Comparative Statistical Analysis of Miles Mikolas' 2022 Season Pitching Sequences on Resulting Events

Daniel Fang

University of North Carolina at Chapel Hill

January 10, 2023

Abstract

Pitching sequences called by the catcher are the key driver behind a successful baseball defense. Investigating pitchers' common sequences is very common and leads to the question, what pitching sequences - given specific initial conditions - result in the best and worst outcomes. My analysis uses data, specifically for pitcher Miles Mikolas on the St. Louis Cardinals, downloaded from MLB StatCast on the past 2022 season. The paper is focused on analysing the pitching sequences used by Mikolas in the 2022 season and the resulting outcomes from each of these sequences. It was found that Mikolas had a stunning pitch to contact season, with interesting insights towards his Sinker to Slider sequence.

1 Introduction

The St. Louis Cardinals found themselves a relatively successful 2022 season, securing first in the NL Central but falling short in the NL Wild Card Series to the Phillies. This semi-successful run was largely a result of stellar fielding defense and streaky powerful hitting, but the Cardinal's pitching seemed inconsistent at best. However, Miles Mikolas' pitching was a slight exception with his Earned Run Average (ERA) falling over 0.65 under the league average of 3.96. Earned Run Average is the amount of runs allowed by a pitcher per 9 innings. Hence, a lower ERA is ideal as it gives a greater chance of outscoring the opposing team. A pitcher's ERA is also in correspondence with his hits allowed as well as types of hits allowed. Thus, to get a better idea of the impact of Mikolas' pitching sequences on his relatively low ERA, we examine the pitch outcomes instead as they have a near-direct correlation with ERA. We hope to better understand specifically if and how Mikolas' pitching sequences in the 2022 season impacted the Cardinals' performance.

2 Methods

2.1 Data

The data was retrieved from the StatCast MLB website that contains all of Mikolas' pitching statistics from the past 2022 season. The important information used from the data provided includes pitch type, game date, events, and outcomes of the pitch. Furthermore, the data was sifted through using a function that I created, which separates all data by game. Much more data was provided than used, but can stand as prospect for further pitching analysis. The data terminology used is as follows: pitches are the pitch types, events are the results of actions by the batter (strike, foul, ball, etc...), and outcomes are the results of a hit or strike. Additionally, the pitches used by Mikolas are denoted by SI (sinker), SL (slider), CH (changeup), CU (curveball), FF (four-seam fastball).

2.2 Game Analysis

The games were analyzed by iterating through each game object's pitches, events, and outcomes. We then create dictionaries for each event and outcome that store specific pitching sequences (pairs in this case) as keys and the frequencies of each event/outcome, as a result of that pitching sequence, as the values. The pairs are simply the pitch types concatenated together (i.e. FFCU is a four-seam fastball followed by a curveball). Furthermore, we analyze all of the games and accumulate a total of each event/outcome for each pitching sequence throughout Mikolas' 2022 season. We then plot Extra Base Hits (XBH) and Outs (field outs and strikeouts) on separate bar graph plots.

3 Results

3.1 Graphs

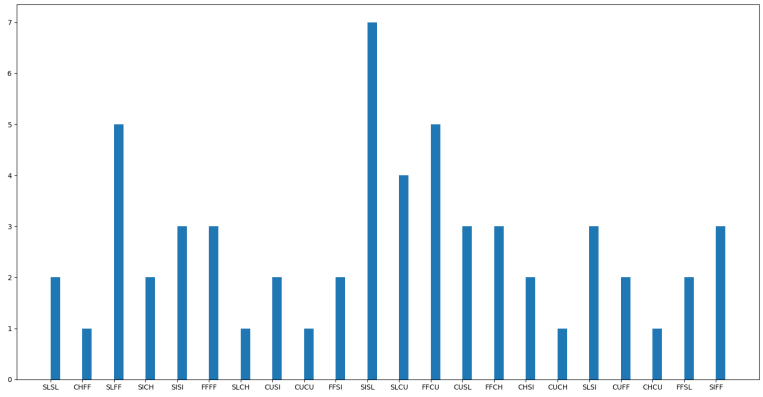

Figure 1: Plot of extra base hits for each pitching sequence pair

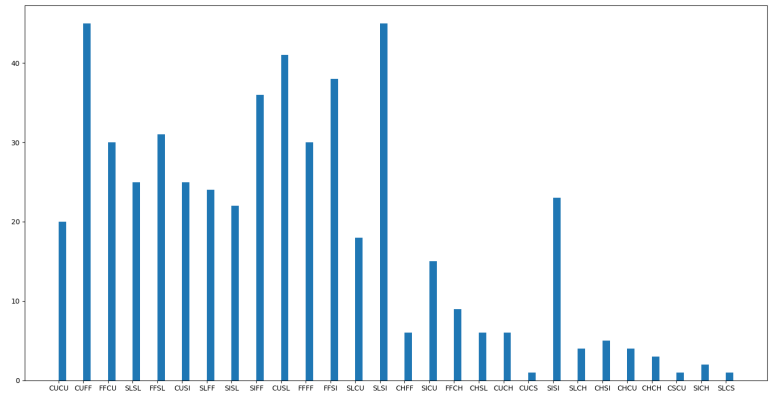

Figure 2: Plot of extra base hits for each pitching sequence pair

Both above graphs show the frequency of Extra Base Hits and Outs for each pitching sequence. It was noticed that Mikolas had pitched an incredible amount of outs this season with very little XBHs given. Out of a total of over 500 outs (field outs and strikeouts), only about 150 of them were strikeouts. As a pitch to contact pitcher, Mikolas created roughly 350 opportunities for the Cardinals to field outs on opponents. On the other hand, he held opponents to less than 90 XBHs, which is nearly a 75% ”success” on his pitching strategy.

In another light, we also notice that Mikolas’ worst pitching sequence this season seemed to be his Sinker into Slider, giving up 7 XBHs and 4 home runs. While there is much more data to be analyzed to confidently say that this is the case, it provides insight into his statistically worst pitch this season.

4 Conclusion

In analyzing Mikolas’ pitching sequences in this past 2022 season, it can be said that he likely had a very successful season, holding opponents to roughly 25% extra base hitting on contacts. It

should also be said that Mikolas' and his catcher may need to consider using the Sinker into Slider in a limited fashion as they head into spring training to avoid unnecessary hits and runs.

If given more time, there are numerous aspects of Mikolas' pitching that I would have wanted to examine. One of these being creating longer pitching sequences (i.e. 4-5 pitches in a row) to better understand how some longer sequences might affect the outcomes. Another statistic I wanted to examine was Mikolas' accuracy and strikeout rate with each pitch using the strikeout zones each pitch landed in. Lastly, further diving into hitting statistics would have allowed for use of hard hitting to more accurately analyze Mikolas' pitching in terms of hits and XBH. While there are several factors that aren't considered about Mikolas' pitching, this preliminary analysis brings to light important conclusions that should be further considered and explored.