

The Whiff Effect: Do Pitchers Repeat a Pitch More Often After a Swing-and-Miss?

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Abbreviated abstract: A few years ago, I heard Diamondbacks broadcaster Bob Brenly say that hitters could bait a pitcher into throwing the same pitch again if they swing and miss at it. Is it true that a pitcher is more likely to throw the same pitch again after a whiff? I investigate this question using 2019 MLB pitch data from Baseball Savant, and find that yes, pitchers repeat their last pitch more often after a whiff. This effect holds even after controlling for count and pitch type. I believe that this should be incorporated in advanced scouting reports on pitchers and I take a close look at two pitchers, Madison Bumgarner and Max Scherzer, as examples.

Problem

- You are a Major League Baseball pitcher. Congrats! You stand on the mound in an 0-0 count, and one of two things happens:
 - You throw a fastball causing the batter to swing and miss
 - You throw a fastball for a called strike in the strike zone
- Both scenarios result in a strike, now the count is 0-1.
- Question: After getting the swing-and-miss and making the batter look silly, are you more likely to throw another fastball than you would be after the called strike?
- That is the question this research attempts to answer: **is a pitcher more likely to repeat his previous pitch after getting a swinging strike?**

Data

- We have 732,473 pitches from the 2019 MLB season pulled from Baseball Savant
- For each pitch, we ask two questions:
 - What was the result of the previous pitch?
 - Does this pitch type match the last pitch?
- That gives us this lovely table!

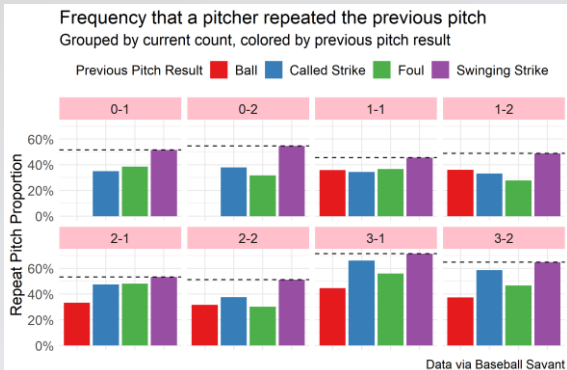
Previous Result	Sample Size	Repeat Pitch Frequency
Ball	248084	39.1%
Called Strike	110603	37.7%
Foul	129990	34.3%
Swinging Strike	51561	51.4%

Data: Baseball Savant

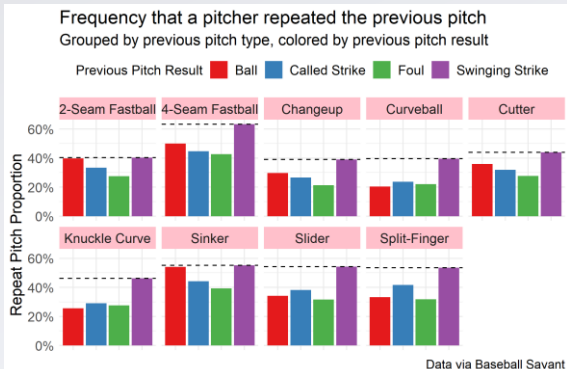
- It appears that yes, pitchers repeat their pitches more often after swinging strikes... but there are other factors we must account for

Methods

Advice for reading plots: focus on purple bars, these indicate repeat pitch frequency after swinging strikes

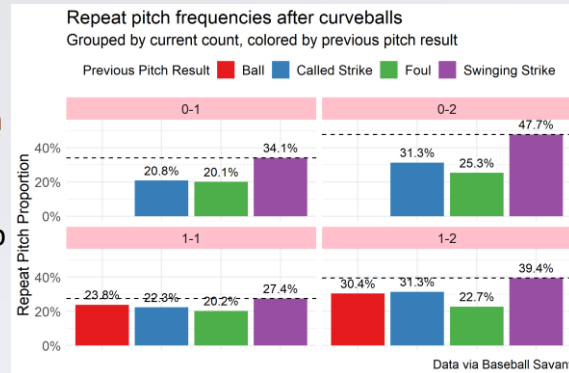


Controlling for count: relationship holds up



Controlling for previous pitch type: relationship holds up

Plotting only curveballs to get a feel for interaction between previous pitch type and count: relationship still holds up

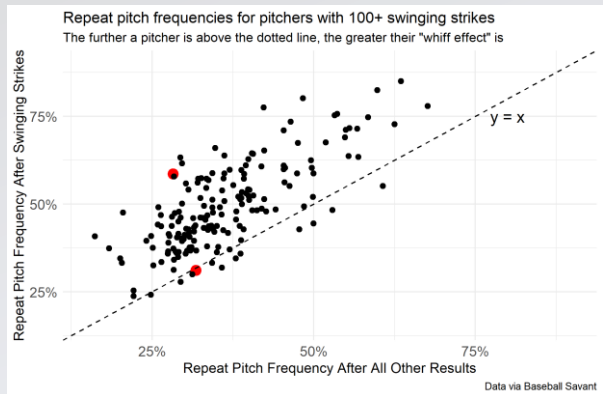


Possible confounding explanation for above plot:

- Pitchers with better curveballs have higher chance of getting whiffs.
- Pitchers with better curveballs throw curveballs more often.
- So, of course the repeat pitch frequency is higher after a whiff.

Perhaps that explains a bit of the relationship, but on the next slide, we will see that on the individual pitcher level, the “whiff effect” still exists.

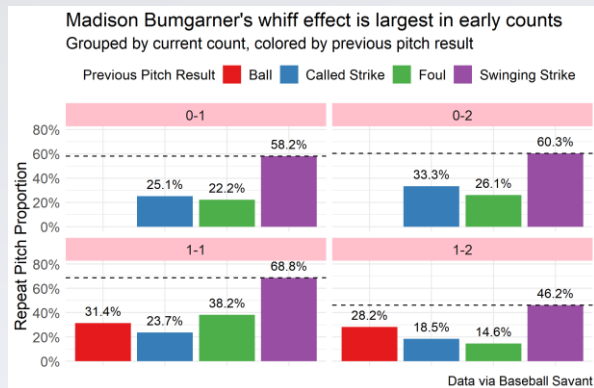
Primary Application: since trends differ by pitcher, this could be a part of advanced scouting.



Each of the 175 dots above is a pitcher. If a pitcher falls along the dashed line, previous pitch result does not have a relationship with repeat pitch frequency. The two red dots are our case studies.

- For 64% of pitchers, repeat frequency after whiffs is at least 10 percentage points higher than after other results
- For 21% of pitchers, repeat frequency after whiffs is at least 20 percentage points higher than after other results

Example 1:
Diamondbacks pitcher Madison Bumgarner has a massive "whiff effect" in early counts; he is about 2x as likely to repeat his previous pitch after a swinging strike



Example 2: Nationals star Max Scherzer does not increase repeat pitch frequency after swinging strikes, but it could be interesting to explore the decline in frequency after foul balls (green bar) a bit more

