

# Numbers Do Lie

Jon Burras

**"There are three kinds of lies: Lies, damned lies, and statistics"**

-Expression popularized by Mark Twain- (1835-1910)

When is an absolute not an absolute? When does an objective reality become blurred and is not so objective? You might have heard the old adage that something is an "*exact science*." What most people do not realize is that science itself is not necessarily "*an exact science*." There is a whole lot of grey area in what most people believe to be "*irrefutable exactness*." Science is often a collection of hunches, suppositions and guesses. Just because something has been viewed through the scientific viewfinder does not necessarily mean that it is true.

Along these same lines, you might have heard the phrase "*numbers don't lie*." The common belief is that math is an objective reality and that a number stands for a very specific and quantifiable amount. According to the unexamined mind, a number is as absolute as an enormous slice of granite. Hence, it might come as quite a shock to many to learn that often there can be very little truth to numbers and that "*numbers do lie*." In fact, numbers lie so often that one might begin to question if numbers are ever really true.

Numbers are commonly used to tell a story. Sometimes the story has merit; often it does not. Statistics and numbers are frequently used like a barrage to blindside a weak argument or try to undermine a case that you do not agree with. The rational mind will collect as many numbers as possible to tell a story and throw away the numbers that do not fit the argument. The rational mind is often attached to statistics like a troll to a bridge.

This very same rational mind will raise the scientific model to the heights of "god-like" status and attempt to undermine anything that is not scientific. This intellect will claim that if it is not "scientific" than it is "anecdotal." The term "anecdotal" is used to undermine perceptions that do not come from a laboratory or scientific journal. Anecdotal evidence is often perceived as "gossip," "hearsay," "folktale" or "voodoo." According to this unexamined perception of reality, science is given free reign and considered "*unquestionable*." Anecdotal information is classified as "*fairytale*."

There are many ways to tell a story. Scientific studies and numbers are one way to tell a story. Anecdotal means or personal experience are another way. While scientific numbers-crunching often claims to own "the truth," this is far from accurate. Scientific studies and numbers can be accurate in telling the truth; they can also be an outright lie. The general perception is that if a number came from the scientific model than it must be true and that anything that was not studied scientifically cannot be true.

For instance, the drug Vioxx was scientifically researched, tested, approved and marketed. Vioxx reportedly killed tens of thousands of Americans. According to ConsumerAffairs.com, "*The Food and Drug Administration (FDA) estimates that Vioxx may have contributed to 27,785 heart attacks and sudden cardiac deaths between 1999 and 2003. The estimate is based on the number of prescriptions issued for Vioxx between 1999 and 2003.*" How could all that science be true if so many people succumbed to the drug?

In another instance, Dr. Kenneth Cooper conducted many scientific experiments before he concluded that the way to perfect heart health was to become "*aerobically fit*." Dr. Cooper is considered the "*godfather of aerobics*." Yet in *Fit Magazine 2000*, Dr. Cooper has said that he has since changed his mind about running. He now recommends for people to walk, *at any speed*. Dr. Cooper did not return to his laboratory to make follow up scientific research to come to this new conclusion. What made Dr. Cooper change his mind about running? It was *anecdotal* information that made him change. According to *Fit Magazine 2000*, Dr. Cooper continued to receive phone calls from "*distraught widows*" whose husbands had suffered heart attacks and died while running. A phone call is not science or another statistic—it is personal experience or "anecdotal" information.

There is a magical perception that scientific numbers are always correct. Gathering and flaunting statistics have become the modern method of storytelling. Most assume that if it is scientific then it must be true. Statistics are often used like a smokescreen to bolster a weak or non-existent claim and hope that no one will question where the numbers came from. Throwing out a flurry of numbers is like trying to disguise a secret; most people will seldom question where those numbers came from and who might be benefitting from them. Some of the most overused and under examined phrases in our culture are "research shows" and "clinically tested." It is within this framework that numbers are thrown out, often telling an accurate story and at other times selling lies to us.

There are many examples of the untruth of numbers. From sports to science, marketing to public policies, numbers and statistics are the ink and paper that we often use to tell our modern stories. How many of those stories based on numbers are actually true? The following lists many of these mathematical lies and manipulations that often go unexamined.

This next example of the numbers game comes to us by way of the incestuous relationship between the FDA (Food and Drug Administration) and the processed food industry. Several years ago a campaign was undertaken that created laws to label the ingredients that come in processed foods. However, a deal was made "*with the devil*" and those food labels became almost worthless. For instance, a food manufacturer can claim that his product has "*zero*" transfat contained within the package if the transfat is less than 0.5 grams "*per serving*." A transfat is a mostly man-made hydrogen-injected oil like soy oil, vegetable shortening or margarine and is considered by most to be an unhealthy product.

Thus, a food producer will lower the serving size to make this numbers game work more effectively in his favor. A small bag of potato chips might contain several servings of chips in the bag, all of which might be produced using transfats. However, since each serving size has been reduced to a handful of chips, the food producer is allowed to label his product as containing "*zero*" transfats. So much for the fuzzy math.

A soda manufacturer often uses this same numbers game to try to fool the consumer. A 12 oz. can of soda might claim on the label that it only has 50 calories *per serving*. However, the fine print might say that a serving is classified as 6 oz. Thus a 12 oz. can of this soda will contain 100 calories. Unless the consumer is wary of this numbers game, he might assume that the soda is considered one serving rather than two servings and errantly believe that he is consuming only 50 calories.

The scientific medical world is filled with numbers that manipulate the truth or outright just lie to you. Take for example the notorious cholesterol screening test. These blood tests claim to be accurate yet they could be very erroneous. Drinking alcohol, a heavy workout, taking medications or not fasting at least twelve hours before a cholesterol test can severely alter the results. "*False positives*" are very common when it comes to cholesterol screening. Infections, kidney disease, leaky gut, low thyroid output and a host of other maladies can severely distort the actual cholesterol count in your body as well. In some cases, the instrumentation to test cholesterol is actually faulty, (this according to *Healthy.net*). As you can see, cholesterol numbers fluctuate on a daily basis and one might wonder if anyone ever truly receives an accurate cholesterol number to begin with?

Cholesterol lowering drugs also play the fuzzy math game. A popular cholesterol drug manufacturer conducted an experiment in hopes of validating the claim that its drug was effective in lowering cholesterol numbers. Researchers gathered one group of one-hundred participants, (the study group) and gave them the cholesterol lowering drug. The second group of one-hundred participants received a placebo or sugar pill. Out of the study group one person suffered a heart attack. From the placebo group two people experienced heart attacks. The researchers used a fancy way to calibrate the results. They utilized the "*relative method*," comparing the 2% heart attack ratio from the placebo group with the 1% heart attack ratio from the study group. Researchers came to the conclusion that their cholesterol lowering drug *proved* that it had reduced the risk of heart attacks by 50%.

Math can be such a manipulative game that is played out. A more accurate method of accounting is to use the "*absolute method*" where you compare the 2% heart attack ratio of the one-hundred original placebo participants with the 1% heart attack ratio of one-hundred in the study group. What you have left is the notion that the cholesterol lowering drug had a 1% effectiveness rate. For every one-hundred people taking the drug only one person might receive any benefit. However, the FDA approved these creative evaluations and you will often see cholesterol lowering drugs marketed in a manner that claim to be effective in reducing the risk of heart attack by 50% or more. How does one go from a failed experiment to a huge success?—fuzzy accounting.

It would appear that FDA officials need to brush up on their math skills. Another example of how scientific numbers do not compute comes to us by way of Cheerios and the oats campaign. General Mills, the manufacturer of Cheerios breakfast cereal, conducted clinical studies and concluded that by eating up to three cups of Cheerios per day along with one and a half cups of non-fat milk one could reduce his total cholesterol number anywhere from 4-10% in six weeks. The average person lost only 7 points off their LDL (low density lipoproteins). (1)

What the study does not tell you is that as you are eating your bowls of Cheerios each day what is it that you are *not eating*? According to General Mills own press release, study participants were placed on a special diet, and in the words of General Mills a "reduced calorie diet low in fat" was used. (2) As your breakfast cereal is filling you up you might not be eating the bacon and eggs, biscuits and sausage, ham and butter—all foods that are laden with cholesterol. Interestingly, this information was not included in the study. I wonder how much study participant's cholesterol might have dropped just by changing one's diet without the Cheerios? Lies by omission are common when statistics

are used to tell stories. Only in America can one be allowed to make health claims about a highly processed breakfast cereal.

Statistics and "clinical studies" lie all the time. Failed experiments are never published and these amount to far more than the ones that are published. Just because an experiment is conducted that yields statistics does not mean that any of it is true. Numbers do lie. Statistics can be as smooth talking as a used car salesman trying to sell you a car that is worthless.

Following along the numbers game found in the Western medical world, many people are given the diagnosis of *osteoporosis* or *osteopenia* only because the bone density numbers have been manipulated. Bone density machines are calibrated to the standard of a young, athletic female around college age when bone density results would be ideal. Everyone else is measured against this standard and most cannot measure up to this ideal body. Hence, many people (especially women) are prescribed with osteoporosis drugs only because the calibration machines have been set so high that it is almost impossible to pass the test. In addition, a bone density screener might only measure one part of the body, (like a hip or wrist), and assume that whatever readings are found in these two locations correspond to the rest of the body. This is not always the case. You might have a pocket of low bone formation in one area while the rest of the body is normal.

After one is prescribed with *osteoporosis* drugs the numbers lie continues. Medical doctors will report that the drugs have been successful in stopping the loss of bone. That is true. What you are not told is that your bones are weaker and more brittle than ever before. Bone is living tissue that requires osteoblast cells to build new bone and osteoclast cells to remove old dead bone. Osteoporosis drugs kill both osteoblasts and osteoclasts. Hence, while you have stopped the removal of old dead bone cells you are not building any new bone as well. The medical world seems to think that just by recording the numbers that demonstrate that you are no longer losing bone cells that your health journey using drugs is a success. How about those numbers again?

A medical breast x-ray could be as misleading as any number. Just as there are many fluctuations in cholesterol test numbers, there are also many false positives when it comes to breast x-ray examinations. Nearly 12% of the time false positives show up on mammograms, (this according to the BreastCancer.org). Imagine being told that you have breast cancer and find out later that it was just a misreading of the mammogram. Just because it is a scientific test producing a quantifiable number does not necessarily mean what most people expect it to mean.

The cancer industry is notorious for dancing around numbers. We often hear that the orthodox chemotherapy and radiation treatments for cancer are winning the "*War on Cancer*." There could be nothing further from the truth. Despite over forty-years of the declared *War on Cancer* and billions of dollars spent on scientific research, the numbers are still about the same. Over five-hundred and seventy thousand Americans continue to die from cancer each year. Many more die from chemotherapy and radiation poisoning but these numbers are never included in official cancer deaths.

According to Ty Bollinger in *Cancer: Step Outside the Box*, the cancer industry often includes as many of the easiest cancers to treat in their accounting (like non-malignant melanomas), yet often leaves out the most difficult cancers to treat with chemotherapy and radiation (like lung and pancreatic cancer). If you leave numbers out

your total is sure to look better. Here is another example of a numbers lie by omission. Despite this over-zealous claim that the cancer war is being won by the cancer industry, about thirty-five percent of people in the United States who receive chemotherapy and radiation will not live past five years after the treatment. Others will die soon after the five year mark or develop a new cancer years later. Those people were considered cured though.

The way the cancer industry measures success is like a high school football coach applauding his team because they are only losing by forty points. Extending the life of a cancer patient for a few weeks or months is considered success.

Numbers can also lie just by re-categorizing them. For instance, a common practice in the drug industry is to claim how much money is being spent on research. The drug industry often claims that the reason drugs are so expensive is because a vast amount of their budgets is devoted to research for new drugs. According to Marcia Angell in her book *The Truth About the Drug Companies*, the former editor for the *New England Journal of Medicine* states that the way numbers are reported is often misleading. According to Ms. Angell,

*"... the pharmaceutical industry is not especially innovative. As hard as it is to believe, only a handful of truly important drugs have been brought to market in recent years, and they were mostly based on taxpayer-funded research at academic institutions, small biotechnology companies, or the National Institutes of Health (NIH)."*

While claiming to have to spend vast amounts of dollars on research, the numbers lie continues. Fuzzy accounting tells the real story. Profits and marketing account for most of a drug company's budget. According to Ms. Angell,

*"But while the rhetoric is stirring, it has very little to do with reality. First, research and development (R&D) is a relatively small part of the budgets of the big drug companies—dwarfed by their vast expenditures on marketing and administration, and smaller even than profits. In fact, year after year, for over two decades, this industry has been far and away the most profitable in the United States."*

Universities and The National Institute of Health (NIH) are responsible for developing a large amount of new drugs and then go on to allow the drug companies to gain vast profits from them. Drug industry research money is dwarfed by the huge expenditure on marketing of drugs. We see this every day in radio, television, internet and print ads.

In the sporting world we often tell stories using numbers and statistics. How many of these numbers are actually accurate? For instance, in a baseball game the umpire is responsible for calling balls and strikes. Baseball players will tell you that each umpire has a subjective opinion of the strike zone. Is he calling the strike zone tight or loose? We often think of the "strike zone" as an absolute geographical square floating in perfect GPS space. A 2 ball-2 strike count for one umpire will be a 3-1 count for another. A "walk" on balls could turn into a "strike out" if the player is not aware of how the umpire is calling the game.

In the baseball field, rarely are any two stadiums the same. One professional stadium will have a left field wall that is thirty feet (or more) shorter than at another stadium. If you were considered a home run hitter your home run numbers will be greater if you play in the stadium with the shorter outfield walls. The difference between a "home run" and an "out" might only be a few inches or feet. A baseball stadium that is enclosed

will have a greater chance for a player to hit a home run as he is not fighting the natural elements like wind, sun in his eyes and rainy weather. Also, a hitter who plays in a stadium at a high altitude will have a greater chance of hitting home runs as the ball will travel farther in thinner air at a higher elevation than at sea level. At the end of the year, the size of the stadium or its location is not often included when accounting for statistics.

A running back on a football team might be the greatest running back in the history of the game but if he does not have a decent group of linemen in front of him clearing away the opponents then his statistics might be greatly reduced. If this same running back plays on a team with the best passing quarterback to ever play the game his statistics might also be reduced because he is relegated to block more than run for yardage. Sports statistics are not always what you think they are. Having talent is one element of accumulating numbers; being on the right team in the right situation also plays a key component.

There is no greater example of how numbers lie than the "steroid era" in baseball. Major league baseball went through an era where it seems that baseballs were miraculously "jumping out of the park." We later learned that some of those who were hitting record home runs and garnishing unworldly statistics were also "suspected" of taking "performance enhancing drugs" (PED's). These drugs enabled some players to perform at a higher level than normal while "padding" their statistics. More home runs does not necessarily mean a better hitter. A few players amplified their athletic talent with illegal drugs to create numbers in the stat columns that surpassed all records.

In track and field numbers can be aided or hampered by wind events. Some events (60 meters, 100 meters, 200 meters and 110 meter hurdles) have wind rules that state if the wind is blowing more than 6.5 miles per hour a record time or jump (triple jump and long jump) will be disqualified. For instance, in 2009 the 100 meter track world record was broken by Usain Bolt in a time of 9.72 seconds. He had a tailwind of about 5.5 miles per hour, just barely within the legal limit. Might not the world record have been broken that day without the tailwind? Other track and field records are disqualified because the wind speed is above the allowed 6.5 miles per hour, even if just slightly above. In the record books we see the statistics and record holders but seldom do we remember what the weather conditions were that day.

Speaking of weather, how often have you heard that there is a percentage chance that it will rain in your area on a given day? You might hear the weatherman report that there is an 80% chance of rain coming your way. You prepare all day long for this weather event and then nothing happens. The *U.S. Weather Forecasting Service* has a formula that they use to calculate the chance of rainfall in a given area. It is called the *PoP system—Probability of Precipitation*.

This formula tries to guess at which areas are likely to receive rain and what percentage of those areas will actually receive rainfall. For instance, if the weatherman says that there is a 40% chance of rain in an area in a certain time frame that means he is 50% confident that 80% of an area will receive rain. You might be in that area that receives a deluge of water making your rain chance 100% likely or you might find yourself in the 20% of an area that receives no rain at all making your prediction at 0%. While weather forecasting is considered a "science" using numbers and statistics, there is a whole lot of guessing that goes on as well. A seasoned farmer often has a better chance

of predicting rain by smelling the air and observing the clouds than a high-tech weatherman hunkered down in a television studio void of windows.

Rainfall totals might vary drastically from city block to city block. You might receive 2 inches of rainfall on your home while two blocks over there might be only 1/4 inch of rain in the same time period. The official government statistics will measure and record from where the rain collection station is located. Your rain totals may vary drastically from what is officially noted. The accuracy of rain gauges also comes into question. Rain gauges measure rain that falls relatively straight down into a cylinder. A strong storm blowing sideways may not be measured by the rain gauge as the rainfall will not make it into the measuring device. The official rainfall total that you hear may be completely different than what is actually occurring in your immediate area.

Numbers are also misleading when accounting for the divorce rate in the country. A familiar phrase heard is that America has a divorce rate of nearly 50%. The most common belief that most people hold about this statistic is that nearly half of the people getting married will end up divorced. What most people do not take into account is that many people get married and divorced more than once. A person who has multiple marriages and divorces will tend to make the divorce rate higher than it actually is.

According to Divorcerate.org, a first marriage has a divorce rate of only 41%. When you account for the divorce rate of second marriages (60%) and third marriages (71%) you arrive at the fifty percent divorce rate. Another way to view statistics is to say that 59% of first marriages will remain intact.

Another statistical numbers manipulation comes to us when we attempt to calculate life expectancy rates. It is commonly proclaimed that the United States has a much longer life expectancy rate than one-hundred years ago due to more drugs and a better health care system. This statistic can be extremely misleading.

For instance, in 1901 the life expectancy at birth in the United States was listed at forty-nine years of age. Today the number we often hear is that the current life expectancy is about seventy-seven years. Here is the numbers game being played. In 1901, many infants and children died of infectious diseases before they even reached the age of ten. The infant mortality rate in 1937 was about 8.5 % and in 2011 it was less than one percent. If you made it through childhood it was common to live well into an advanced age. It was the elimination of most infectious diseases (small pox, influenza, typhoid, etc.) which allowed most children to live into their adult years. When you eliminate the large number of children who died at birth and early on from the statistics, the numbers certainly will look different. In actuality, we only live about six years longer than we did one-hundred years ago. (3) Life expectancy has increased slightly due to better hygiene, cleaner water and better sanitation methods.

One needs to go no farther than the car lot to be fooled by number after number. When you look at the gas mileage sticker required by law on the automobile that you are thinking of buying, you might be amazed to learn that the number on the sticker might actually be quite different in real world situations. Mileage performance numbers come from well-planned lab tests in controlled environments. There is no uphill or downhill, wind or rain, stop and go traffic, dusty roads or clogged fuel injectors. Engines are finely tuned, tires are properly inflated and the best gasoline is used. "*Actual mileage may vary*" is seen in fine print at the bottom of the sticker. Why do you think this is? It is unusual for anyone in the real world to get the same mileage listed on the window sticker.

When you see the price tag of new cars you might be led to believe that number to be the actual price of the car. This number could be very different than the actual cost of the car. Many add-ons include sales tax (city, state, local), registration fee, convenience fee, emission certification fee, insurance, title documentation fee, dealer prep (looking under the hood, washing the car, inflating the tires), delivery charge (cost of bringing the car from the factory to the dealership), and then any extra dealer installed equipment.

If you finance a car it could jump the total number up even more. Premium interest rates are advertised in fine print for "*well-qualified customers*" only. By some standards, a well-qualified customer is one who is able to submit a 10% down payment and have a credit score above 750. (According to *creditscoring.com*, the average credit score in the United States is 678). Most people would not satisfy the requirements to be considered "*well-qualified*" and will have to pay a higher interest rate.

When it comes to cell phones, you might have fallen for some creative advertising. A new state of the art 4-G smart phone might be advertised as delivering twenty-one hours of battery life. When you purchase this phone you later discover that in a "*real world*" environment you are only getting ten hours of battery life before a charge is required. Cell phones (like cars) are tested in ideal laboratory environments where the phone is not required to expend much energy. Your normal day however, might consist of internet research on your phone, downloading apps and music, taking pictures, playing video games, sending large data files and watching videos. The advertised numbers only add up if you are living in a lab environment and never actually use the phone.

There is no greater numbers irony than the advertised cost of an airline ticket and the true cost of traveling. There are so many hidden costs associated with the price of a plane ticket that truth seems to be far from a possibility here. First off there is the cost of the ticket and then any taxes on that ticket. A 7.5% federal tax is added to each airline ticket. If you are flying from the continental United States to Alaska or Hawaii you will also be taxed an additional \$7.50. There is the Passenger Flight Segment Tax of \$3.40 every time you takeoff and land. If you are traveling outside of the United States you are taxed an additional \$15.10 every time you leave the country or re-enter. There is an airport fee (called Passenger Facility Charge) as well as a TSA (Transportation Security Administration) security fee.

If you want a meal on the plane, desire to watch a movie or have a drink besides water or a soda, there is a fee for that. Watch out if you need to cancel or rebook a flight because there is a fee for that as well. If you have to send a minor on the plane without an adult you will also be charged a fee.

Next you will have to pay a fee if you wish to check luggage in. For most airlines there are no free one pieces of luggage anymore. All checked luggage on most carriers requires a fee. If the bag is overweight (usually more than \$50 lbs.) there is another fee for that. If the bag is oversized there is a fee. Some airlines even charge a fee to speak with a real person on the phone as opposed to purchasing a ticket on the internet. When shopping for airline tickets the number you are quoted is never the same as the actual cost of flying. Some estimates conclude that when you account for all the taxes and fees that the actual cost of an airline ticket is between twenty and fifty percent higher than what the face value of the ticket is.

We are often bedazzled when we hear the phrase "number one rated" or "number one best." Who is doing the rating? Just look at one particular segment—The Academy

Awards—to discover what a particular voting group might consist of. *The Los Angeles Times* newspaper revealed the makeup of the *Academy Awards'* nearly six-thousand member voting group;

*"A Los Angeles Times study found that academy voters are markedly less diverse than the movie going public, and even more monolithic than many in the film industry may suspect. Oscar voters are nearly 94% Caucasian and 77% male, The Times found. Blacks are about 2% of the academy, and Latinos are less than 2%."*

Might a more diverse group choose a different number one rated movie. Ratings are subjective and often biased opinions of individuals who often think and act alike. A great movie might be passed by because it does not fit into the voter's "perception" of "greatness."

Class room text books frequently will tell you numbers lies. For instance, most grade school science books calculate that the earth is ninety-three million miles away from the sun. This figure does not take into account that the earth travels in an elliptical orbit and sometimes it is ninety-three million miles away from the sun, sometimes it is ninety-one million miles away from the sun and other times it is ninety-four million miles from the sun. Ninety-three millions miles is not an exact number but an average.

A lie detector is often regarded as a machine that has the absolute power to detect all lies and can claim that a person is a "truth-teller" or a "liar." A lie detector might be incorrect from 10-30 % of the time. According to a brief written by the American Civil Liberties Union (ACLU) in 1996;

*"Despite the claims of 'lie detector' examiners, there is no machine that can detect lies with any degree of accuracy. The 'lie detector' does not measure truth-telling; it measures changes in blood pressure, breath rate and perspiration rate, but those physiological changes can be triggered by a wide range of emotions such as anger, sadness, embarrassment and fear."*

From the accuracy of lie detector tests to the amount of fine print and hidden charges on your telephone bill, numbers are slippery and slimy and are to be trusted as much as a pick-pocket. When you hear that "four out of five dentists" recommend a certain brand of sugar-free chewing gum do you really believe that the 155,700 registered dentists in the United States all were polled about this question or a slick advertising company created a fanciful jingle?

From fuzzy accounting on tax returns to scientific political polls, if one is to believe in numbers you must also question where the numbers came from and who is benefiting by the numbers story being told. Numbers by themselves carry little weight; what is behind the numbers makes all the difference. Just because a statistic shows up in a published manual or on the internet does not make it true.

The hair on the back of your head should stand at attention when you hear any of the following words or phrases:

*It is a fact*  
*Scientific studies clearly show*

*Clinically tested*  
*Scientifically verified*  
*Numbers don't lie*  
*You can't argue with math*  
*Rated number one*  
*Science doesn't lie*  
*It is only anecdotal evidence and not true science*  
*If it is an academic study then it must be true*

In the days of Mark Twain most people lived on small farms and had a rural existence. They followed natural wisdom and numbers and statistics were just beginning to show up as ways to tell stories. Today numbers are second nature to us and we are bombarded with statistics every day without ever questioning where they came from.

The stories of our lives are being told by our "stat" sheets and calculators. Just because a number comes from an official government agency or an authoritative sounding institution does not necessarily mean that it is true. Numbers do lie more often than you might imagine. With today's heavy reliance on numbers and statistics to tell stories, what do you imagine Mark Twain might say now?

## Resources

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