

Old Age and Treachery vs. Youth and Skill: An Analysis of the Mean Age of World Series Teams

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ABSTRACT

Every October, baseball fans discuss and debate the ages of World Series opponents. Such a comparison limits itself to the two teams competing for the Commissioner's Trophy. Does the older of the two teams win more often than not? If so, how does the age of that team compare to the rest of the league? Perhaps the older of the two teams won the World Series but was still younger than the league average. Furthermore, there are two distinct types of players in baseball. Batters score runs. Pitchers prevent the other team from scoring runs. In 2016, the mean age of the World Series Champion Chicago Cubs' pitchers was 31.1 years and older than the mean age of the Cleveland Indians' pitchers at 25.3 years. The reverse was true for batters. The mean age of Cubs' batters was 27.2 years versus the Cleveland Indians' batters at 29 years. In this paper we examine how player's ages have changed over time, if there exist differences in ages between pitchers and batters and how ages of World Series teams compare against league averages.

INTRODUCTION

"As springtime rolls around a young man's fancy lightly turns to thoughts of"... baseball. As a not-so-young-anymore, young man, I have seen my favorite rookies become hall-of-famers. Accordingly, my thoughts turn to the ages of professional baseball players. Every October, fans will discuss the ages of World Series opponents. In "Does Experience Really Rule Over Youth in the World Series", Jason Catania analyzed the average player age for both teams in the World Series for the ten-year period from 2004 to 2013. The World Series winner was chronologically older on average 80% of the time. However, this comparison was only for the two teams competing for the Commissioner's Trophy. Perhaps the older team wins more often than not. How does the age of that team compare to the rest of the league, and more importantly, how should General Managers build teams with respect to their average age?

ABOUT THE DATA

The website, <http://www.baseball-reference.com/>, provides a wealth of data going back to the Major League Baseball's inception in 1876, its first World Series in 1903 and much, much more. Given all the changes in the League since 1876, I provide two sets of results. One set will cover all years of baseball since 1876. The other will cover all years from 1977 (the first year of free agents playing after the 1976 ruling) to the present. I've designated 1977 as a starting point for this analysis since the increased dollars and freedom from Free Agency might be a strong incentive to extend one's career. Due to the player's strike there was no World Series in 1994.

Observations for teams are for active franchises. Observations for the Arizona Diamondbacks go back to 1998. Observations for the Atlanta Braves go back to 1876 and include the Milwaukee Braves, Boston Braves, Boston Bees, Boston Rustlers, Boston Doves, Boston Beaneaters and Boston Red Stockings. Only data from active franchises is included. No representation from the Cleveland Infants, the Kansas City Cowboys, the Pittsburgh Burghers or the St. Paul Apostles exists. The last season played by a non-active franchise was 1915. The total number of teams competing in MLB is provided in Table 1.

1998-Present: 30 teams
1993-1997: 28 teams
1977-1992: 26 teams
1969-1976: 24 teams
1962-1968: 20 teams
1903-1961: 16 teams
1901-1902: 15 teams
1884-1900: 8 teams
1883: 7 teams, 1882: 5 teams
1876-1881: 2 teams (Atlanta Braves, Boston Red Sox)

Table 1: Number of Teams in MLB by Season

ALL TIME MEAN AGE OF BATTERS AND PITCHERS BY TEAM AND SEASON

For each season, we compute the mean age for batters and pitchers. As shown in Figures 1 and 2, these means do not follow a normal distribution.

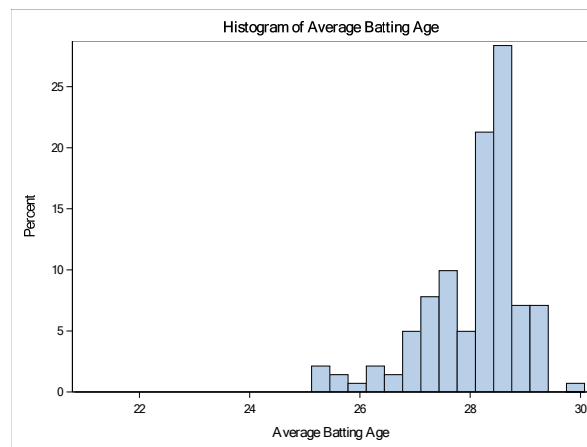


Figure 1: Histogram of MLB Average Batting Age

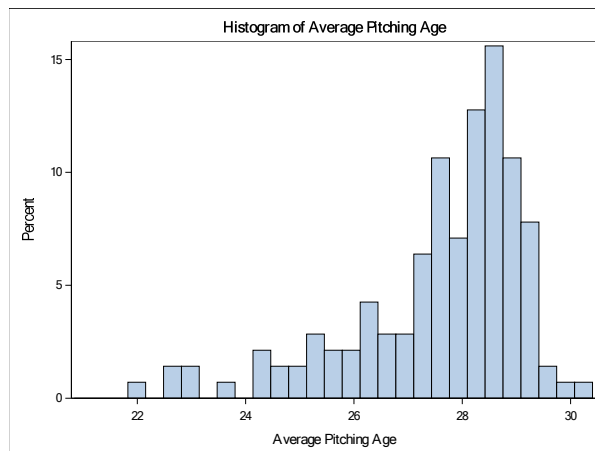


Figure 2: Histogram of MLB Average Pitching Age

A solid, positive correlation (Pearson Correlation Coefficient $r = 0.743$) exists between mean batting age and mean pitching age across seasons since 1876. It is easy to see from Figure 3 that in the early days of baseball, there was a distinct difference in the average age of batters and pitchers. The average age of pitchers was always less (except for 1882) than the average age of batters until 1923. As time has passed the differences in mean age of batters and pitchers have grown smaller. Considering only free agency era data, the Pearson Correlation Coefficient increases to $r = 0.869$. However, this difference has yet to statistically settle down to 0. Using only free agency years, the 99% confidence interval for the difference in the two means runs from 0.1289 to 0.2991 as seen in Figure 4. Running the two-sided hypothesis test that the difference equals 0 at 99% confidence yields a p-value < 0.0001 and corresponding t-score of 6.81. While the average age difference may seem very small, it is still a statistically significant difference. This is due to the very compact time-span of ages where one can play professional baseball.

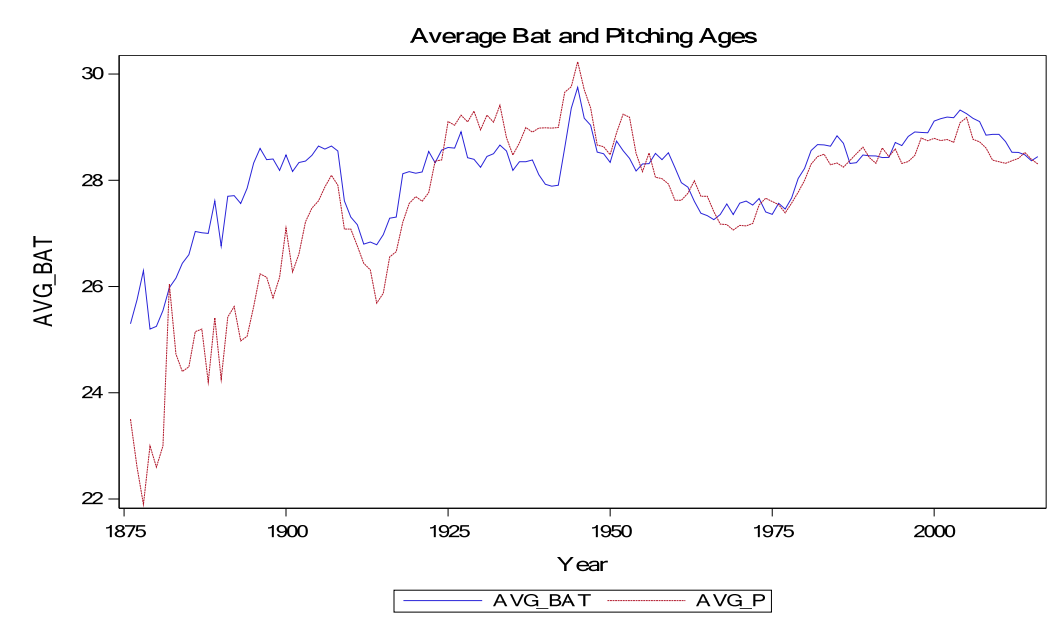


Figure 3: A timeline of MLB Average Batting and Pitching Ages

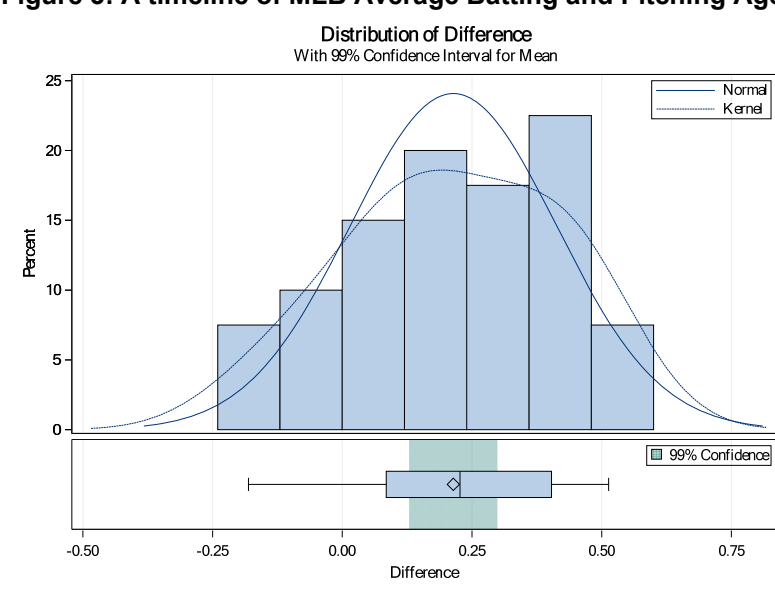


Figure 4: Free Agency Difference of Average Batting and Pitching Ages

MEAN AGE OF BATTERS AND PITCHERS OF WORLD SERIES TEAMS COMPARED TO THE LEAGUE

In "Does Experience Really Rule Over Youth in the World Series", Jason Catania analyzed the average player age for both teams in the World Series for the ten-year period from 2004 to 2013. In Catania's analysis the World Series winner was chronologically older 80% of the time.

First, let us extend Catania's analysis to include a distinction between batters and pitchers. For the 39 World Series Champions since free agency;

17 were older in both batting and pitching;
7 were older in pitching but not batting;
4 were older in batting but not pitching;
11 were younger in both batting and pitching.

How do these World Series winners' average ages compare to the rest of the league? As shown in Figures 5 and 6, the average age of World Series winners is frequently not only above both the mean and median ages but also larger than Q_3 . However, this average age for winners is rarely an outlier.

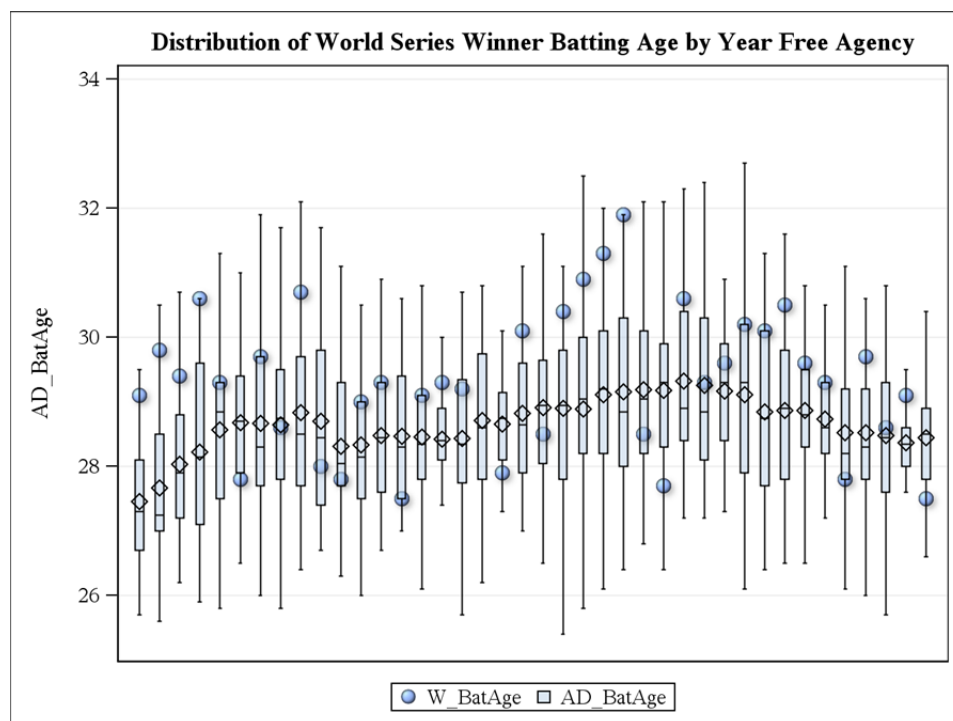


Figure 5: World Series winner average Batting Age

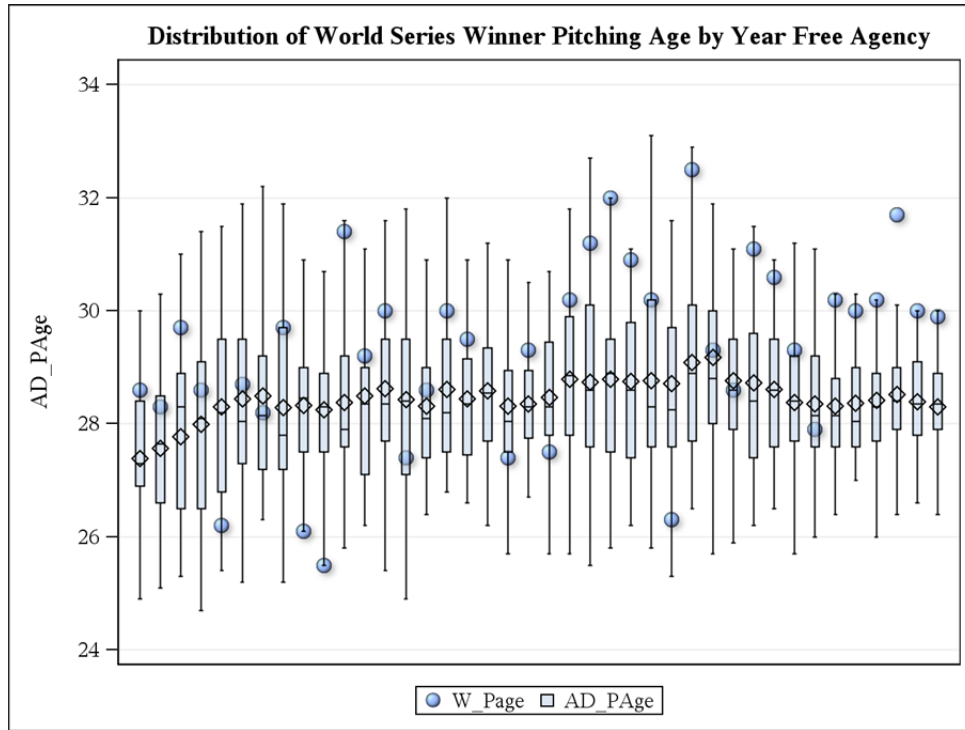


Figure 6: World Series winner average Pitching Age

For the last 39 World Series winners, their average batting age was greater than the league average on 28 occasions. For pitching, the World Series winner was older on 30 occasions. Running a one-sided hypothesis test that 50% of the World Series ages would be older for batting and pitching yielded the following results.

$p=50\%$		
	z-score	p-value
Batting Age	-2.53	0.0057
Pitching Age	-3.16	0.0008

In both cases we obtain a p-value less than 1% and can conclude World Series winners are older.

Just how much older are the World Series winners? When ranked oldest to youngest for the season, the World Series Champions were ranked as one of the five oldest batting teams 38.46% of the time and one of the five oldest pitching teams 46.15% of the time. The batting age for Series winners has a mean rank of 10.0256 and a median of 7. For pitching, the mean rank is 9.5 with a median of 6.

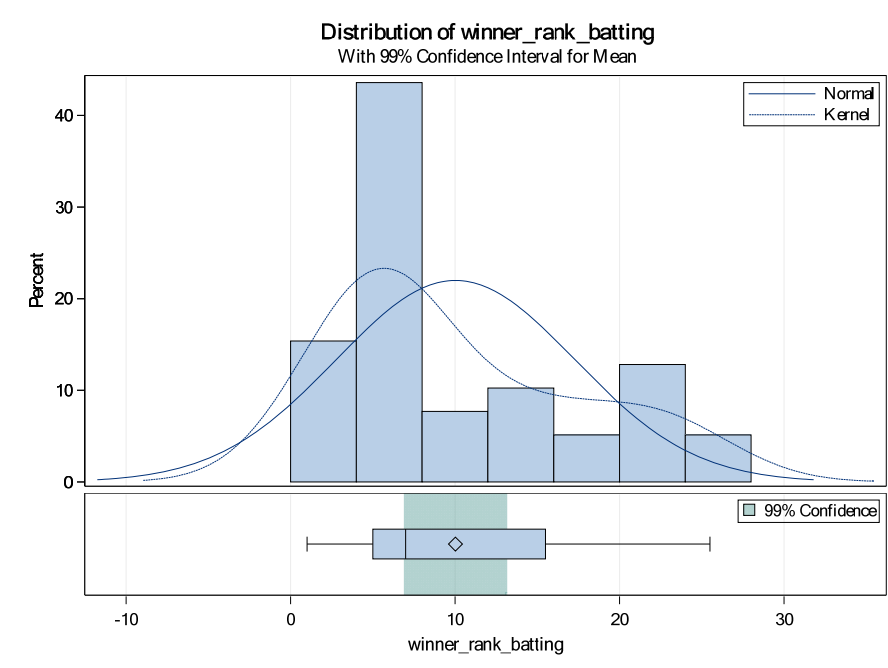


Figure 7: World Series winner Batting Age Rank

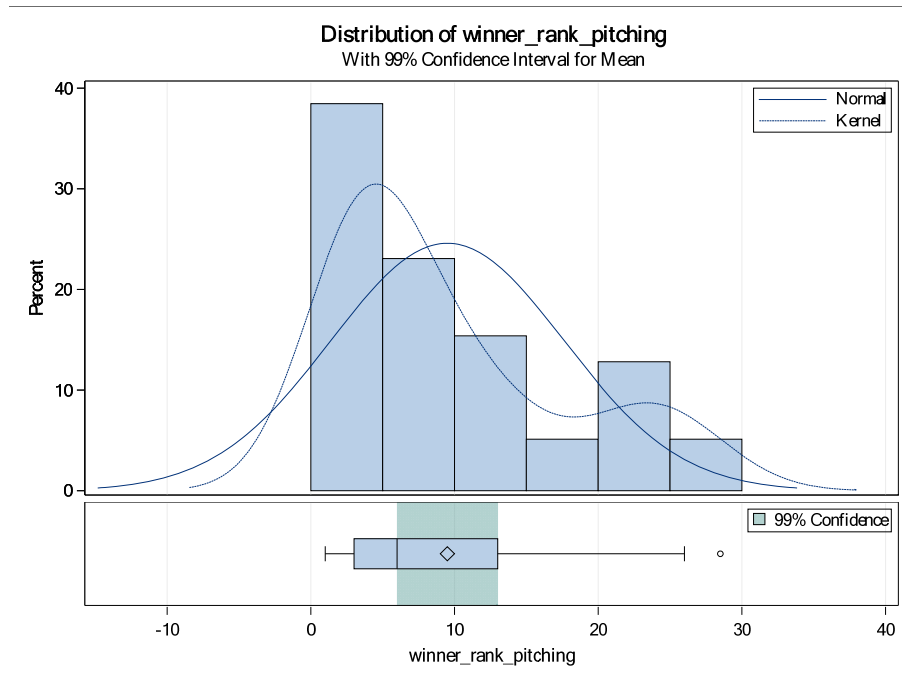


Figure 8: World Series winner Pitching Age Rank

Since 1977 the number of teams competing in MLB has grown from 26 to 28 and now to 30. Thus, 13.5, 14.5 or 15.5 is the median rank of teams depending upon the season. Rather than splitting the years into three disjoint sets, we run a one sided hypothesis test that the mean rank of World Series winners is less than 13.5 and then again at 15.5.

	Median=13.5		Median=15.5	
	<i>t</i> -score	<i>p</i> -value	<i>t</i> -score	<i>p</i> -value
Batting Rank	-2.99	0.0024	-4.71	<0.0001
Pitching Rank	-3.08	0.0019	-4.62	<0.0001

Regardless of median rank used, we acquire *p*-values less than 1% indicating that the World Series winners are older than the median age when ranked.

CONCLUSION

On average, batters tend to be older than pitchers in MLB. The average ages of these two types of players tended to rise and fall together throughout the history of MLB. Frequently the older of the two World Series opponents wins the Commissioner's Trophy. This work shows that older teams (in terms of mean age of pitchers and batters) when compared to the MLB team averages tend to win the World Series.

FUTURE WORK

Many pathways exist to build onto this work. Rather than analyze chronological age of the player, one could analyze years of experience of the player at the major league level. This paper draws a distinction between batters and pitchers. Further work could drill down into the roles of these pitchers and batters (starting pitcher vs. closer, catcher vs. outfielder, etc.). One could also examine the role of salary to afford these older, experienced players. In order to age as a player in professional sports one must be pretty good. Such player quality will come with a hefty price tag for a team. How do the ages vary on these older teams that win the World Series; are the individual player ages clustered near the mean or more dispersed? For those younger teams that beat the odds and win the World Series, which, if any, of their players stay in the league and eventually become a World Series winner for an older team? One could also examine the age of the franchise or years spent in one city for correlating factors as well.

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