

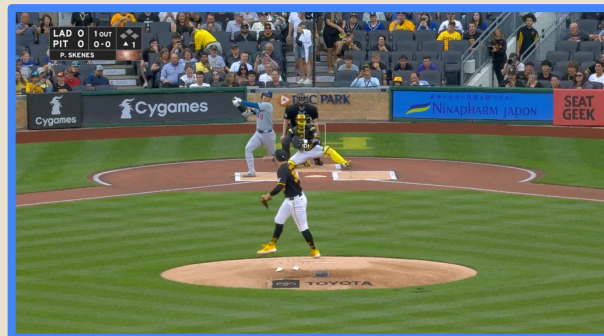
Analyzing Longevity with Pitch Decay: A New Way of Evaluating Pitchers

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Skenes, Ohtani, and Pitch Decay

- Part of our inspiration for choosing pitch decay was Lance Brozdowski's video on the 2024 matchup of Skenes and Ohtani.
- Brozdowski dives into pitch decay, how a specific pitch's efficiency decays the more a specific batter sees it,
- This matchup demonstrates how valuable pitch decay is for pitchers, even ones as good as Paul Skenes.

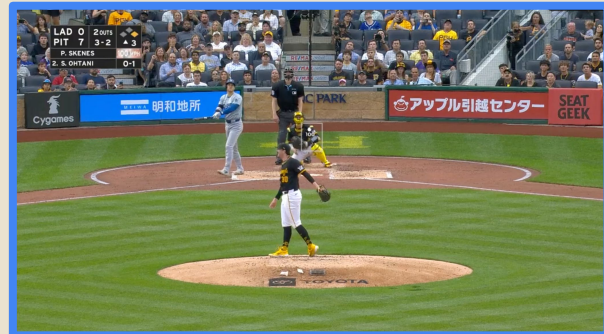
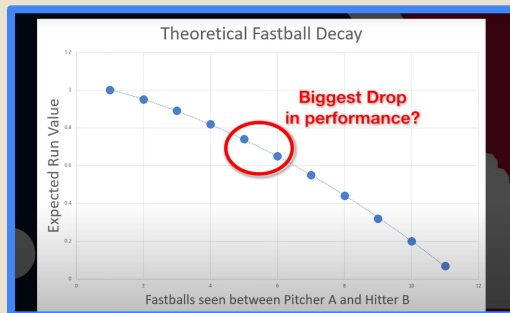


Skenes gets Ohtani to whiff on 101 inside

Fastball "Decay" Rate

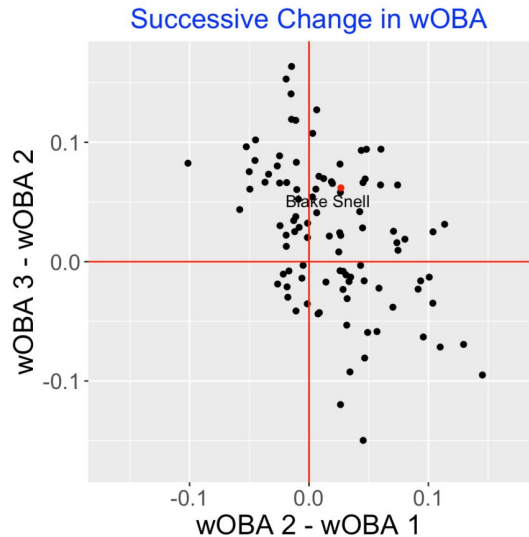
Fastball performance, after pitch X, between ONE pitcher and ONE hitter

	xwOBA (contact)
1st Fastball	.346 (?)
3rd Fastball	.352 (?)
6th Fastball	.378 (?)



Ohtani hits a 415 feet HR on 100 up and in

Previous Work: Jim Albert's Essay "Times Through The Order Effects"



- Albert compared wOBA change once a pitcher pitches further into the game using data from SPs during the 2019 MLB season
- In the chart shown, the **Y-axis** consists of wOBA during the **third** TTTO subtracted by the wOBA of their **second** TTTO.
- The X-axis is wOBA during the **second** TTTO subtracted by the wOBA of their **first** TTTO.

Previous work: Jon Roegele's "The Effect of Seeing Pitches"

- Over a three-season span (2011-2013), Roegele examined the wOBA increase per pitch to given hitter from given pitcher in given game by pitch type
- He found that, in general, "soft" pitches (breaking and offspeed) decay at a faster rate than fastballs
 - .006 wOBA increase per pitch compared to .003 wOBA per pitch
 - 2-to-1 ratio lines up with pitch usage (64% "hard" and 36% "soft")

Reveals that the "times through the order" or TTTO effect is very real and specifically impacts starting pitchers

Pitch	wOBA Delta/Pitch	Samples
Curve	.009	47420
Slider	.006	89731
Change	.006	60961
Sinker	.004	49064
Cutter	.003	29415
Two-seamer	.003	68489
Four-seamer	.002	186794

How can we expand upon this research?

- Over the past five seasons, managers in-game pitching decisions have been scrutinized by baseball fans.
- Additionally, clubs can determine if a pitcher is a true starter or a reliever by evaluating how their arsenal is affected by pitch decay
 - This allows for in-depth prospect valuation even before they fully develop their arsenal
- Do some pitch shapes decay more than others?



MLB Starters, at the Start of the Year				
Year	Through	Starts	IP/Start	Pitches/Start
2018	5/3/18	920	5.46	90.1
2019	5/1/19	908	5.28	87.6
2020	8/28/20	930	4.73	79.2
2021	5/5/21	906	5.07	83.1
2022	5/11/22	928	4.91	80.2
2023	5/3/23	926	5.18	86.9
2024	4/30/24	904	5.24	86.2

In-Game Decision Making

- In-game decision-making can be assisted by RPM data on four-seam fastballs
- Managers can use the data, particularly for lower RPM fastball pitchers, to make an early switch before pitch decay occurs, even if their velocity is still peak.
- Understanding the RPM data, managers can capitalize on the probable drop-off in RPM at a specific pitch mark, inning, or time through the order.

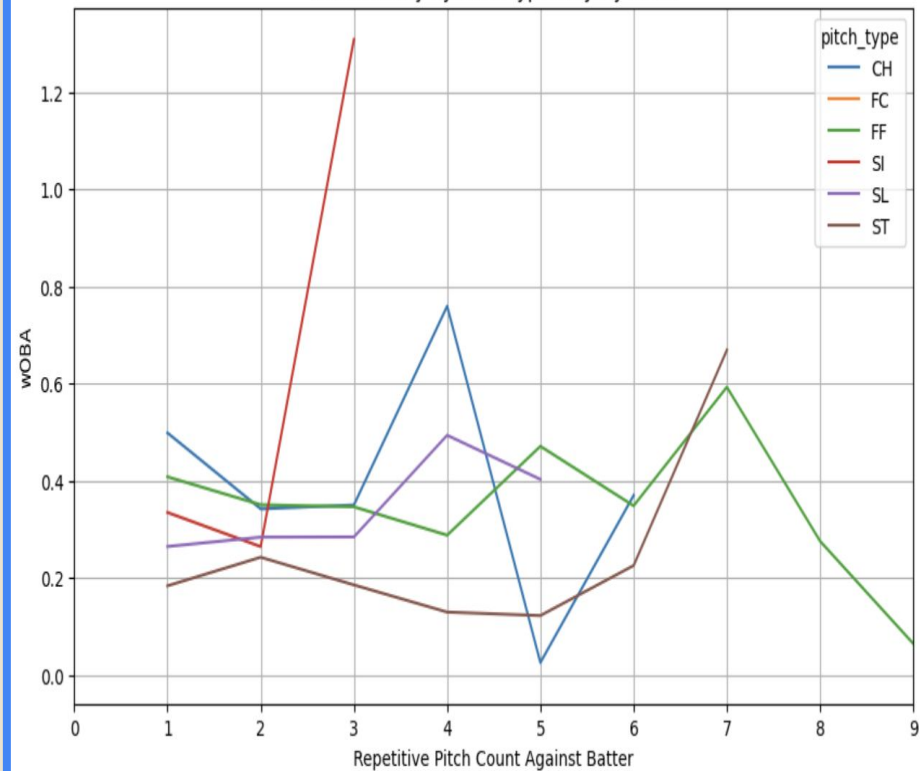


Joey Estes: Case Study

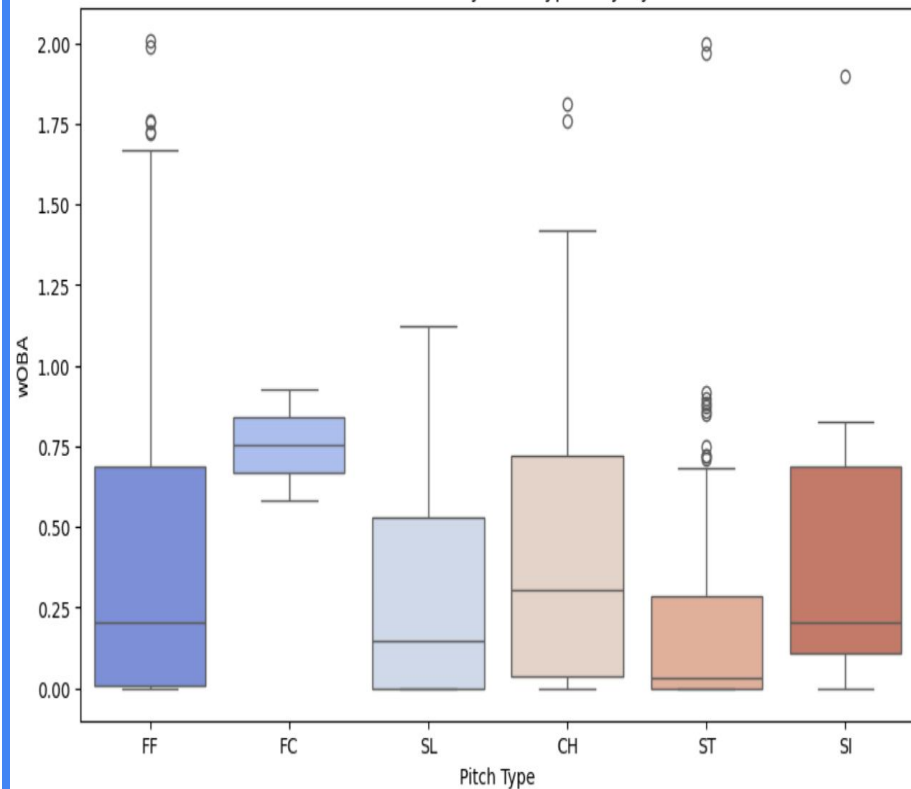
- Joey Estes, a young pitcher with potential, provides an intriguing way to understand pitch decay dynamics. Analyzing his wOBA decay trends across pitch types, spin rates, and pitch counts helps uncover actionable insights
 - Certain pitches, like Estes' slider, show more consistency after seeing repetitive pitches, while others, like his fastball, exhibit much higher variance
- Joey Estes struggles with consistency in high-leverage pitches like fastballs, especially after a batter has seen it many times, but seems to excel with his secondary pitches like his slider and sweeper



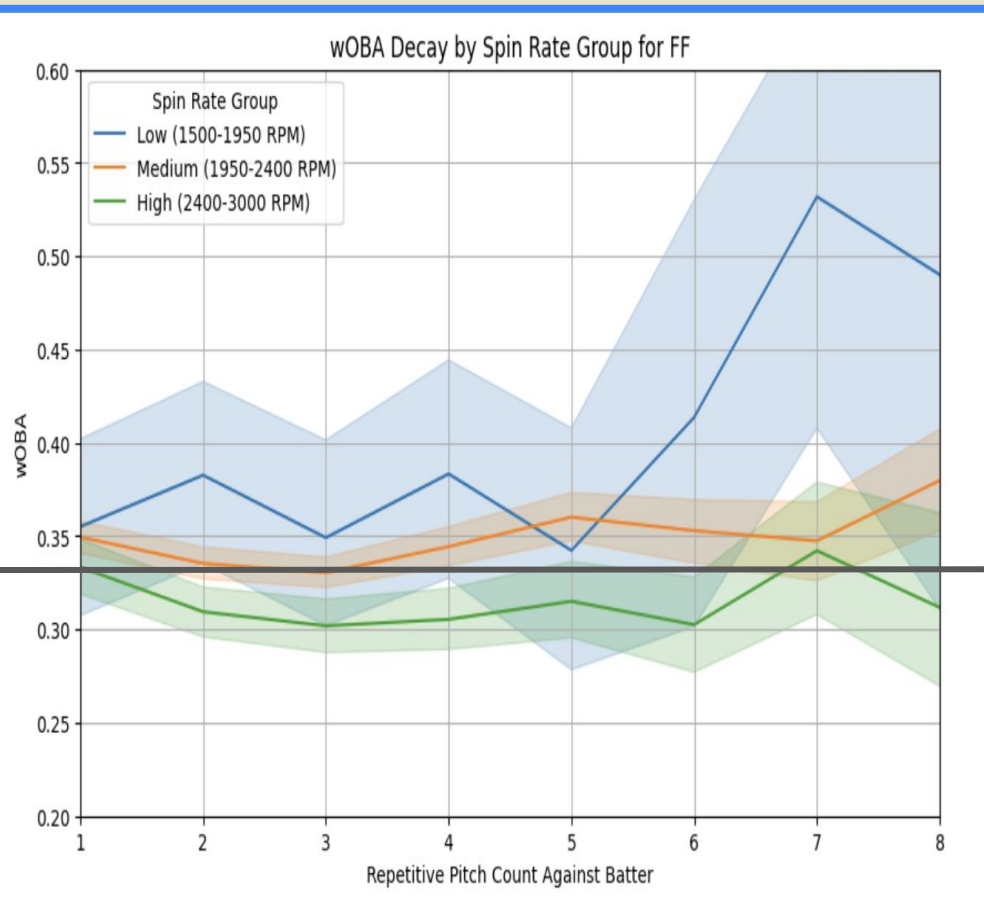
wOBA Decay by Pitch Type for Joey Estes



wOBA Distribution by Pitch Type for Joey Estes



Fastball Spin Rate Matters!



Sample Size of Buckets

Pitch Count	Low (1500-1950 RPM)	Medium (1950-2400 RPM)	High (2400-3000 RPM)
1.0	1659	53504	19579
2.0	1004	37453	14465
3.0	676	25263	9838
4.0	446	16212	6163
5.0	273	10115	3762
6.0	147	6057	2239
7.0	94	3557	1240
8.0	58	2035	735

Findings

- After experimenting and gathering data, we discovered that pitch decay is clear and evident
- Pitch decay for lower RPM (1500-1950) Four-seam fastballs demonstrates clear decay, which can decrease a pitcher's overall efficiency
- Teams can utilize this information to better manage pitching staffs and to understand the limits of each starter on their roster
- If teams had comprehended this data years ago, they could have avoided several crucial occurrences that changed the state of baseball

Blake Snell's infamous pulling in 2020

- In Game 6 of the 2020 World Series, Blake Snell had pitched 5.1 innings while allowing only two hits and zero runs when he was pulled
- The decision faced scrutiny from the baseball world
- However, if we look at it from the angle of pitch decay, instead of the third time through the order, does the defensibility of the decision change?



Pitches Seen So Far

	Betts	Seager	Turner
FF	5	5	3
SL	2	0	1
CH	2	0	3
CV	1	3	2

- Mookie Betts, Corey Seager, and Justin Turner were the three hitters due up when Snell was pulled.
- Betts and Seager were in the top 25 in runs produced above average per 100 pitches against fastballs

- We found that pitchers with over 2400 avg RPM fastballs saw their opponent's wOBA stay below the MLB average of .320 up until the batter had seen 7 fastballs
- Overall SPs with high-spin fastballs saw significantly less decay

What does this mean for baseball moving forward?

- Knowing that lower RPM fastballs decay faster, organizations can better evaluate prospects
 - Better predictive understanding of what the future of an amateur player looks like
- Allows an inside edge on other organizations as a front office can more accurately predict future value and therefore can leverage that advantage to help them win trades and sign relatively unknown talents
- Example: Mark Appel
 - Described by Sports Illustrated “as risk-free a pitcher pick has ever been made”
 - His fastball was low spin (averaged 1892, 2022) which, given our findings on its susceptibility to decay, could have given the Astros’ Organization reason to reconsider taking him at #1

Looking Forward

- Our research has offered new ideas on player valuation, in-game decisions, and a range of other subtopics within baseball
 - But there is always space to expand
- Further research could examine similar pitch decay trends with other pitch types
 - We focused on fastballs. How does spin rate for changeups affect the decay? Do curveballs with more vertical depth decay slower?