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Final Paper

For my final project, I have decided to look at baseball. Specifically, how batters do in certain counts and how they use this to their advantage. Many people look at the rate players get on base and only focus on walks and hits. A batter's eye and plate discipline is a hard statistic to put in numerical form. But it is not a hard concept to think of. How often does a player see a 2-1 count vs. a 1-2 count? How does a player perform in these different counts? It is obvious that players will perform better when ahead in the count. But many players do not have good plate discipline and thus do not get ahead in the count as often. I believe that collecting data and viewing it in R will lead me to generate a list of players who are the best at forcing counts in which they are ahead and another category to show which players execute and perform well in said counts.

To start, I looked at the most valuable players from the 2015 season. How did they perform in different types of situations? First, I looked at Bryce Harper. Which counts does he perform the best in? The best count for Bryce Harper in 2015 was a 1-0 count. On those counts, Harper had a batting average of .684, which is amazing. Looking at 1-2 counts vs. 2-1 counts, Harper batted .458 on 2-1 counts and only .235 in 1-2 counts. This shows how certain counts can help a player's performance. The number I was interested in was the difference between these two numbers to show the gap of a player's performance in these counts. The difference is 223. I also

looked at how often this player sees these counts. Harper had 219 plate appearances after a 1-2 count and had 144 plate appearances after a 2-1 count. This shows that Harper saw opposing pitchers get ahead in the count much more frequently.

Something that I kept in mind when doing this project was the sample size. For Harper's one season, the sample size may have been too small. I decided to look at another player who is known for having a great eye at the plate: Joey Votto.

Joey Votto has some very interesting statistics. I looked at his statistics in 2-1 counts and in 1-2 counts to see how he performed.

2015 1-2 count batting average	2015 2-1 count batting average	2012-2015 batting average after 1-2 count (on base percentage)	2012-2015 batting average after 2-1 count (on base percentage)
.192	.459	.216 (.332)	.294 (.521)

What I concluded from this is that Votto is very good at getting himself ahead in the count. He had many at bats while ahead in the count. The statistic that sets him apart from other players is how he performs once actually ahead in the count. You can see the vast differences in his batting average in the table above when he has these different situations.

Another interesting statistic from Votto that I mentioned above is that he gets ahead in the count more often than not. The league average for pitchers getting ahead in the count is around 60%. Votto is ahead about 50% of the time. This shows that he is 10% better than the league average in forcing the count in his favor. This is why Votto is so successful and considered one of the best in the league.

The next player I looked at was take a brief look at Brett Gardner. The reason for this is because Brett Gardner is among the leagues best at not swinging at the first pitch. I was interested to see if this benefits him. Similar to Votto, Gardner is nearly 10% better than the league average in getting ahead in the count. Similarly, Gardner performs much better when ahead in the count (.231 behind, .271 ahead). This may lead to an answer to the swing or do not swing at the first pitch dilemma in baseball.

The last, and most interesting, piece of data I found was regarding batting averages while ahead in the count. I was interested to see which players performed ahead of the mean in these respects and how it would affect their future performance. I looked at the top 5 players from the 2015 season in batting average while ahead in the count.

Ender Inciarte	Bryce Harper	Salvador Perez	Dee Gordon	Francisco Lindor
.444 (.303/.219)	.417 (.330/.246)	.394 (.260/.276)	.390 (.333/.266)	.385 (.313/.318)

The interesting part of this table is that all of the players, except Salvador Perez, have seen decreases in their batting average in the 2016 season. Bryce Harper's average has decreased by about 80 points.

Next, I decided to look at players who underperformed in the 2015 season in terms of batting average while ahead in the count.

Hanley Ramirez	Chase Utley	Jordy Mercer	Joc Pederson	Zack Cozart
.222 (.249/.311)	.237 (.212/.291)	.233 (.244/.307)	.232 (.210/.254)	.217 (.258/.312)

All five of the players have seen dramatic increases in their batting average in 2016 compared to 2015. This can show how players' performance while ahead in the count can show luck and possibly predict future performance.

Overall, I learned that many statistics in baseball can be used to predict and show player performance. I also now know many different ways in which different counts can affect player performance. I look forward to seeing how accurate my future predictions can be.