**Study of Hank Aaron and Barry Bonds Homeruns**

Barry Bonds and Hank Aaron are 1st and 2nd on MLB’s All Time Homerun list. Barry Bonds has 762 home runs while Hank Aaron has 755 home runs. Below shows each player the amount home runs they hit in each season.

Barry Bonds

* 16 25 24 19 33 25 34 46 37 33 42 40 37 34 49 73 46 45 45 5 26 28

Hank Aaron

* 13 27 26 44 30 39 40 34 45 44 24 32 44 39 29 44 38 47 34 40 20 12 10

Hank Aaron is 1 year ahead of Barry Bonds. Using R code, we show the 5 Number Summary and Boxplot for both players.

Barry Bonds Hank Aaron

Minimum: 5 Minimum: 10

Q1: 25 Q1: 26.5

Median: 34 Median: 34

Q3: 45 Q3: 42

Max: 73 Max: 47

****

In the boxplot, blue graph shows Barry Bonds while red graph indicates Hank Aaron.

Another graph displays a Histogram between the two players.

****

Barry Bonds played 22 seasons of MLB while Hank Aaron played 23. Both have a mean of 34 Home Runs. Barry Bond’s standard deviation is 14.04 while Hank Aaron’s standard deviation 11.18.

1. Suppose Hank Aaron played the same number of seasons as Barry Bonds, we find a probability that determines the mean of the Home Runs that Hank Aaron hits can be greater than 36.

N = 22

Mean = 34

Standard Deviation = 11.18

Standard Error = 11.18/(22)^(1/2) = 2.38

P(X > 36) = P(Z > (36 – 34)/2.38) = P(Z > 0.84) or P(Z < -0.84) = 0.2005

1. Now we want to find the probability that the determines the mean of Home Runs Barry Bonds hit can be greater than 38 in 23 seasons.

N = 23

Mean = 24

Standard Deviation = 14.04

Standard Error = 14.04/(23)^(1/2) = 2.93

P(Y > 38) = P(Z > (38-34)/2.93) = P(Z > 1.36) or P(Z < -1.36) = 0.0869

So, in conclusion, there’s a 20% chance that Hank Aaron can average more than 36 Home Runs in the same number of seasons as Barry Bonds. But there’s an 8% chance that Barry Bonds can average more than 38 Home Runs in the same number of seasons as Hank Aaron.

Now we know Barry Bonds hit more home runs in less seasons than Hank Aaron. Looking at the histogram, Barry Bonds was far more consistent and efficient than Hank Aaron. Looking at the number of home runs in a season, Barry Bonds highest home run in a season was 73 in 2001, while Hank Aaron’s highest was 47 in 1971. Looking at this, we want to know if there’s an increase number in home runs from 1971-2001 at the 5% significance level. (Keep in mind that Barry Bonds has 762 Home Runs and Hank Aaron has 755.)

Using R:

prop.test(c(73,47),c(762,755),alternative="greater",correct=FALSE)

2-sample test for equality of proportions without continuity

correction

data: c(73, 47) out of c(762, 755)

X-squared = 5.8596, df = 1, p-value = 0.007746

alternative hypothesis: greater

95 percent confidence interval:

0.01081666 1.00000000

sample estimates:

prop 1 prop 2

0.09580052 0.06225166

We reject the null hypothesis since the test statistics (2.42) is greater than the p-value. Thus, we have proof that there’s an increase number in home runs from 1971-2001 at the 5% significance level.

For each player, we take 5 random numbers.

Barry Bonds Hank Aaron HR = Difference

25 27 -2

34 10 24

42 44 -2

37 36 1

49 38 11

We want to test for a difference between the varieties using a paired t test at α = 0.05.

Using R:

x1=c(25,34,42,37,49)

> x2=c(27,10,44,36,38)

> t.test(x1,x2,paired=T)

Paired t-test

data: x1 and x2

t = 1.2785, df = 4, p-value = 0.2702

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-7.498874 20.298874

sample estimates:

mean of the differences

6.4

Test statistics = 1.27 is less than critical value = 2.132 which means we fail to reject the null hypothesis. Therefore, we don’t have evidence if there’s a difference between the varieties.

“Career Leaders &Amp Records for Home Runs.” *Baseball*, www.baseball-reference.com/leaders/HR\_career.shtml.