Researched and written by Carly Venenciano

Research Questions

- Which pitchers threw the most pitches and how did it affect their success rate?
- What pitches did the pitchers throw the most?
- How does spin rate change with the number of pitches thrown for a specific type of pitch?
- What sequence of pitches lead to the most strikes?

Important Definitions

- Success rate: The number of pitches that resulted in strikes divided by the number of total pitches thrown
    - This discussion rounds the rates to the nearest hundredth
- Sequence of pitches: The pitch thrown before and during the play that resulted in a strike. If a pitcher throws a strike on their first pitch of the inning, the sequence is that one pitch.

I investigated the three pitchers with the highest pitch counts determined in 'pitch_counts.py': Micah Dallas, Hagen Smith, and Joseph Menefee. These pitchers also had similar pitch counts ranging from 65 to 70. In 'success_rates.py' the calculation of all pitchers' rates is presented without rounding. 'breakdowns.py', 'spin_rates.py', and 'sequences.py' calculate data for only the three pitchers. The pitch type was determined using the AutoPitchType as opposed to the TaggedPitchType.

Results

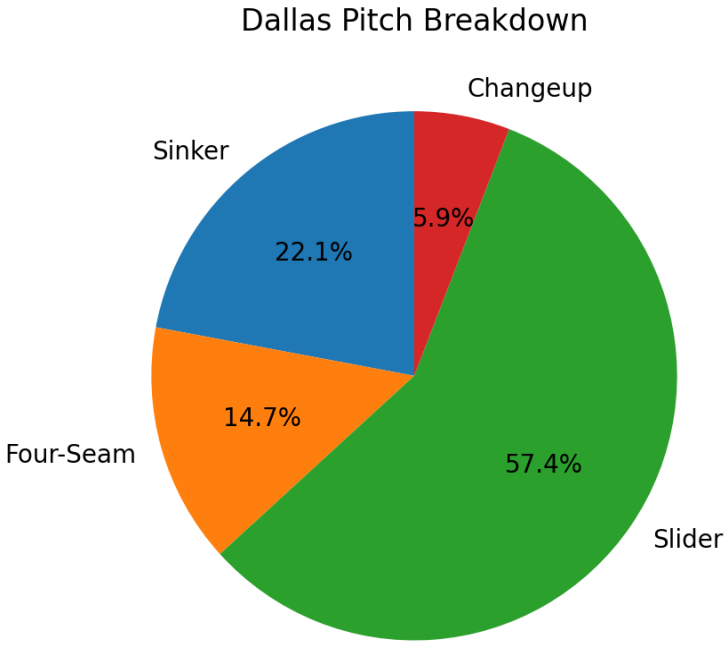
Pitch Counts & Success Rates

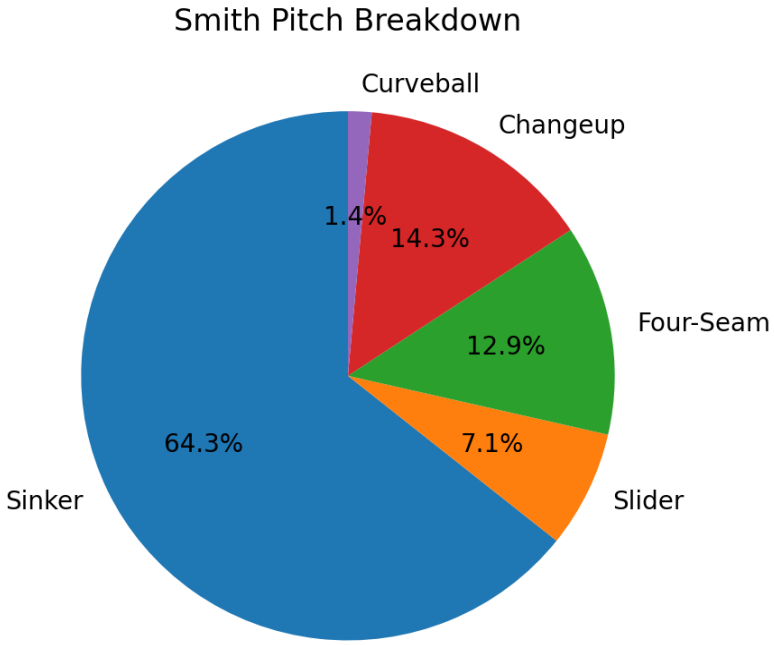
The success rates of all pitchers varied significantly from 6.25% to 41.66%, however, the number of pitches thrown for each pitcher varied greatly too, from 10 to 70. The general trend is that the pitchers who threw less pitches had higher success rates.

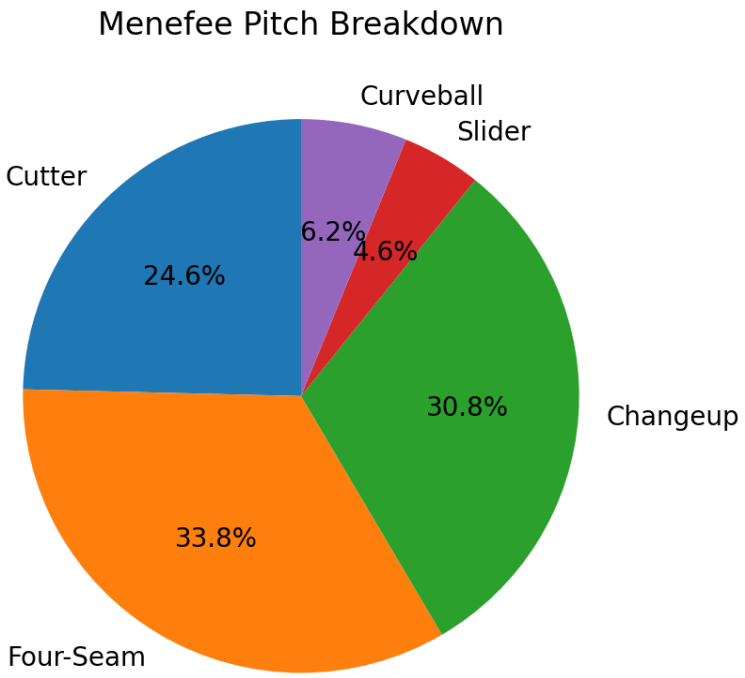
The three pitchers with the highest pitch count, Dallas, Smith, and Menefee, threw 68, 70, and 65 times correspondingly. Their success rates are 22.06% for Dallas, 18.57% for Smith, and 27.69% for Menefee.

Pitch Breakdowns

For the selected pitchers– Dallas, Smith, and Menefee– I examined the breakdown of the types of pitches they threw. As shown in the following charts, Dallas threw Sliders 57.4% of the time, Smith threw Sinkers 64.3% of the time, and Menefee threw Four-Seams 33.8% of the time along with Changeups 30.8% of the time. Menefee has the greatest diversity of pitches.


Dallas Pitch Breakdown
Changeup
Sinker
5.9%
22.1%
14.7%
Four-Seam
57.4%
Slider

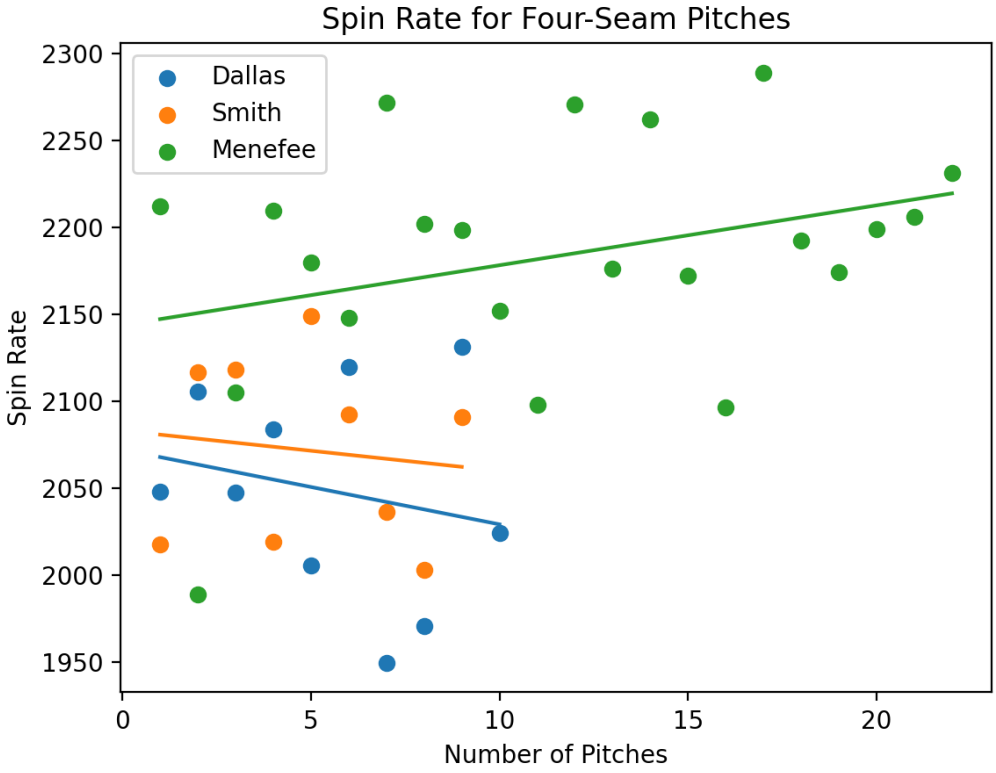

Smith Pitch Breakdown
Curveball
Changeup
1.4%
14.3%
Four-Seam
12.9%
64.3%
7.1%
Sinker
Slider

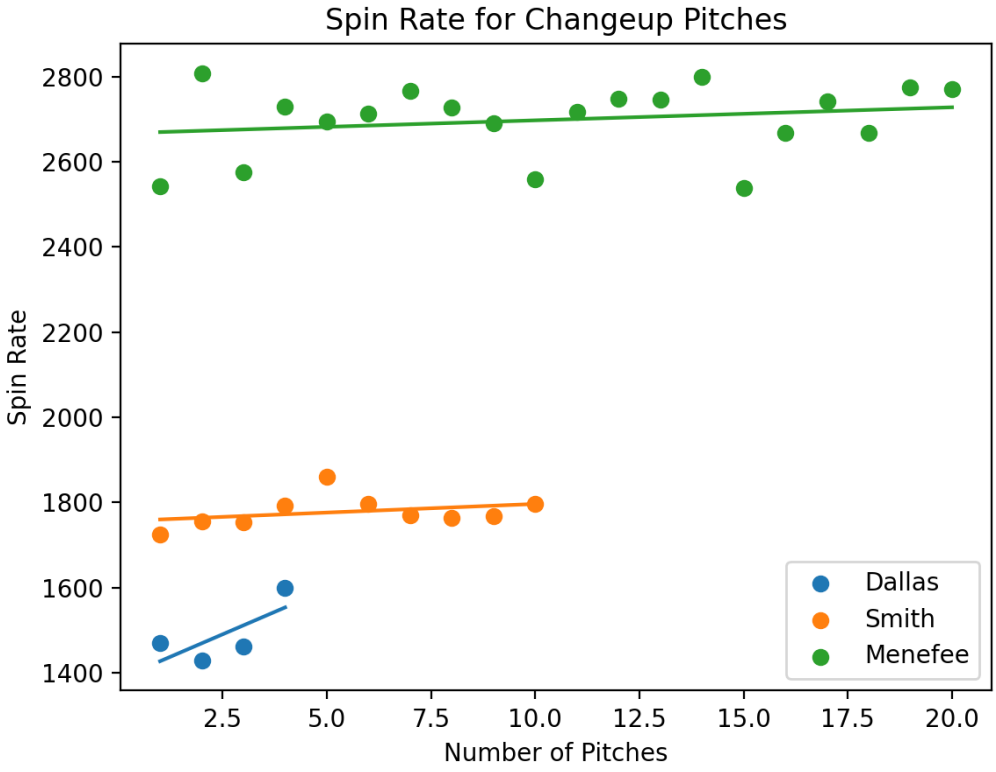


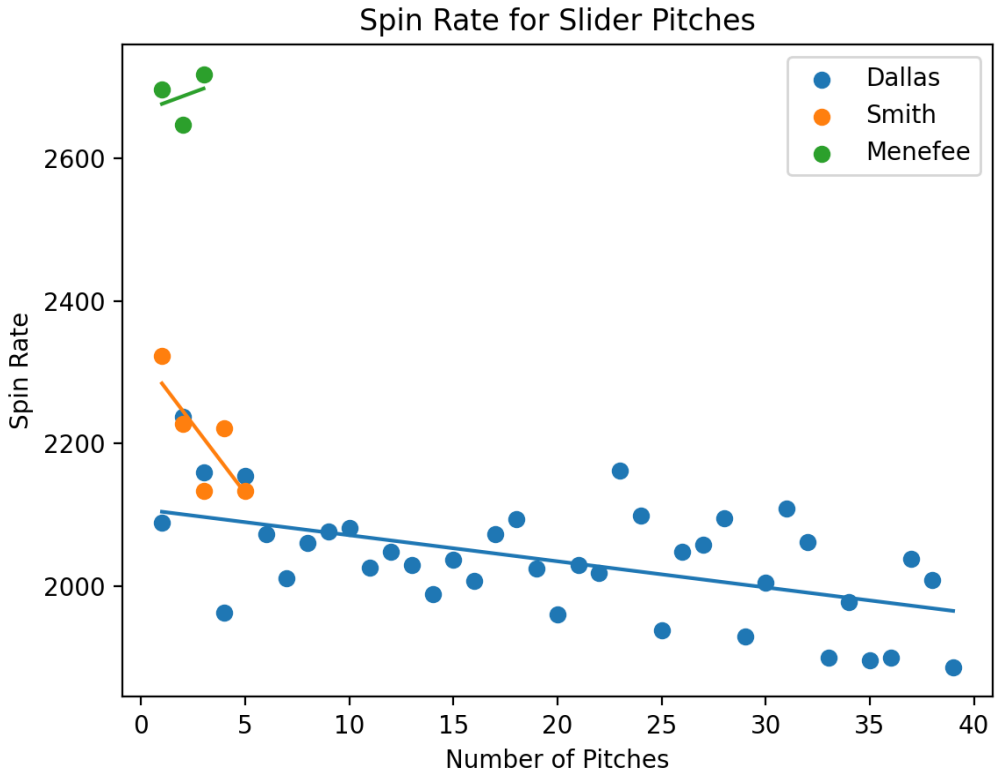
Spin Rates

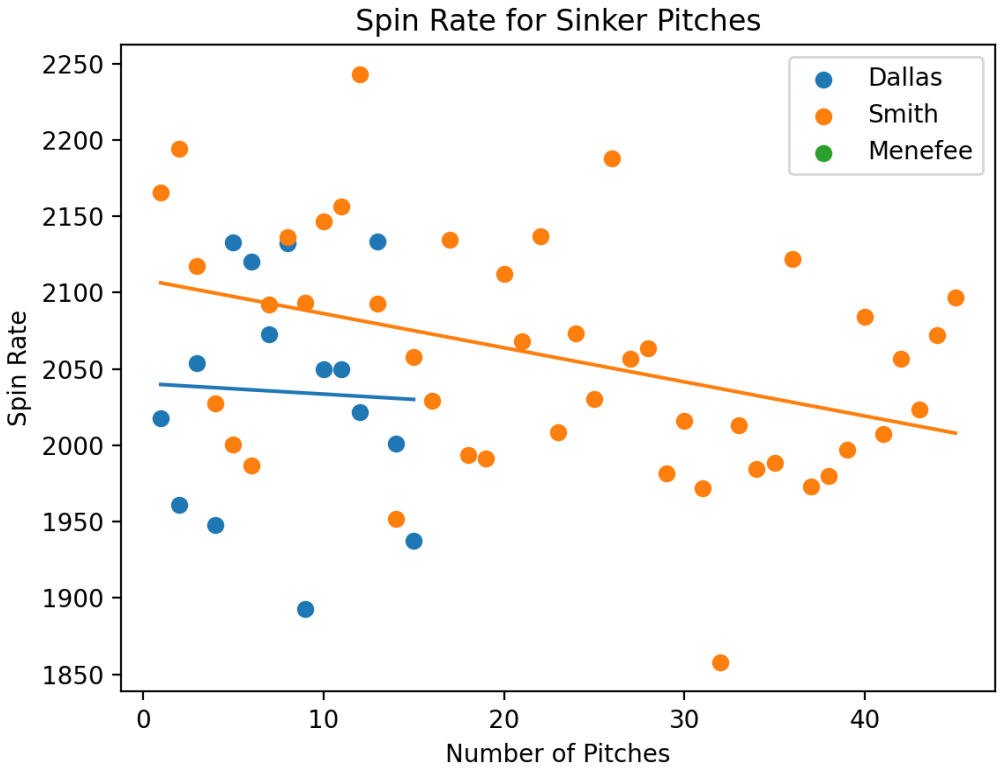
The spin rates for Four-Seam, Changeup, Slider, and Sinker pitches were compared. I chose to not compare Curveballs because of their low occurrences.

For Four-Seam, Slider, and Sinker pitches, Dallas and Smith show downward trends of spin rates with Smith's spin rates averaging greater than Dallas'. Smith and Dallas spin rates trend upward for Changeup pitches. Menefee's spin rates show upward trends for Four-Seam, Changeup, and Slider pitches. Smith and Menefee show relatively consistent spin rates for Changeup pitches.


Spin Rate for Four-Seam Pitches
Dallas
Smith
Menefee
Spin Rate
Number of Pitches
2300
2250
2200
2150
2100
2050
2000
1950
0
5
10
15
20

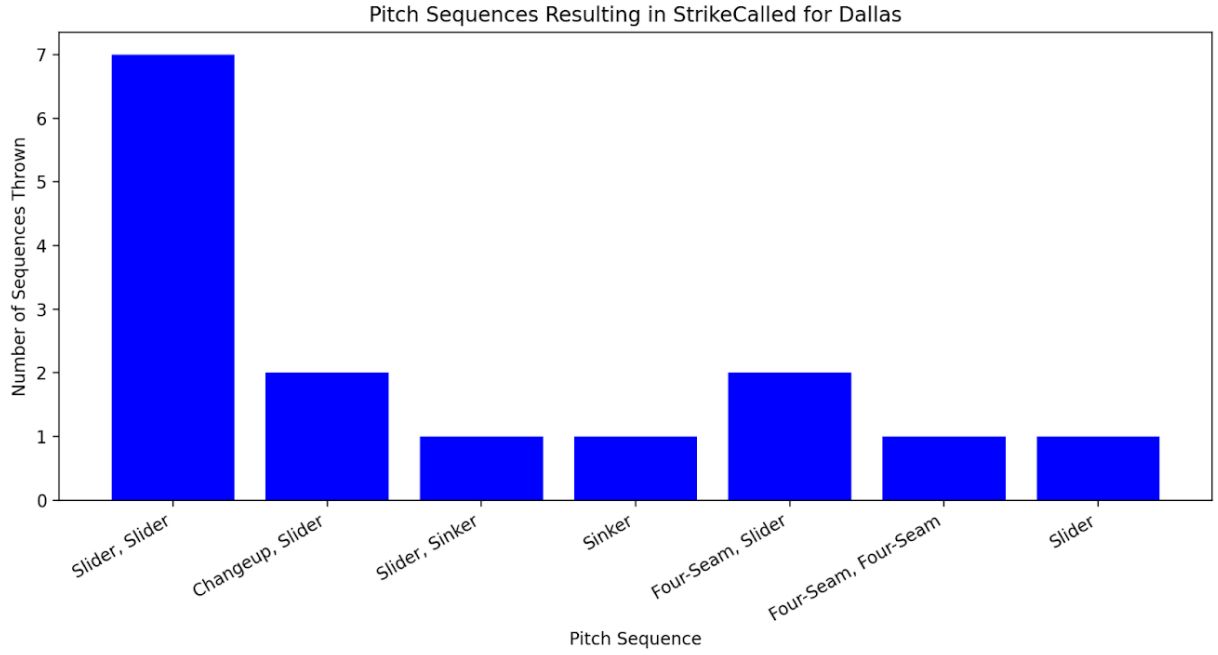

Spin Rate for Changeup Pitches
Dallas
Smith
Menefee
Spin Rate
Number of Pitches
2800
2600
2400
2200
2000
1800
1600
1400
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0

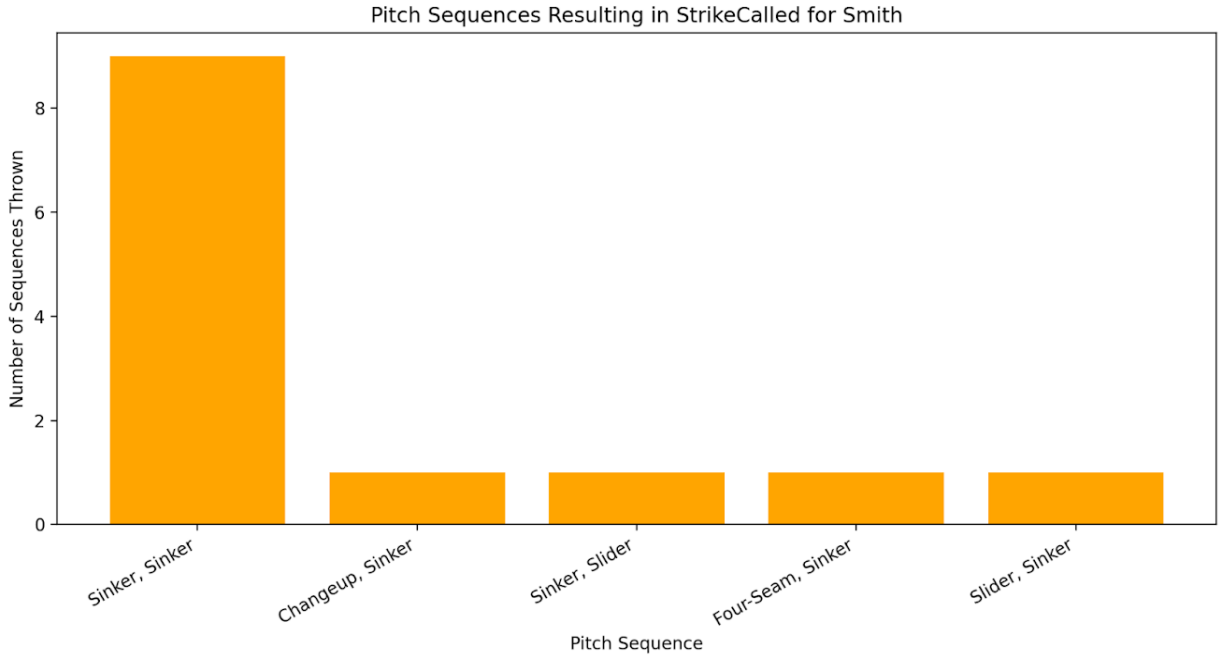

Spin Rate for Slider Pitches
Dallas
Smith
Menefee
Spin Rate
2600
2400
2200
2000
0
5
10
15
20
25
30
35
40
Number of Pitches

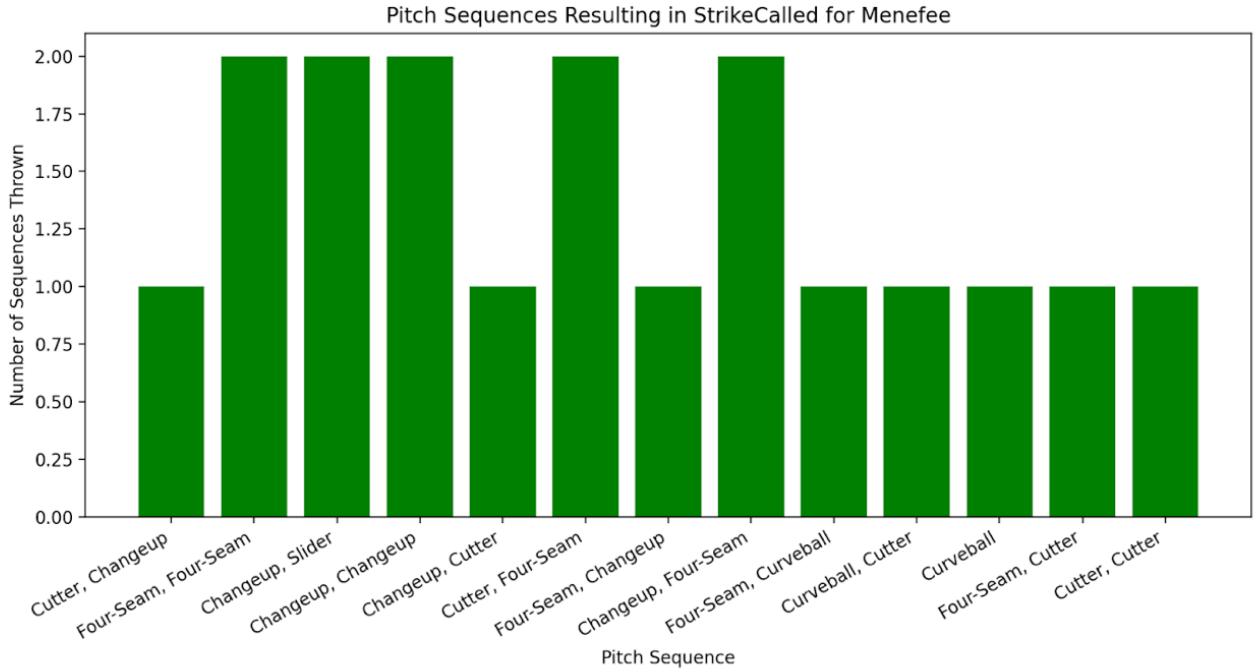

Spin Rate for Sinker Pitches
Dallas
Smith
Menefee
Spin Rate
2250
2200
2150
2100
2050
2000
1950
1900
1850
0
10
20
30
40
Number of Pitches

Sequences

The pitching sequences that resulted in strikes varied greatly for each pitcher. Dallas threw seven different sequences with Slider-Slider being the most common. Smith threw five different sequences with Sinker-Sinker being the most common. Menefee threw thirteen different sequences varying from one to two occurrences.







Further Extension

Regarding the pitchers' breakdowns, spin rates, and sequences, further extensions can examine their trends in different games.

Additionally, pitching sequences that result in strikes can be examined through sequences that extend further than the previous and current pitch. One could look at the previous two or three pitches that lead up to strike.