Leading Off

What Conditions Are Conducive To Pitching A Perfect Game?

By Erica Block

Perfect games are rare. There have been only 23 of them in modern MLB history, and just 21 have been thrown since the beginning of the 20th century. Perfect games fascinate me because their occurrence seems impossible to predict, and the characteristics of pitchers who throw perfect games don't appear to follow an obvious pattern.

For instance, it wouldn't be surprising if perfect game pitchers tended to be aces. Some were dominant pitchers of their era, but not all of them. Pitchers who've been inducted into the Hall of Fame (e.g. Sandy Koufax) and good-but-not-great pitchers (e.g. Kenny Rogers, Don Larsen) alike have achieved the feat. And pitchers don't always throw them at the peak of their careers. Both veterans and relatively inexperienced pitchers have thrown perfect games; pitchers who've thrown them don't fall neatly into a specific age range.

To the observer, perfect games occur at random (in the mathematical sense of the word). Some of the most talented pitchers in baseball history have never thrown one, yet some solidly average journeymen have. Randy Johnson's gem was the 463rd MLB game in which he pitched. On the other end of the spectrum, Dallas Braden's perfect game was only the 18th win of his career.

From a statistical perspective, perfect games comprise an extremely small sample size. Analyzing a set with just 23 elements in it isn't likely to yield any profound discoveries. But it's worthwhile to know if perfect games share any common attributes with one another. Are there any circumstances or qualities that make it more likely for a pitcher to throw one? Although a number of statisticians and fans have explored ways to calculate the odds of throwing a perfect game, I've yet to find a thorough analysis offering insight into the qualities shared by perfect games and the pitchers who throw them.

How many perfect games unfolded at a pitcher's home stadium and how many played out on the road? Was the stadium packed, or was the perfect game sparsely attended? What percentage of perfect games were thrown by left-handed pitchers and what percentage were thrown by righties? Because of these questions, I examined the categorical (non-statistical) data surrounding the 21 perfect games that have been thrown in Major League Baseball since 1900. Rather than look at traditional pitching statistics like WHIP or ERA, I explored more dynamic, qualitative questions like the ones above. Let's take a closer look at what I found.

RHP To LHP Ratio

Of the 21 pitchers who have pitched a perfect game since 1900, two-thirds of the group are right-handed and one-third is left-handed. That 33.3 percent of perfect pitchers are southpaws means lefties are slightly overrepresented among perfect game pitchers. Twenty-eight percent of all major league pitchers are left-handed, according to data from baseball-reference.com.
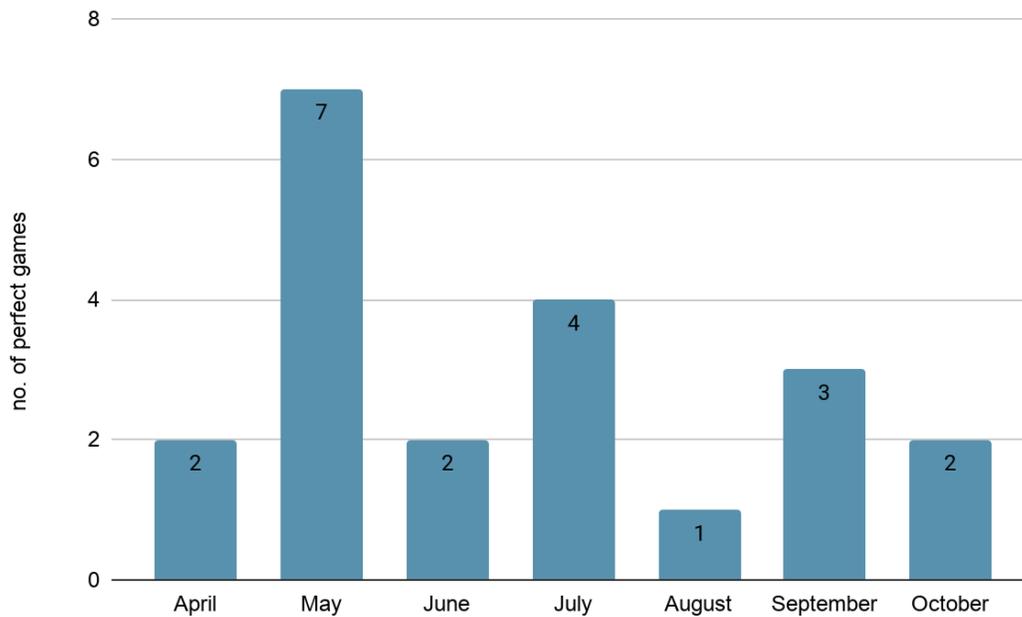
Age Distribution

Average age to throw a perfect game	30.143 years old
Median age to throw a perfect game	29 years old

The youngest person to pitch a perfect game was Catfish Hunter, who was 22 years old at the time; the oldest is Randy Johnson, who pitched one when he was 40. The ages of perfect pitchers are pretty evenly distributed. Twenty-nine is the most common age to throw a perfect game. It's important to note that inferences made with these numbers will have a large margin of error, due to the small sample size.

Time Of Year

May is the most common month for perfect games to occur. August is the least common month to pitch a perfect game. Here is the distribution by month:

It's also worth noting that perfect games have become more frequent as time goes on.

Day Vs. Night

Thirteen perfect games have occurred during day games and eight have occurred in the evening. However, these numbers are skewed toward day games, as night games under the lights wouldn't become a regular occurrence until the 1930s. The first-ever MLB night game was played in 1935. When games before 1935 are eliminated from the day game vs. night game count, the spread is more evenly balanced. Ten perfect games have been pitched in the afternoon, versus eight pitched at night.

Miscellaneous Observations

- Ted Barrett has worked two perfect games as the home plate umpire. He is the only umpire who has officiated more than one perfect game.
- Ron Hassey caught two perfect games and is the only catcher who has caught more than a single one.
- The Tampa Bay Rays have had the most perfect games thrown *against* them. They've been on the losing side of perfect games three different times.

- The New York Yankees have thrown more perfect games (3) than any other team.

Obviously, the utility of analyzing perfect games from a categorical angle is somewhat limited. Sabermetric analyses of baseball statistics can convey much more information--and more granular information--about player performance and value. Nonetheless, scrutinizing a baseball game's unique circumstances in a more qualitative way allows people to appreciate the little differences, overlaps, nuances, and commonalities in baseball history.

Picturing The Data

Adonis Salazar, a data scientist based in Dallas, has created open source interactive visualizations pertaining to perfect games that are really cool. Check them out below or access them on his blog.