

Week 14 Report

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We started off this project by going through the steps provided by John on 5-4-21; we filtered through Baseball Savant to find pitchers with the highest fastball spin rates in 2018, 2019, and 2020. Initially, we chose several statistics including strikeouts, ERA, exit velocity, barrel batted rate, and swing miss percentage, and created graphs of these statistics against the differential in spin with all of the players in our dataset. Upon seeing no correlation of these statistics and the differential, we picked different statistics. We found 7 pitchers below the top 50 of this category as instructed. Then, we picked all starting pitchers to account for counting statistical discrepancies. The players we utilized for our analysis were:

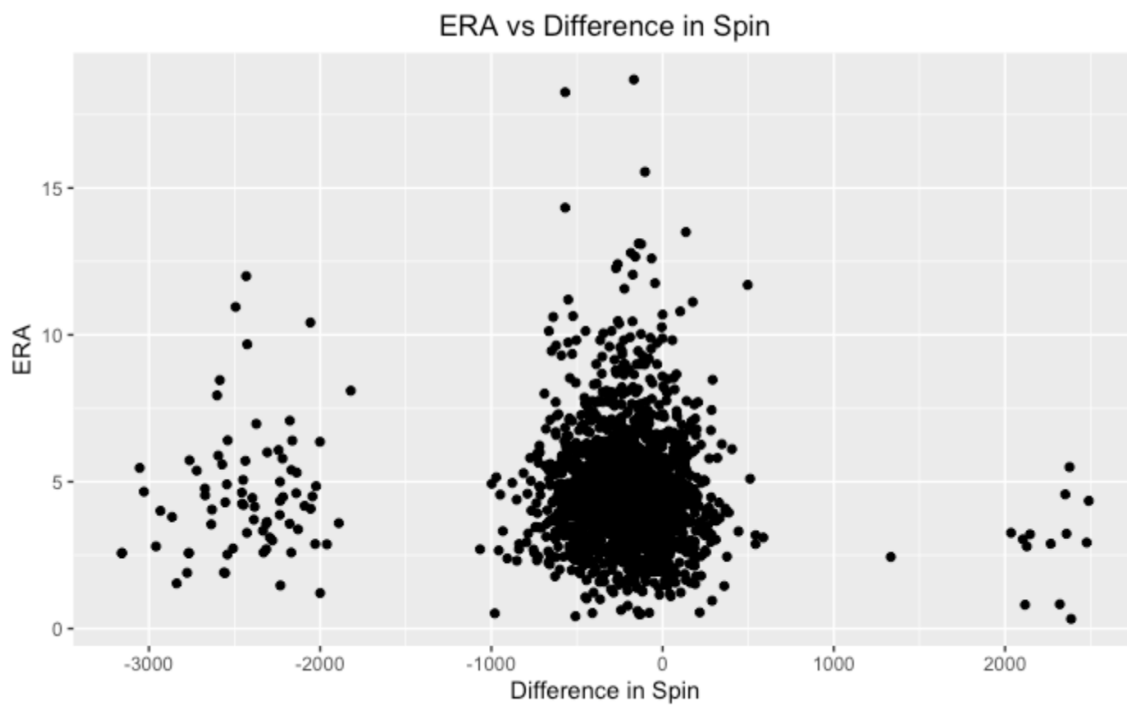
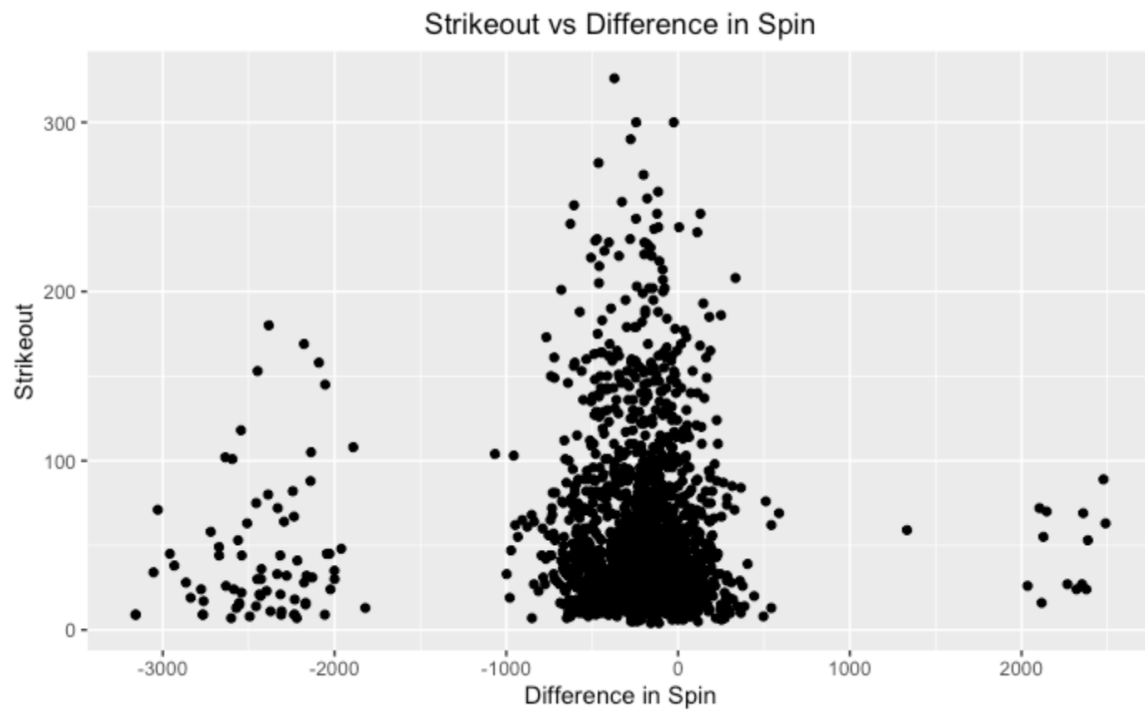
- 2019 Gerrit Cole
- 2019 Yu Darvish
- 2019 Sonny Gray
- 2018 Max Scherzer
- 2018 Rich Hill
- 2019 Dylan Bundy
- 2019 Walker Buehler

We used the formula:

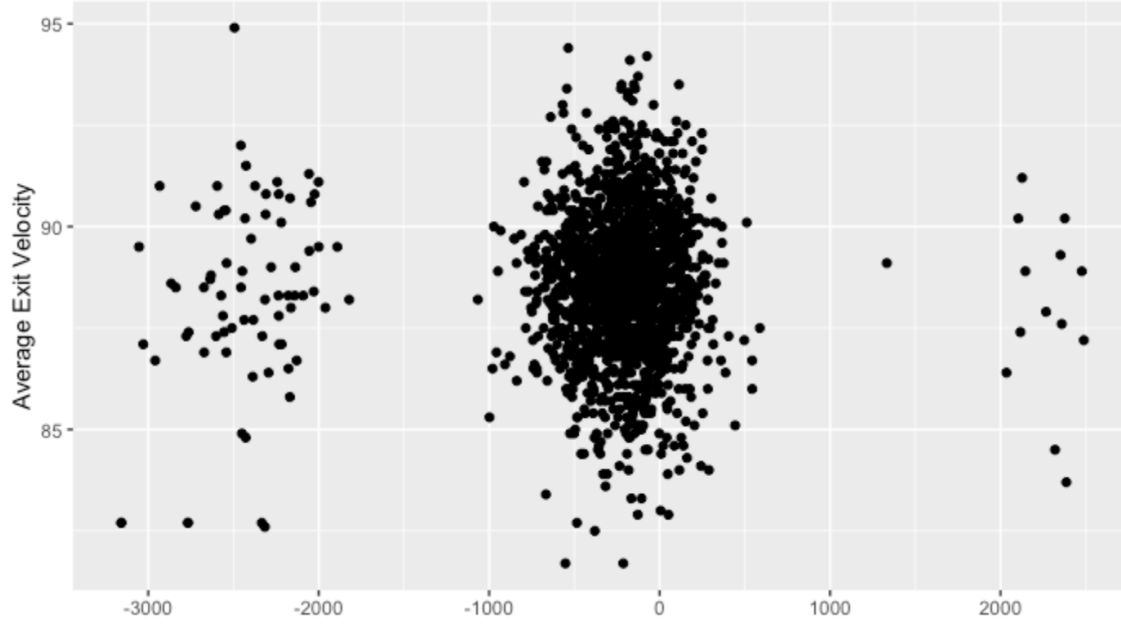
Fastball spin rate minus the maximum of slider or curveball spin rate

to find our “Difference” variable which was used as our independent, X variable for the rest of our analysis. The 7 pitchers we selected throw both sliders and curveballs to keep the analysis consistent.

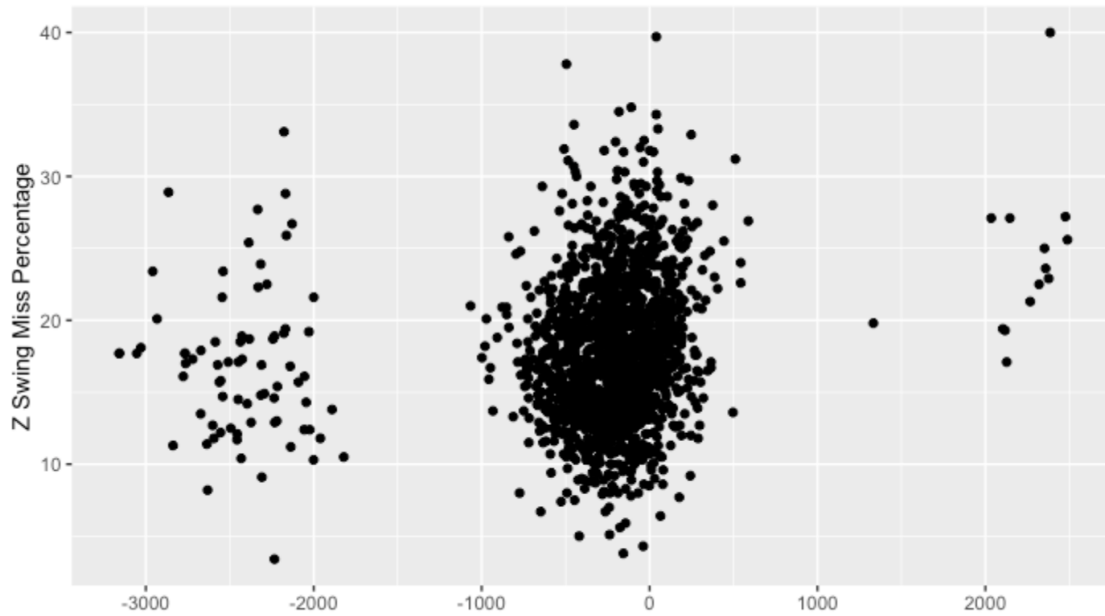
Initial Graphs Upon Which No Trends Were Identified



Average Exit Velocity vs Difference in Spin

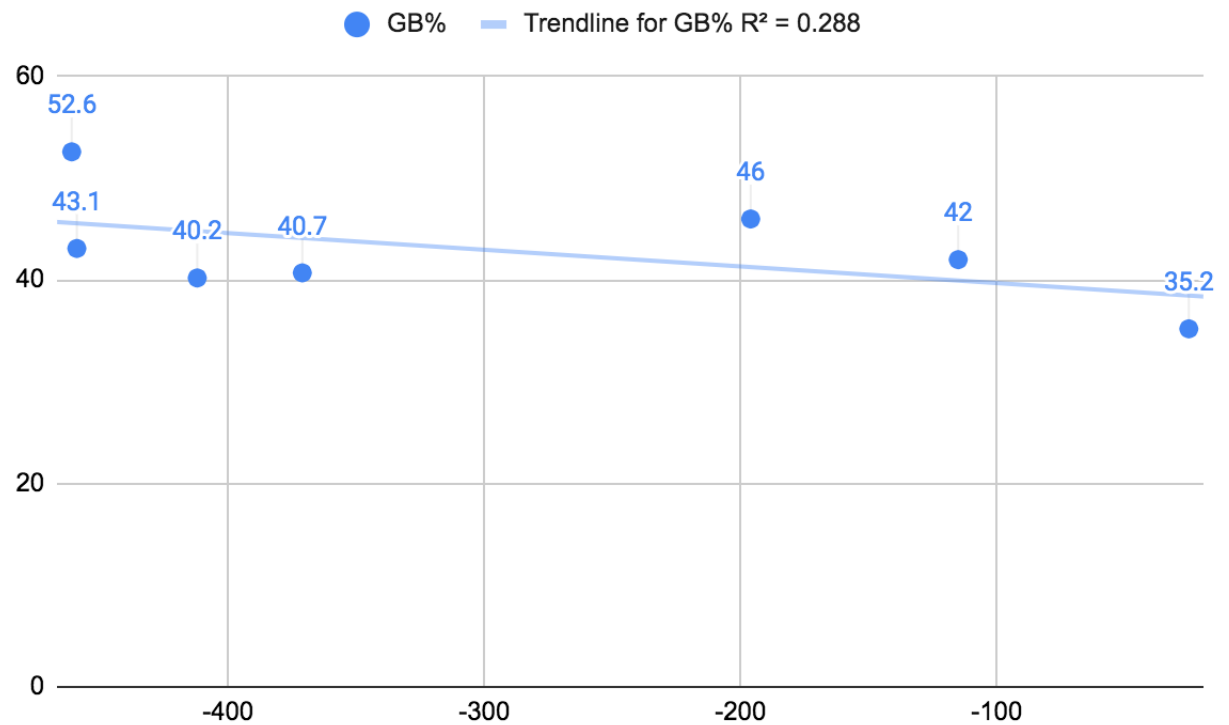
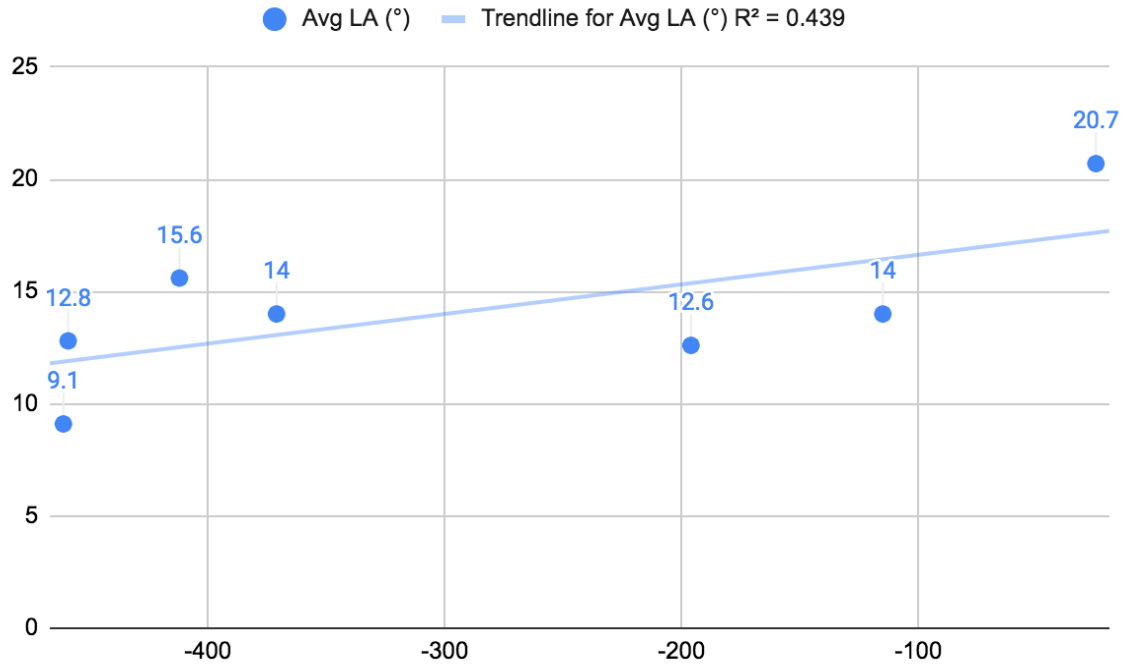


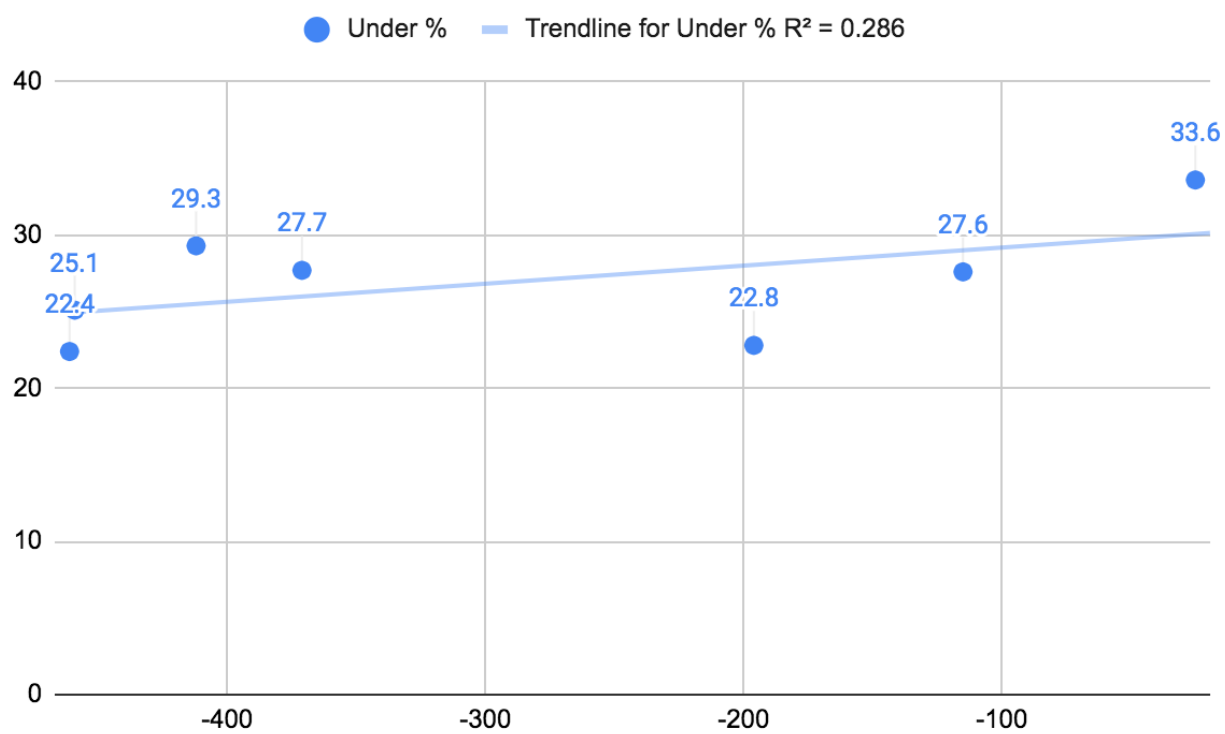
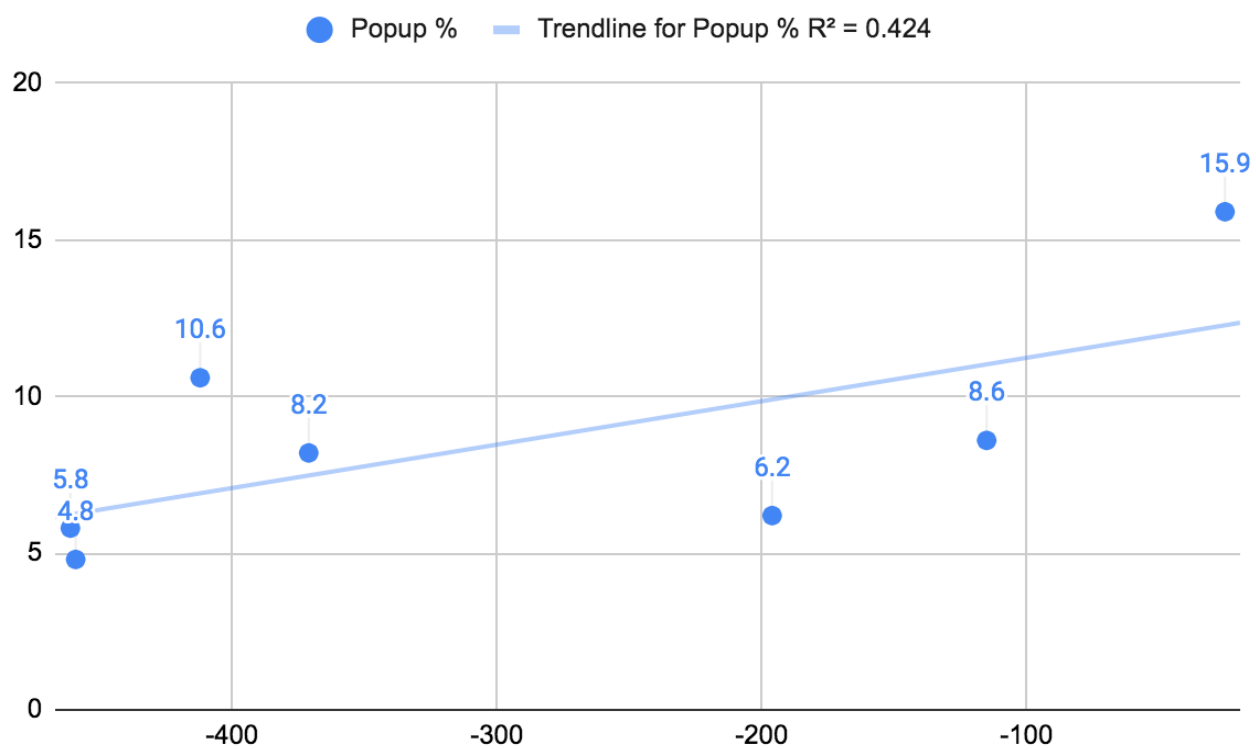
Z Swing Miss Percentage vs Difference in Spin



Analysis and Trends

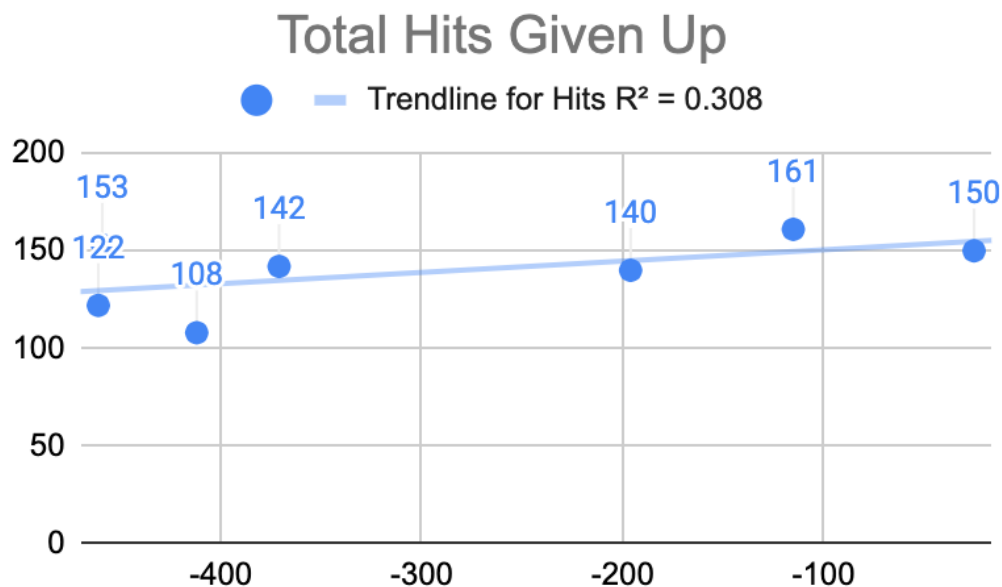
Trend 1: *Low Differential=Balls in the Air and High Differential=Ground Balls?*





These first four graphs all show a similar story among our 7 pitchers. Essentially, these graphs show that when the spin rate differential is higher, more ground balls are likely to be induced, and when spin rate between fastballs and sliders/curveballs is smaller, hitters tend to hit the ball in the air with a higher launch angle, popup percentage, and under percentage. Most of the time, pitchers prefer to give up ground balls over fly balls as they usually result in less damage and can be beneficial in the form of double plays and force outs when runners are on base, so we suggest that pitchers may want to have a larger differential in spin rate between their fastball and slider/curveball based on this sample. Be cautionary with this conclusion, however, as the size of our sample is very small (7) and the highest R^2 value we had among these statistics was .439 which is not very strong.

Trend 2: *Low Differential=Give up more hits and High Differential=Give up less hits?*



From the graph above you can see that the pitchers that have a higher differential spin rate tend to give up less total hits compared to pitchers whose spin rate differential is smaller. This may mean that when pitchers have a smaller differential in spin rate that hitters can see the ball

coming in better. When the spin rate differential is larger the batter has a harder time picking up the pitch coming in making it harder for them to get a hit. We recommend that pitchers have a large differential spin rate to potentially lead to giving up less total hits. However, like stated previously, be cautionary with this conclusion, as the size of our sample is very small (7) and the R^2 value we had was 0.308, which is not very strong.

Last Name	First Name	Year	Fastball Avg. Spin	Slider Avg. Spin	Curveball Avg. Spin	Difference	Avg LA (°)	Pop up %	GB%	Under %	Total Hits
Cole	Gerrit	2019	2530	2622	2901	-371	14	8.2	40.7	27.7	142
Darvish	Yu	2019	2529	2725	2624	-196	12.6	6.2	46	22.8	140
Gray	Sonny	2019	2527	2868	2988	-461	9.1	5.8	52.6	22.4	122
Scherzer	Max	2018	2487	2386	2512	-25	20.7	15.9	35.2	33.6	150
Hill	Rich	2018	2472	2785	2884	-412	15.6	10.6	40.2	29.3	108
Bundy	Dylan	2019	2458	2573	2404	-115	14	8.6	42	27.6	161
Buehler	Walker	2019	2456	2867	2915	-459	12.8	4.8	43.1	25.1	153