



The Wrong Stuff

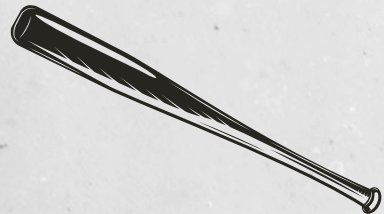
By: Liam Jennings, Tiger Teng, and
Belle Schmidt



Defining Stuff+



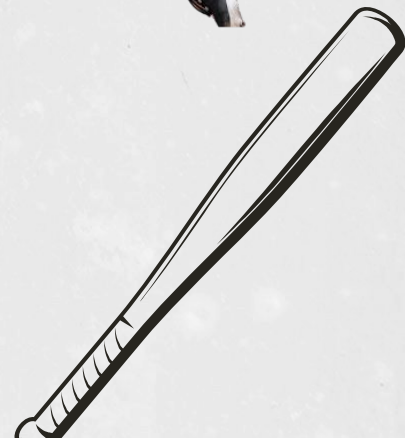
- Stuff+ evaluates a pitch based on its physical characteristics (aka the nastiness of a pitch)
- Features include:
 - Velocity
 - Vertical and horizontal movement
 - Release point
 - Spin Rate (RPMs)
 - More



Introduction

Questions:

- What variables are most important for evaluating the effectiveness of a pitch?
- Is Stuff+ important for evaluating the effectiveness of a pitch?
- How has the Stuff+ and effectiveness of pitches changed over time?



Data



FanGraphs

Average Stuff+ in a given season for each of the pitcher's pitch types



Baseball Savant

Aggregated extension, horizontal break, induced vertical break, spin, velocity, xwOBA, and whiff% by pitcher, season, and pitch type



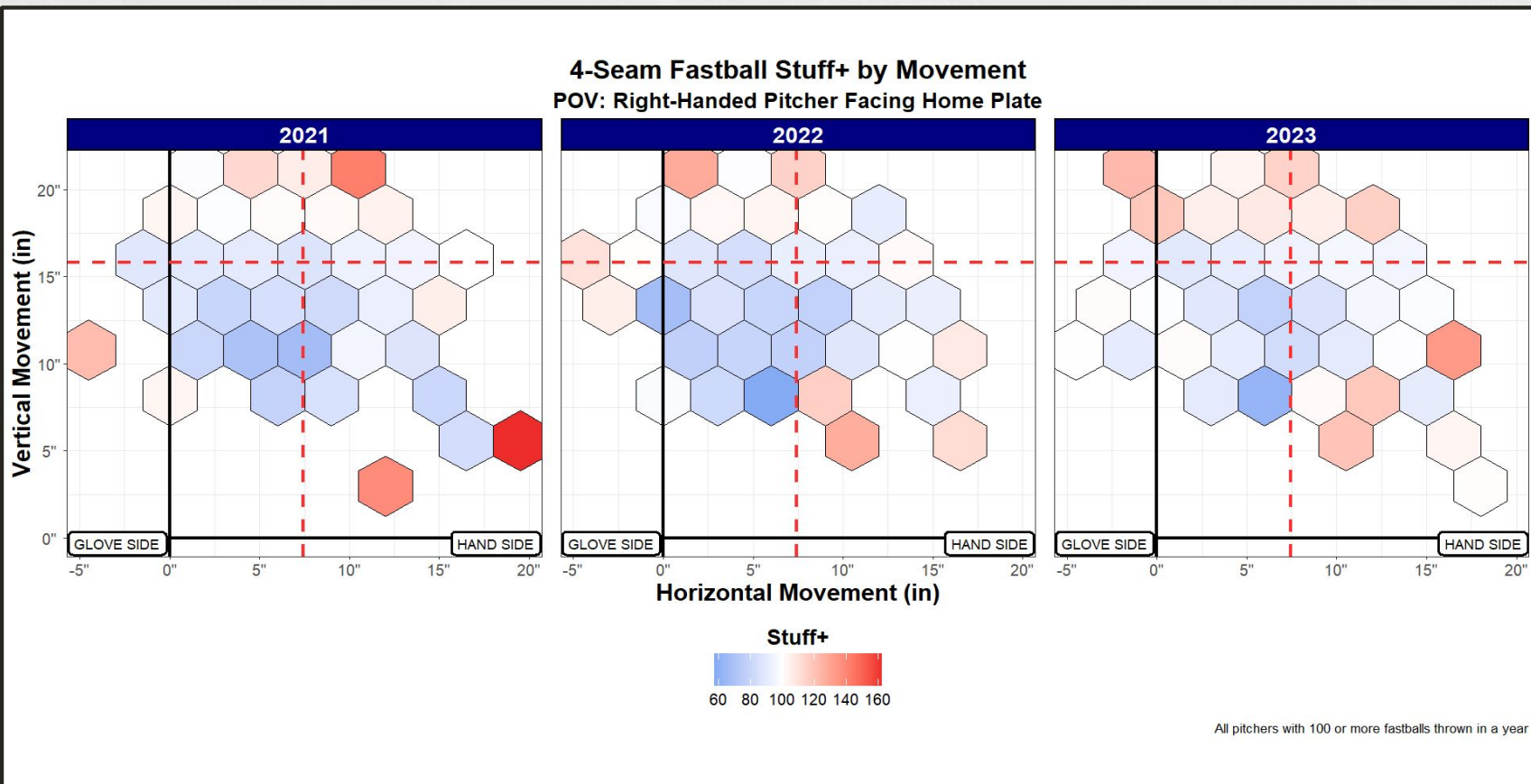
Undervalued? Overvalued?



Andrew Heaney & Julian Merryweather 4-Seam Fastball

PLAYER NAME	SEASON	VELOCITY	EXTENSION	INDUCED VERTICAL BREAK	HORIZONTAL BREAK	SPIN	STUFF PLUS	WHIFF PCT	XWOBA
Andrew Heaney	2021	92.0	6.2	15.2	-15.3	2443	100.0	27.8	0.328
Andrew Heaney	2022	92.9	6.2	14.3	-14.8	2441	94.6	31.1	0.324
Andrew Heaney	2023	92.5	6.5	13.9	-15.9	2413	106.6	25.6	0.336
Julian Merryweather	2021	97.5	6.8	17.5	-7.7	2262	129.4	19.1	0.429
Julian Merryweather	2022	97.3	6.6	16.9	-6.5	2286	127.0	14.6	0.493
Julian Merryweather	2023	98.1	6.5	16.6	-6.3	2342	128.4	20.6	0.386

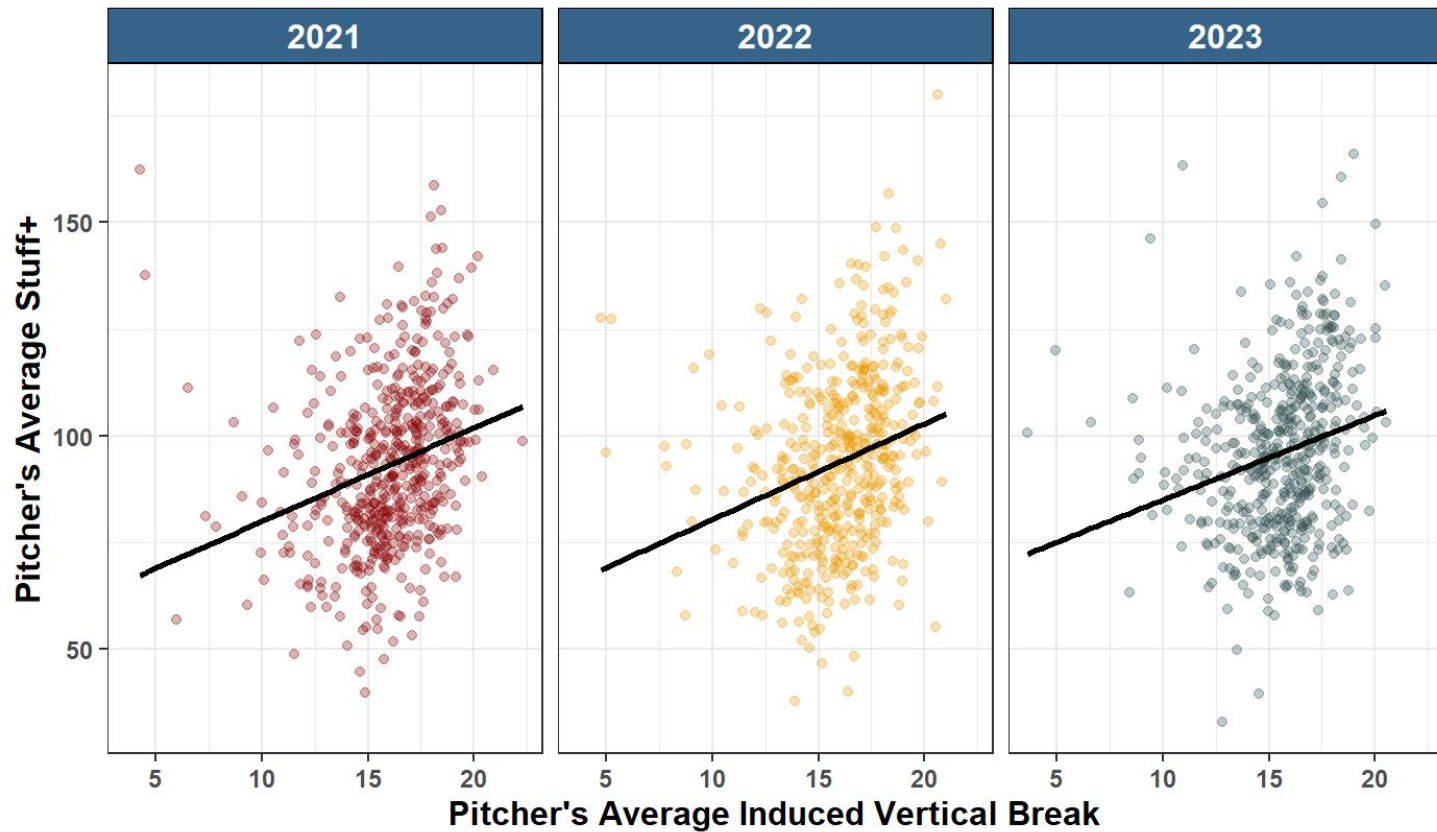
Bias in 4-Seam Fastball Stuff+



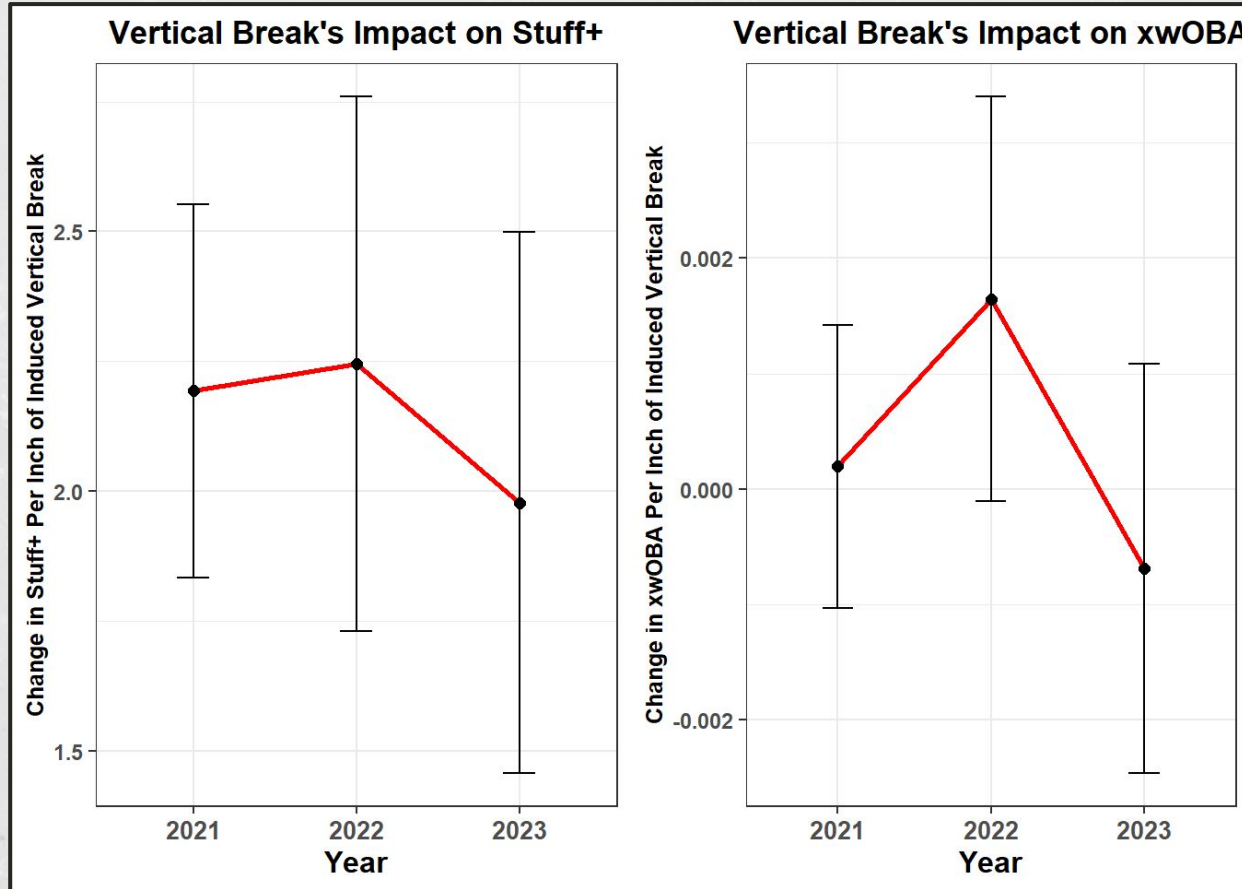
Modeling Year-to-Year Change



Relationship Between Vertical Break And Stuff+ For 4-Seam Fastballs

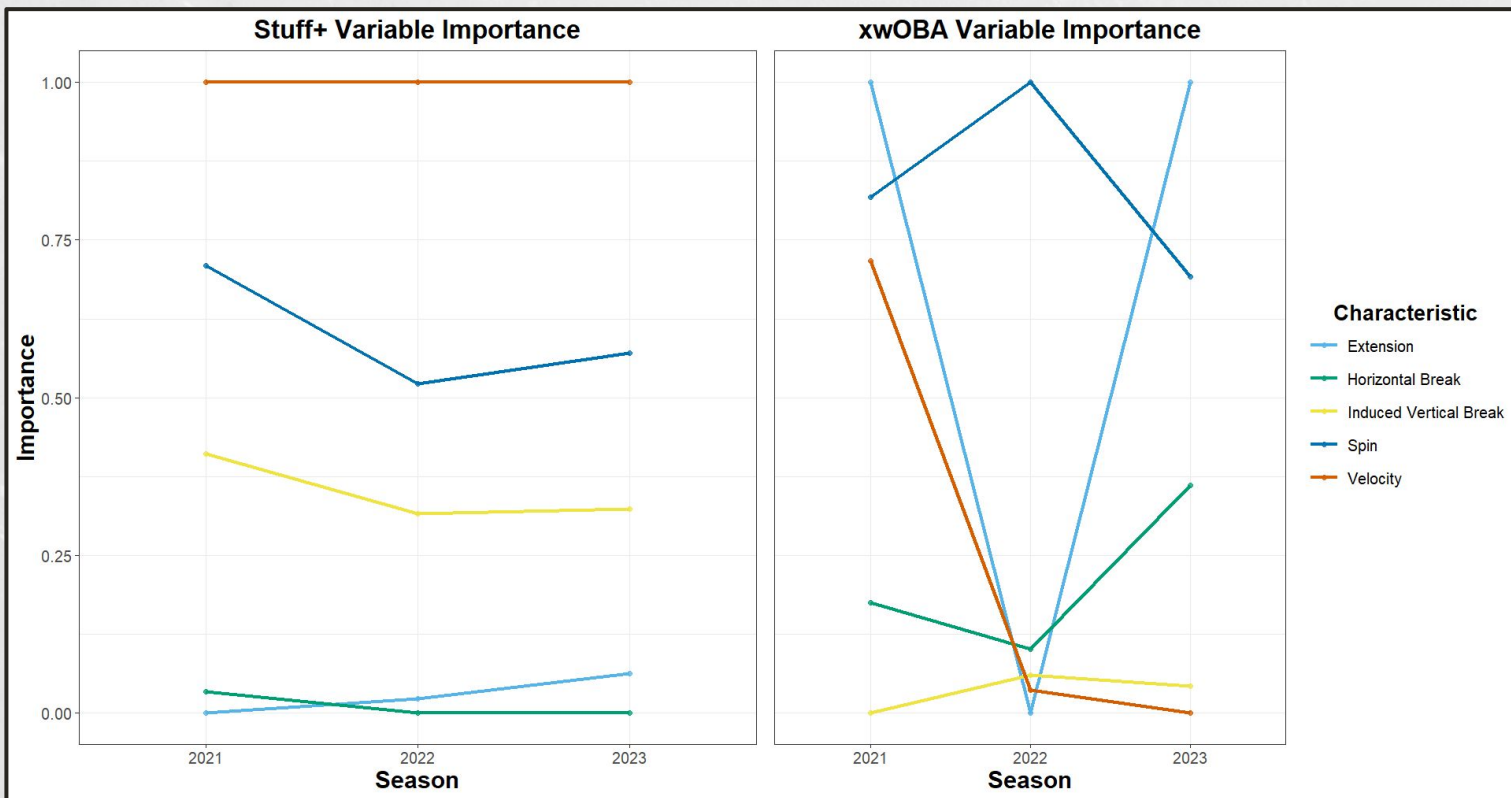


How Well is Stuff+ Adjusted Year-to-Year?





Random Forest Models





Discussion



Limitation:

- Aggregated Data
- Limited Pitch Types
- Temporal Scope



Future Work:

- Apply methods to other pitch types
- Examine the differences between similar pitch types (e.g., sliders and sweepers)