Fear, Risk and Chance

By John Brodman

Risk and chance are two sides of the same coin. They refer to the probability that something (an event) may occur. Risk is usually associated with the probability that something bad might happen, like the risk of getting bitten by a shark (1 in 3.8 million over the course of a lifetime). Chance is a little more positive, but it still refers to the probability of something happening, like the chance of winning the Powerball lottery (1 in 10.2 billion for each play). We usually don't talk about the risk of winning the lottery, but we do talk about the risks of dying in a plane or automobile accident. While chance and risk is really the same thing, fear is something altogether different. It is a psychological concept that may or may not be grounded in statistical or probabilistic reality, but fear is also an instinct, something very real and something that can't be denied. Fear can temper our decision-making processes and sometimes keep us from doing something really stupid. The key is to know and understand your fears, without letting them run your life.

There are risks involved in almost everything we do, as our instant communications technology keeps reminding us. A tornado can't touch down anywhere without it immediately being broadcast on the news and weather channels. Every calamity gets its 15 minutes of fame on TV, Facebook, YouTube, twitter, and cell phone networks. Today's news is filled with scary developments: air traffic controllers asleep at the switch; planes colliding on the runway; automobile crashes; terrorist attacks; single murders; serial killers; sex offenders; nuclear meltdowns; global warming; tornados, hurricanes, earthquakes; tsunamis; kidnappings; identity theft; and the health consequences of obesity; inactivity; drug and alcohol abuse to name a few. We are constantly being reminded about things that can go wrong.

Our instant communications technology raises an interesting, but related point. Is the world really becoming a more dangerous place or are we just more aware of every scary incident that happens? Many of the incidents we hear about create terror and feelings of fear that can't be denied, but how realistic are our fears compared with the statistical probabilities involved?

In numerical games of chance like the lottery, roulette, playing cards or a roll of the dice, the probabilities are clearly defined by mathematics, but the statistical probability of a fearsome event occurring, based on historical data, may not be that relevant. Statistical analysis can help us understand and put certain events into perspective, but it is often misleading or of limited value when it comes to predicting the future. Catastrophic events are often random, episodic and unpredictable, and this is the real source of our fear.

For example the annual death rate from tornadoes in the U.S. has averaged about 40 per year in the last decade, and this translates into an annual death rate of about one in every 8.3 million persons, a pretty slim chance. The chances of dying in a tornado have come down dramatically in the last 50 years, primarily because of better detection, early warning, and better construction. This record is of little usefulness or comfort to those affected by last month's outbreak of over 600 tornados across the U.S., resulting in 355 deaths in 7 southern states in a two-day period. You have to go all the way back to 1974 to find an annual death toll even close to this two-day event. Knowing the historical, statistical probability didn't help Tuscaloosa.

Forty people die in coal mining accidents each year and there have been no fatalities in commercial nuclear plants in the last 40 years, but we fear a nuclear meltdown because of the potential for catastrophic consequences. You have to look at the statistical record to better understand the risks involved, and you need to understand the estimates being presented to you.

For example there are daily, annual and lifetime risks associated with a given event, and they're very different. Your lifetime risk of dying is 100 percent (sorry, we can't get out of this alive), but your daily risk of dying is relatively small. Let's look at some of the real risks involved in everyday life. Your risk of dying before you awake each night is about 1 in 60,000. If you are a male, your risk of dying is greater than if you are female, and this is true in all age categories. Males in the 20 to 30

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