

A Case of Random Lightning and Baseball

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Posted by [Nathaniel Francis](#)
13 Aug 2015 08:11 AM

Random Happenstance

August 11th 2015, was a rather ordinary day in America. But for baseball fans, it was a rare moment, a veritable case of lightning striking on a sport that is well known for deep statistical analysis. You see, on August 11th, 2015, there were 15 games played by both professional leagues. And throughout those 15 games, something completely unprecedented (and random) happened. Every home team won.

This tweet was sent out by [@ESPNStatsInfo](#) on the subject:

Now, that's **not** an important statistic for the sport. It definitely doesn't affect standings, wages, or careers in any way. It is, however, interesting. And it warrants a peek into what I call statistical lightning.

Statistical Lightning: a definition

[Statistics](#): the practice or science of collecting and analyzing numerical data in large quantities, especially for the purpose of inferring proportions in a whole from those in a

representative sample.

Lightning: the occurrence of a natural electrical discharge of very short duration and high voltage between a cloud and the ground or within a cloud, accompanied by a bright flash and typically also thunder.

These are simple enough definitions for our purposes. What they have in common is chance (or odds). Lightning, for all its virtues in the natural world, is not desirable in a human populated area. Trees fall, power lines blow up - it isn't generally a welcome thing. Statistics is the study of data and can help determine the chances/odds of such a dramatic event affecting you or I (like a lightning strike). Statistical lightning is simply an (of mine) idea that attempts to encapsulate the relationship between chance and dramatic, life changing events. If something remarkably rare and dramatic happens, that's statistical lightning.

The Lottery: Positive Statistical Lightning

The lottery is perhaps the most extreme type of gambling in existence. People invest a small portion of their money for a snowball's chance to receive back an insurmountable amount of money. This is positive statistical lightning. The chances are very lean, but the prize is seriously green (cheesy rhyme, I originally wrote "dramatic"). I'm purposefully ignoring the social impact of the lottery and the criticisms afforded it. This isn't a social piece, it's a conceptual one - most people set aside the criticisms of the lottery when they play it and focus on the statistical lightning that the lottery presents. In a moment, lightning could strike your finances in an amazingly positive way. That's why people play the lottery.

Insurance: Negative Statistical Lightning

No one wants to wake up and learn that they have a rare and horrible disease or that their home requires extensive repairs immediately or that an intoxicated driver slammed into their beautiful car in the middle of the night, completely totaling it (that actually happened to one of my bosses). These are example of negative statistical lightning. Something horrible happens out of nowhere and it just ruins your day, or your month, or your whole life. To prevent this, we've come up with a defense against these kinds of disasters. We call it insurance.

By the Numbers: Managing Statistical Lightning

Both the lottery and insurance have two things in common:

1. **High number pools.** Both depend on extremely large pools of numbers to be effective. If 5 people are playing the lottery, there isn't much investment to generate a dramatic return for the winner. If only 5 people invest in an insurance policy, it doesn't have a large collection of resources to pay out for a disaster.
2. **Dramatic effect.** Both need to have a significant and dynamic effect to have value. An insurance policy that would pay for only a quarter of your doctor bills after an accident isn't very helpful. Winning \$10 in the lottery isn't going to change anyone's life noticeably. It'll

just get them some McDonalds.

An event must have these 2 aspects (high number pool and dramatic effect) firmly in place to be regarded as statistical lightning.

Back to Baseball: Basic Statistics

This post started with a rare statistical anomaly in the world of baseball. That statistic sparked my memory of statistical lightning and will now serve to explain the numerical scope for statistical lightning events.

The closest similarity baseball ever had to the "all 15 games won by the home teams" of August 11th, 2015, according to baseball statistics experts was on May 23rd, 1914 - over a century ago!

So, what are the odds of that happening? In any singular game, the odds of the home team winning are 1 in 2. Any additional game becomes the exponent on 2. So, for 2 games, the odds are 1 in 2^2 (or 1 in 4) and for 3 games it would be 1 in 2^3 (or 1 in 8). So, for 12 the games played on May 23rd, 1914 - the odds were 1 in 2^{12} or 1 in 4,096. That's a big number. To put that back in the context of baseball, on any given day that there are 12 games being played, the odds that all 12 of those games will result in the home team winning are 1 in 4,096. This has only happened once (as far as I know).

Now, back to August 11th, 2015. There were 15 games played that day, not 12 - so the odds of all home teams winning that day was 1 in 2^{15} or 1 in 32,768. That's a ginormous number! 8 times more than the 12 game pool from 1914 ($32,768/4,096 = 8$). And that right there is the power of numbers. Increasing the chances by 3 skyrocketed the odds to over 32,000.

What this means for baseball is that every day there are 12 games played, there is a 1 in 4,096 chance that all the home teams will win. If there are 15 games played that day, then the odds of the same condition (all home teams winning) is a whopping 1 in 32,768. These numbers reset every day. They do not go up or down depending on yesterday's results. They do not waver. This is the nature of single instance statistics.

Not Lightning

I hope you noticed as we traveled through this post together, that the concept of statistical lightning does not apply to the baseball instances. I said at the top that the rare baseball statistic of August 11th, 2015 inspired me to think about statistical lightning, but I did not say that it applied to the instances. The numbers are there, this was a truly rare event. But there was no dramatic effect. In fact, outside of small comments or posts like this, there's no purpose to this rare event. For an event to fall under the category of "statistical lightning", it must be **both** rare and have a dramatic effect. To the world of baseball, all home teams winning in the same day was the equivalent of my 4 year-old flipping 15 coins in a line and all of them landing on heads. Nobody really cares. What we care about are those events that do have a dramatic effect in our lives. This is why institutions like the lottery and insurance have the place that they do.

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