 and Hurricane Katrina brought calls to build impregnable walls against such tragedies ever occurring again. But despite the vows, both New Orleans and the nation's security apparatus remain dangerously leaky. "People call these crises wake-up calls," says Dr. Irwin Redlener, associate dean of the Mailman School of Public Health at Columbia University and director of the National Center for Disaster Preparedness. "But they're more like snooze alarms. We get agitated for a while, and then we don't follow through."

## THE COMFORT OF CONTROL

We similarly misjudge risk if we feel we have some control over it, even if it's an illusory sense. The decision to drive instead of fly is the most commonly cited example, probably because it's such a good one. Behind the wheel, we're in charge; in the passenger seat of a crowded airline, we might as well be cargo. So white-knuckle flyers routinely choose the car, heedless of the fact that at most a few hundred people die in U.S. commercial airline crashes in a year, compared with 44,000 killed in motor-vehicle wrecks. The most white-knuckle time of all was post--Sept. 11, when even confident flyers took to the roads. Not surprisingly, from October through December 2001 there were 1,000 more highway fatalities than in the same period the year before, in part because there were simply more cars around. "It was called the '9/11 effect.' It produced a third again as many fatalities as the terrorist attacks," says David Ropeik, an independent risk consultant and a former annual instructor at the Harvard School of Public Health.

Then too there's what Ropeik and others call "optimism bias," the thing that makes us glower when we see someone driving erratically while talking on a cell phone, even if we've done the very same thing, perhaps on the very same day. We tell ourselves we're different, because our call was shorter or our business was urgent or we were able to pay attention to the road even as we talked. What optimism bias comes down to, however, is the convenient belief that risks that apply to other people don't apply to us.

Finally, and for many of us irresistibly, there's the irrational way we react to risky behavior that also confers some benefit. It would be a lot easier to acknowledge the perils of smoking cigarettes or eating too much ice cream if they weren't such pleasures. Drinking too much confers certain benefits too, as do risky sex, recreational drugs and uncounted other indulgences. This is especially true since, in most cases, the gratification is immediate and the penalty, if it comes at all, comes later. With enough time and enough temptation, we can talk ourselves into ignoring almost any long-term costs. "These things are fun or hip, even if they can be lethal," says Ropeik. "And that pleasure is a benefit we weigh."

If these reactions are true for all of us--and they are--then you might think that all of us would react to risk in the same way. But that's clearly not the case. Some people enjoy roller coasters; others won't go near them. Some skydive; others can't imagine it. Not only are thrill seekers not put off by risk, but they're drawn to it, seduced by the mortal frisson that would leave many of us cold. "There's an internal thermostat that seems to control this," says risk expert John Adams of University College London. "That set point varies from person to person and circumstance to circumstance."

No one knows how such a set point gets calibrated, but evidence suggests that it is a mix of genetic and environmental variables. In a study at the University of Delaware in 2000, researchers used personality surveys to evaluate the risk-taking behavior of 260 college students and correlated it with existing research on the brain and blood chemistry of people with thrill-seeking personalities or certain emotional disorders. Their findings support the estimate that about 40% of the high-thrill temperament is learned and 60% inherited, with telltale differences in such relevant brain chemicals as serotonin, which helps inhibit impulsive behavior and may be in short supply in people with high-wire personalities.

#### CAN WE DO BETTER?

Given these idiosyncratic reactions, is it possible to have a rational response to risk? If we can't agree on whether something is dangerous or not or, if it is, whether it's a risk worth taking, how can we come up with policies that keep all of us reasonably safe?

One way to start would be to look at the numbers. Anyone can agree that a 1-in-1 million risk is better than 1 in 10, and 1 in 10 is better than 50-50. But things are almost always more complicated than that, a fact that corporations, politicians and other folks with agendas to push often deftly exploit.

Take the lure of the comforting percentage. In one study, Slovic found that people were more likely to approve of airline safety-equipment purchases if they were told that it could "potentially save 98% of 150 people" than if they were told it could "potentially save 150 people." On its face this reaction makes no sense, since 98% of 150 people is only 147. But there was something about the specificity of the number that the respondents found appealing. "Experts tend to use very analytic, mathematical tools to calculate risk," Slovic says. "The public tends to go more on their feelings."

There's also the art of the flawed comparison. Officials are fond of reassuring the public that they run a greater risk from, for example, drowning in the bathtub, which kills 320 Americans a year, than from a new peril like mad cow disease, which has so far killed no one in the U.S. That's pretty reassuring--and very misleading. The fact is that anyone over 6 and under 80--which is to say, the overwhelming majority of the U.S. population--faces almost no risk of perishing in the tub. For most of us, the apples of drowning and the oranges of mad cow disease don't line up in any useful way.

But such statistical straw men get trotted out all the time. People defending the safety of pesticides and other toxins often argue that you stand a greater risk of being hit by a falling airplane (about 1 in 250,000 over the course of your entire life) than you do of being harmed by this or that contaminant. If you live near an airport, however, the risk of getting beamed is about 1 in 10,000. Two very different probabilities are being conflated into one flawed forecast. "My favorite is the one that says you stand a greater risk from dying while skydiving than you do from some pesticide," says Susan Egan Keane of the Natural Resources Defense Council. "Well, I don't skydive, so my risk is zero."

Risk figures can be twisted in more disastrous ways too. Last year's political best seller, *The One Percent Doctrine*, by journalist Ron Suskind, pleased or enraged you, depending on how you felt about war in Iraq, but it hit risk analysts where they live. The title of the book is drawn from a White House determination that if the risk of a terrorist attack in the U.S. was even 1%, it would be treated as if it were a 100% certainty. Critics of Administration policy argue that that 1% possibility was never properly balanced against the 100% certainty of the tens of thousands of casualties that would accompany a war. That's a position that may be easier to take in 2006, with Baghdad in flames and the war grinding on, but it's still true that a 1% danger that something will happen is the same as a 99% likelihood that it won't.

## REAL AND PERCEIVED RISK

It's not impossible for us to become sharper risk handicappers. For one thing, we can take the time to learn more about the real odds. Baruch Fischhoff, professor of social and decision sciences at Carnegie Mellon University, recently asked a panel of 20 communications and finance experts what they thought the likelihood of human-to-human transmission of avian flu would be in the next three years. They put the figure at 60%. He then asked a panel of 20 medical experts the same question. Their answer: 10%. "There's reason to be critical of experts," Fischhoff says, "but not to replace their judgment with laypeople's opinions."

The government must also play a role in this, finding ways to frame warnings so that people understand them. John Graham, formerly the administrator of the federal Office of Information and Regulatory Affairs, says risk analysts suffer no end of headaches trying to get Americans to understand that while nuclear power plants do pose dangers, the more imminent peril to both people and the planet comes from the toxins produced by coal-fired plants. Similarly, pollutants in fish can be dangerous, but for most people--with the possible exception of small children and women of childbearing age--the cardiac benefits of fish easily outweigh the risks. "If you can get people to compare," he says, "then you're in a situation where you can get them to make reasoned choices."

Just as important is to remember to pay proper mind to the dangers that, as the risk experts put it, are hiding in plain sight. Most people no longer doubt that global warming is happening, yet we live and work in air-

conditioned buildings and drive gas-guzzling cars. Most people would be far likelier to participate in a protest at a nuclear power plant than at a tobacco company, but it's smoking, not nukes, that kills an average of 1,200 Americans every single day.

We can do better, however, and leaders in government and industry can help. The residual parts of our primitive brains may not give us any choice beyond fighting or fleeing. But the higher reasoning we've developed over millions of years gives us far greater--and far more nuanced--options. Officials who provide hard, honest numbers and a citizenry that takes the time to understand them would not only mean a smarter nation, but a safer one. [This article contains a complex diagram. Please see hardcopy or pdf.]  
TOTAL ANNUAL DEATHS 2.5 MILLION Homicide 17,732 Suicide 31,484

Terrified of bees, snakes and swimming pools? ACCIDENTS 109,277  
Maybe you should worry more about your heart DISEASES 2.3 million  
Other diseases 681,150 Diabetes 74,219 Chronic lower-respiratory disease 126,382 Stroke 157,689 Cancer 556,902 Heart disease 685,089 All other deaths 8,364 Sources: Centers for Disease Control and Prevention; National Transportation Safety Board

*Correction: The original version of this story incorrectly identified David Ropeik as a "former professor at the Harvard School of Public Health." In fact, Mr. Ropeik was a former annual instructor, not a professor, and he was not a member of the school's faculty.*

*With reporting by David Bjerklie/New York, Dan Cray/Los Angeles*

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