

Umpire Bias in the MLB

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Intro

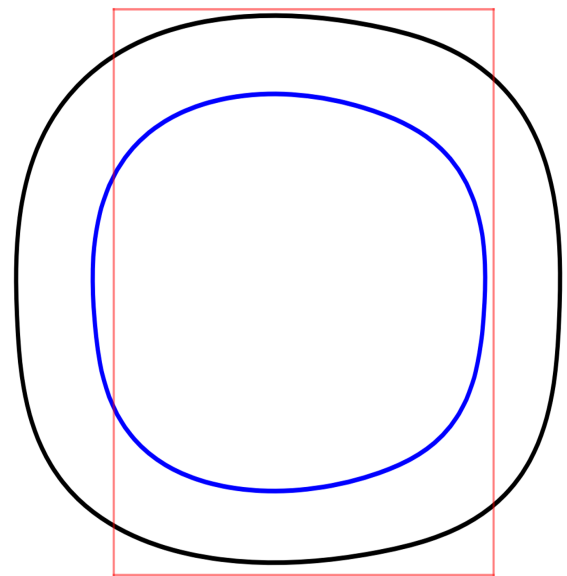
In Major League Baseball, the rulebook states that the strike zone is the volume of space above home plate between the batter's knees and the middle of their chest. Human umpires are tasked with the important yet extremely difficult task in deciding whether a ball is a strike or not. With motion technology, TV audiences are now shown the actual path of a pitch on close calls, ousting human umpires as inconsistent and faulty in their judgements. Robot umpires may be able to call games at near perfect rates, but we still believe in human umpires to sustain the legacy of the game. This paper will identify certain biases umpires have when calling strikes and balls, in the hopes that human umpires may better understand the inconsistencies in their strike zone and adjust accordingly to facilitate fairer games.

For this analysis, we took data from MLB's savant website, a collection of Statcast data from 2008 to the present. Every pitch from 2008 is available, with information on the location of the pitch as it crosses the plate, the type of pitch, the outcome of that pitch, the players on the field, and plenty of other information on the game and game situation. Looking through this data, we found areas where umpires have quantifiable bias in how they call strikes and balls.

Visualizations

To visually show Umpire Bias in certain situations, this paper will utilize contour circles over strike zones representing the percent chance a ball pitched in a zone is called a strike. A ball pitched on the border of the blue circle has a 90% chance of being called a strike, while a ball thrown on the border black circle has a 50% chance of being called a strike. ***The Black circle is what we consider to be MLB umpires' actual strikezone, as a pitch outside of the circle is more likely to be called a ball, and a pitch inside is more likely to be called a strike.*** These circles were created through a generalized additive model, generating probabilities of each pitch being called a strike. Contour lines were drawn over the mapped probabilities, creating zones for different probabilities of a pitch being called a strike.

Fig 1.1 – MLB Umpires' Actual Strikezone 20018-present



Blue Circle: Pitches thrown on this line are expected to be called strikes 90% of the time

Black Circle: Pitches thrown on this line are expected to be called strikes 50% of the time

**Fig 2.1, MLB Umpires Strike Call %
by Zone, 2009-present**

83.07%	88.25%	77.40%
98.79%	99.67%	96.16%
77.03%	78.73%	72.39%

Additionally, the strike zone is broken down into 9 zones, and each zone is color-coded to represent the percent of pitches in that zone called strikes. The dark red zones are zones where the umpire calls strikes the most often, while the dark blue zones are where umpires call the least amount of strikes. The colors are normalized to a 60%-100% strike call scale, meaning dark blue zones are close to 60% strike call percentage, and dark red zones are close to 100%.

Lefty vs. Righty Batters

When a left-handed batter is at the plate, umpires seem to shift their strike zone towards outside pitches.

Lefties, Umpire's Strikezone

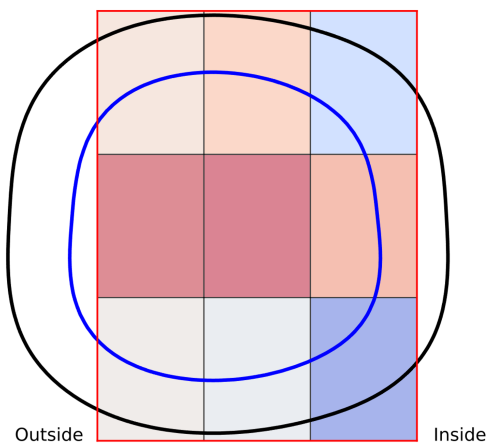


Fig 3.1

Righties, Umpire's Strikezone

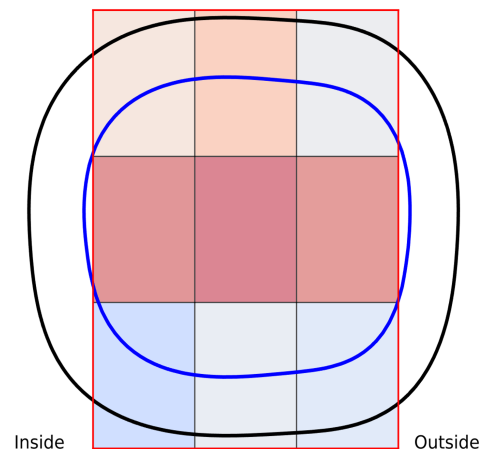


Fig 3.2

	% of inside pitches called strikes	% of outside pitches called strikes
Lefties	54.85	70.56
Righties	79.17	71.66

The strike zone for lefties seems to be distorted, as inside pitches are called at a much lower rate for left handed batters than for right handed batters. This data shows a clear bias towards, as umpires have a smaller inside zone for lefty batters than for righty batters.

2 strike Counts

The strike zone also fluctuates depending on the pitch count. Umpires' strikezones clearly constrict when the count reaches 2 strikes, as seen in the figures below. The aggregate zone (50% chance of being called a strike) with 2 strikes is 13.3% smaller than the aggregate zone with less than 2 strikes. Umpires most likely want to avoid calling strike three on borderline pitches, and alter their strikezones accordingly.

Less Than 2 Strikes

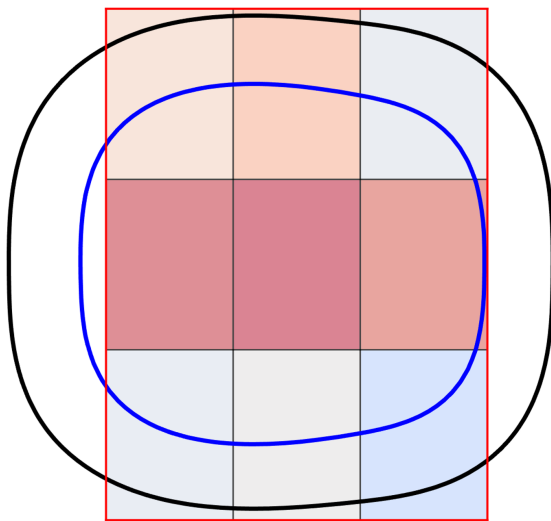


Fig 4.1

2 Strikes

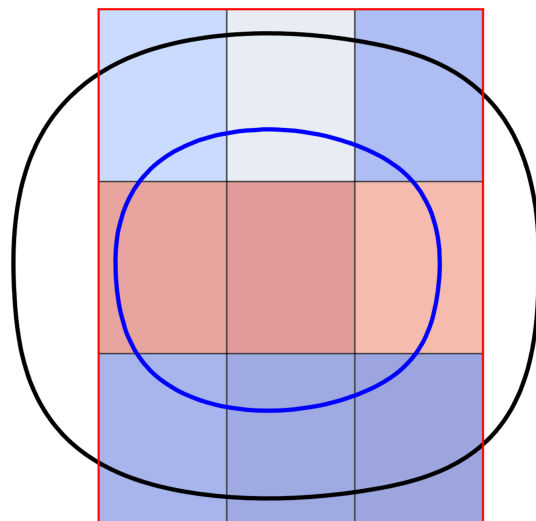


Fig 4.2

This clearly shows inconsistency in calls based on the situation of the at-bat, and umpires should be aware that their strikezones constrict with 2 strikes.

Extra Innings

Additionally, umpires tend to constrict their strike zones when games go into extra innings. Much like 2 strike counts, extra innings come under more scrutiny from fans, managers, and other interested parties, and umpires tend to take this into account by calling less strikes.

Regulation Innings

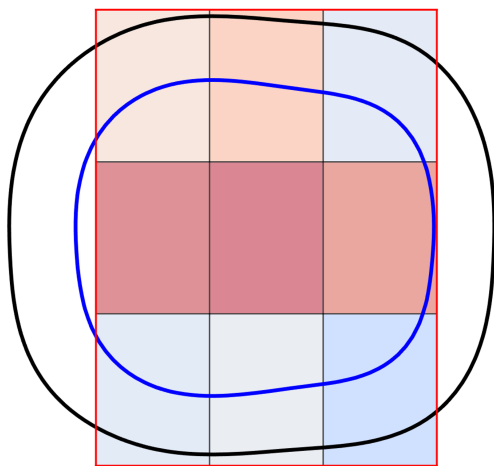


Fig 5.1

Extra Innings

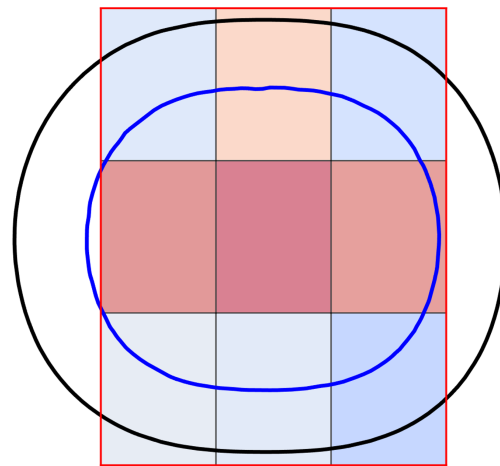


Fig 5.2

MLB umpires' 50% zone is 5.5% percent smaller than their zone in regulation innings, more evidence of their inconsistency throughout games.

Home/Away Bias

Since 2008, the dawn of pitch tracking, Home teams have won 53.8% of their games against the away team. Umpiring decision making, consciously or unconsciously, make impact this strong record for home teams. Based on the analysis below, when home teams are batting, the strikezone is 1.9% smaller than when away teams are batting. Though small, this shows a slight bias towards the home team, which may explain some of the home field advantage present in the MLB.

Away Team Batting

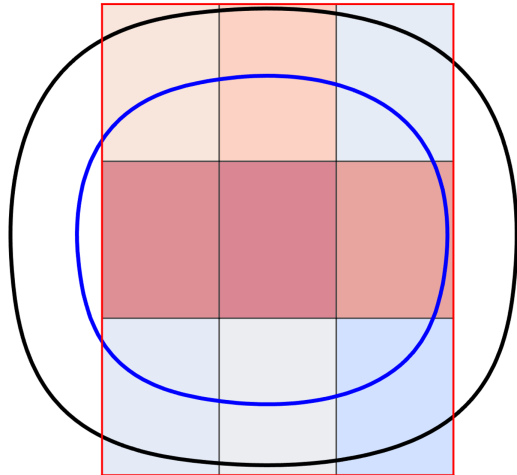


Fig 6.2

Home Team Batting

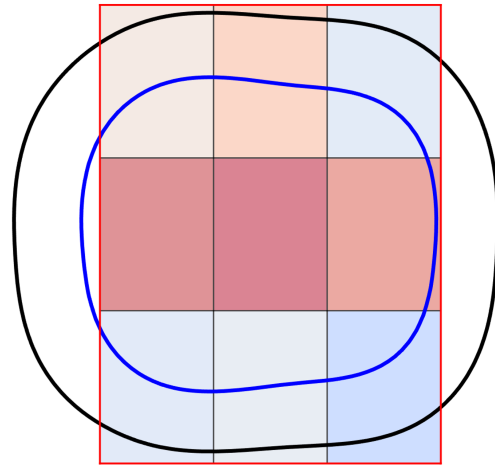


Fig 6.2

Conclusion

MLB umpires are human, and are influenced by many factors throughout the game. In this paper, we have shown that when the stakes are higher, such as when the count has two strikes or a game is in extra innings, MLB umpires tend to constrict their strikezones. Left handed batters enjoy a smaller zone on the inside part of the plate as umpires show their inconsistency when they come to the plate. Finally, Home crowds can influence umpires, adding to the advantage home teams already have.

We believe that human umpires are an integral part of Major League Baseball, and have the adaptability to make objective and fair judgements when necessary. Unfortunately, humans have biases, which can unfairly influence baseball games. It is our hope that umpires can recognize the trends in their biases, and adjust accordingly, in order to retain their place as fair judges in a beautiful game.