



# Which MLB stats drive wins?

Regression Analysis for Upcoming 2024 Season



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# Agenda

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Executive Summary

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# Executive Summary



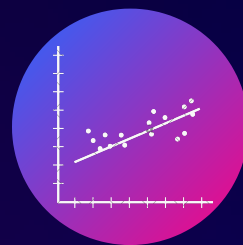
## Goals

- Which stats matter?
- Pitching > Hitting stats?
- Advanced > Traditional stats?



## Analysis

- Pitching stats show higher correlation with wins
- Pitching insights confirm traditional baseball knowledge
- Offensive insights uncover hidden knowledge.



## Regression Model: Linear Regression

- Prediction Error: 6 Wins













## Recommendations






- Skills: Impressiveness  $\neq$  Wins
- Ideal Free Agents: Yan Gomes, Adam Duvall, Clayton Kershaw, Wade Miley






# Which stats drive wins?

## Offensive





		AVG ▾	
	MLB	Regular Season	2023
1		Arraez Marlins	.377
2		Freeman Dodgers	.338
3		Acuna Braves	.335
4		Bichette Blue Jays	.321
5		Díaz Rays	.314






		BB ▾	
	MLB	Regular Season	2023
1		Soto Padres	98
2		Schwarber Phillies	80
3		Happ Cubs	78
4		Ohtani Angels	69
5		Olson Braves	67






		SB ▾	
	MLB	Regular Season	2023
1		Acuna Braves	51
2		Ruiz Athletics	43
3		Carroll D-backs	33
4		Witt Royals	31
5		Franco Rays	29






		OPS ▾	
	MLB	Regular Season	2023
1		Ohtani Angels	1.084
2		Acuna Braves	1.002
2		Freeman Dodgers	1.002
4		Olson Braves	.968
5		Betts Dodgers	.964

## Pitching

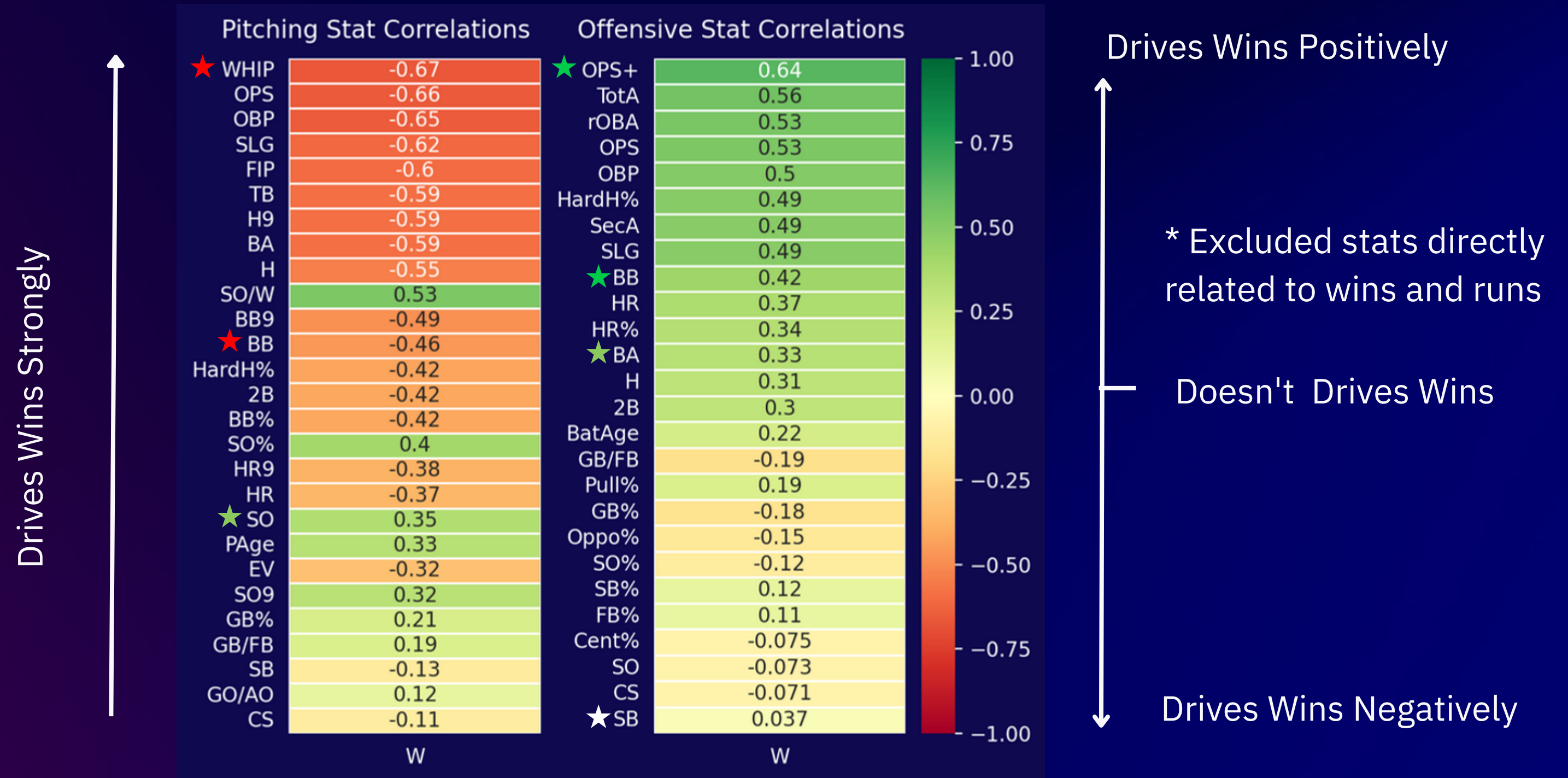
		WHIP ▾	
	MLB	Regular Season	2023
1		Eflin Rays	1.00
2		Eovaldi Rangers	1.01
2		Castillo Mariners	1.01
4		Wells Orioles	1.02
5		Cole Yankees	1.04

		SO ▾	
	MLB	Regular Season	2023
1		Strider Braves	208
2		Gausman Blue Jays	173
3		Lopez Twins	165
4		Cole Yankees	157
5		Ohtani Angels	156

		ERA ▾	
	MLB	Regular Season	2023
1		Snell Padres	2.50
2		Cole Yankees	2.64
3		Steele Cubs	2.65
4		Eovaldi Rangers	2.69
5		Castillo Mariners	2.88

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	MLB	Regular Season	2023
1		Snell Padres	68
2		Kopech White Sox	63
3		Gray Nationals	57
4		Flaherty Orioles	55
4		Senga Mets	55

# Which stats drive wins?















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## Offensive






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## Pitching






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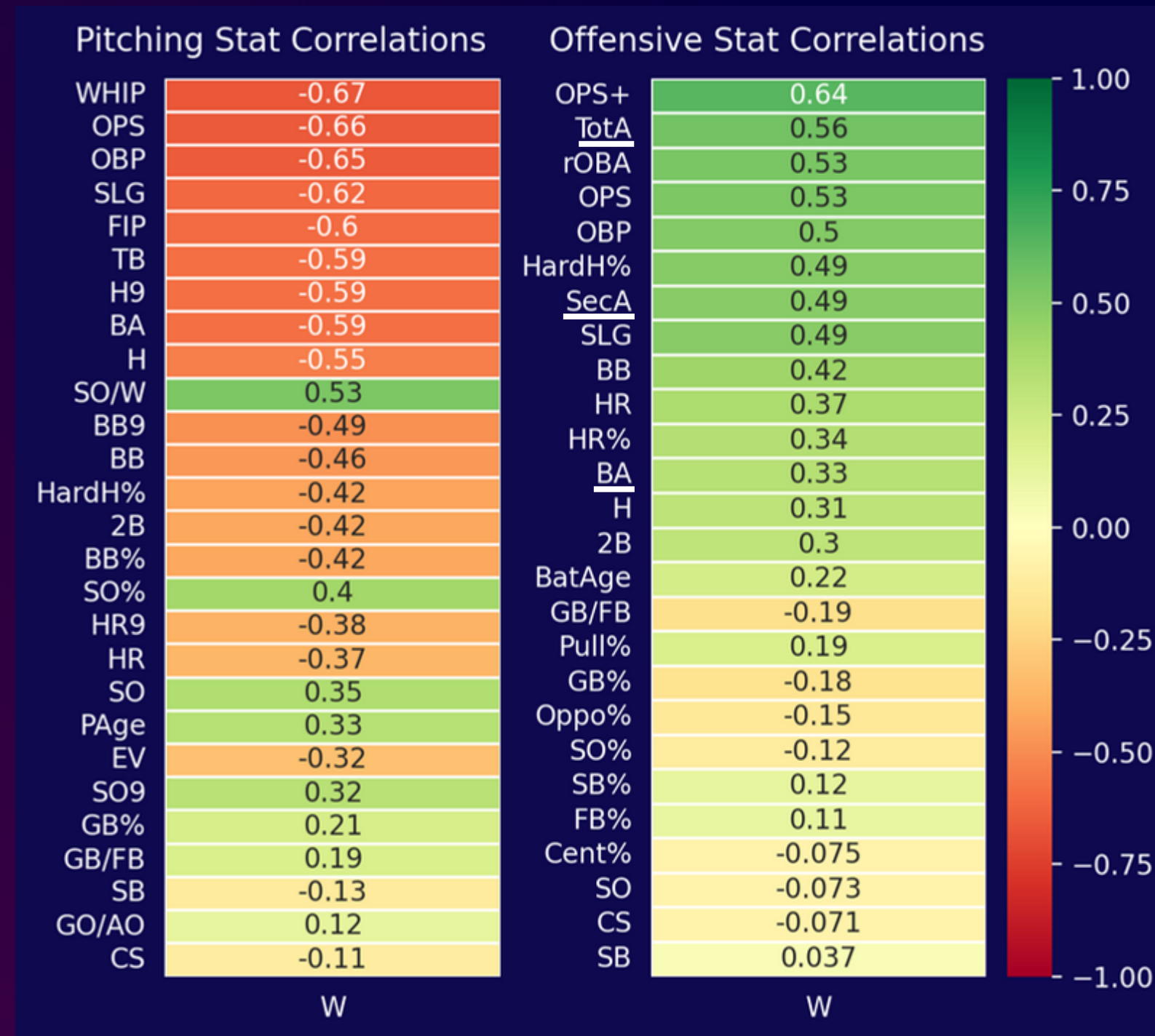
★ ERA ▾

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# Other Insights



- Advanced stats > Traditional stats

# Other Insights

Pitching Stat Correlations

WHIP	-0.67
OPS	-0.66
OBP	-0.65
SLG	-0.62
FIP	-0.6
TB	-0.59
H9	-0.59
BA	-0.59
H	-0.55
SO/W	0.53
BB9	-0.49
BB	-0.46
HardH%	-0.42
2B	-0.42
BB%	-0.42
SO%	0.4
HR9	-0.38
HR	-0.37
SO	0.35
PAge	0.33
EV	-0.32
SO9	0.32
GB%	0.21
GB/FB	0.19
SB	-0.13
GO/AO	0.12
CS	-0.11

W

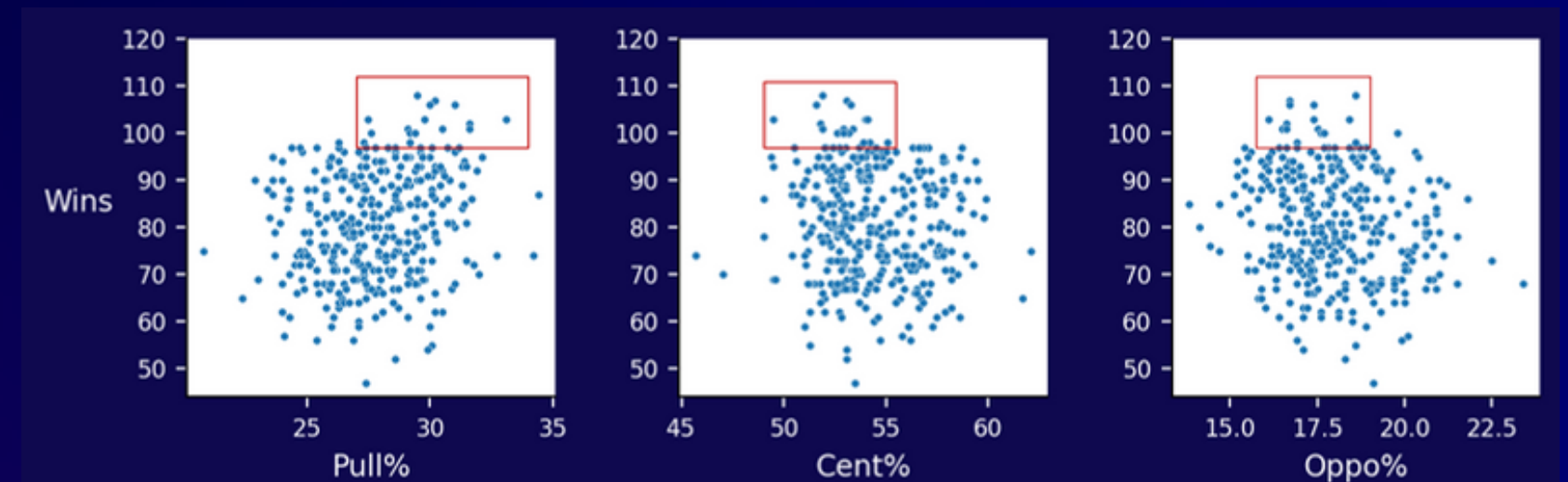
Offensive Stat Correlations

OPS+	0.64
TotA	0.56
rOBA	0.53
OPS	0.53
OBP	0.5
HardH%	0.49
SecA	0.49
SLG	0.49
BB	0.42
HR	0.37
HR%	0.34
BA	0.33
H	0.31
2B	0.3
BatAge	0.22
GB/FB	-0.19
<u>Pull%</u>	0.19
GB%	-0.18
<u>Oppo%</u>	-0.15
SO%	-0.12
SB%	0.12
FB%	0.11
<u>Cent%</u>	-0.075
SO	-0.073
CS	-0.071
SB	0.037

W

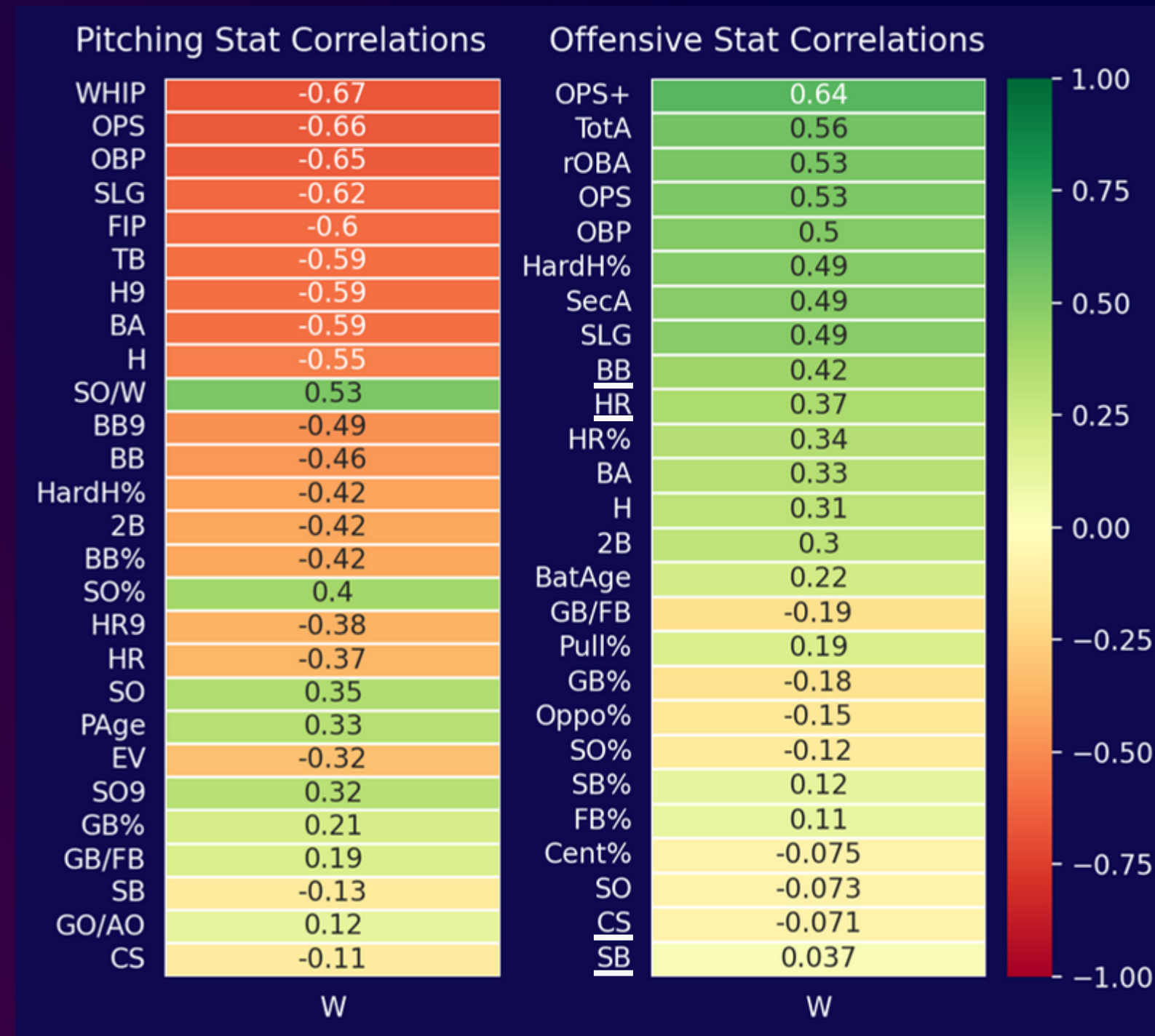


- Advanced stats > Traditional stats
- Winning teams pull more hits



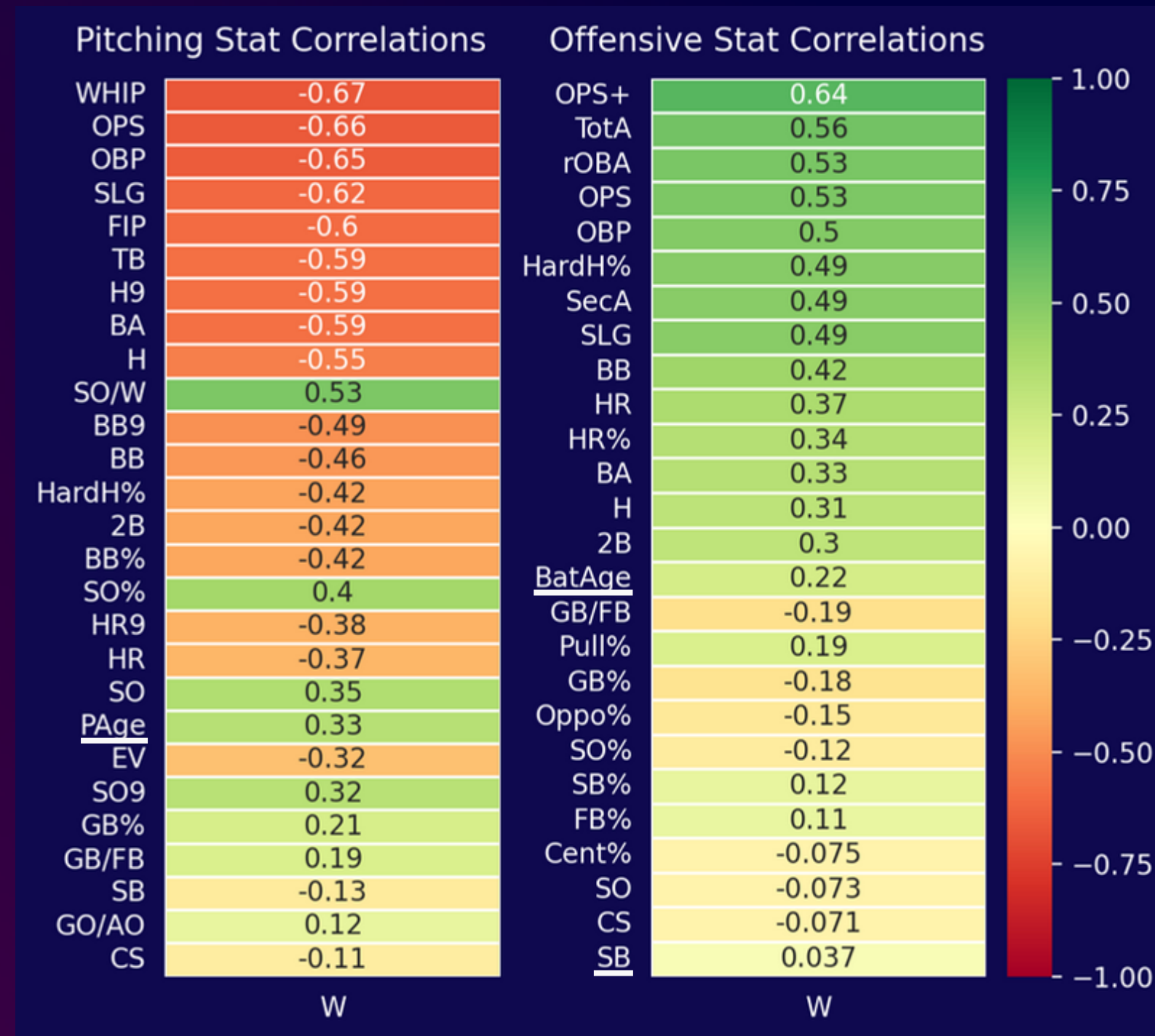


# Other Insights



- Advanced stats > Traditional stats
- Winning teams pull more hits
- Hitting stats are less predictive of wins, but uncover lesser-known insights

# Other Insights



- Advanced stats > Traditional stats
- Winning teams pull more hits
- Hitting stats are less predictive of wins, but uncover lesser-known insights
- Teams with veteran presence win more games

# Linear Regression Model

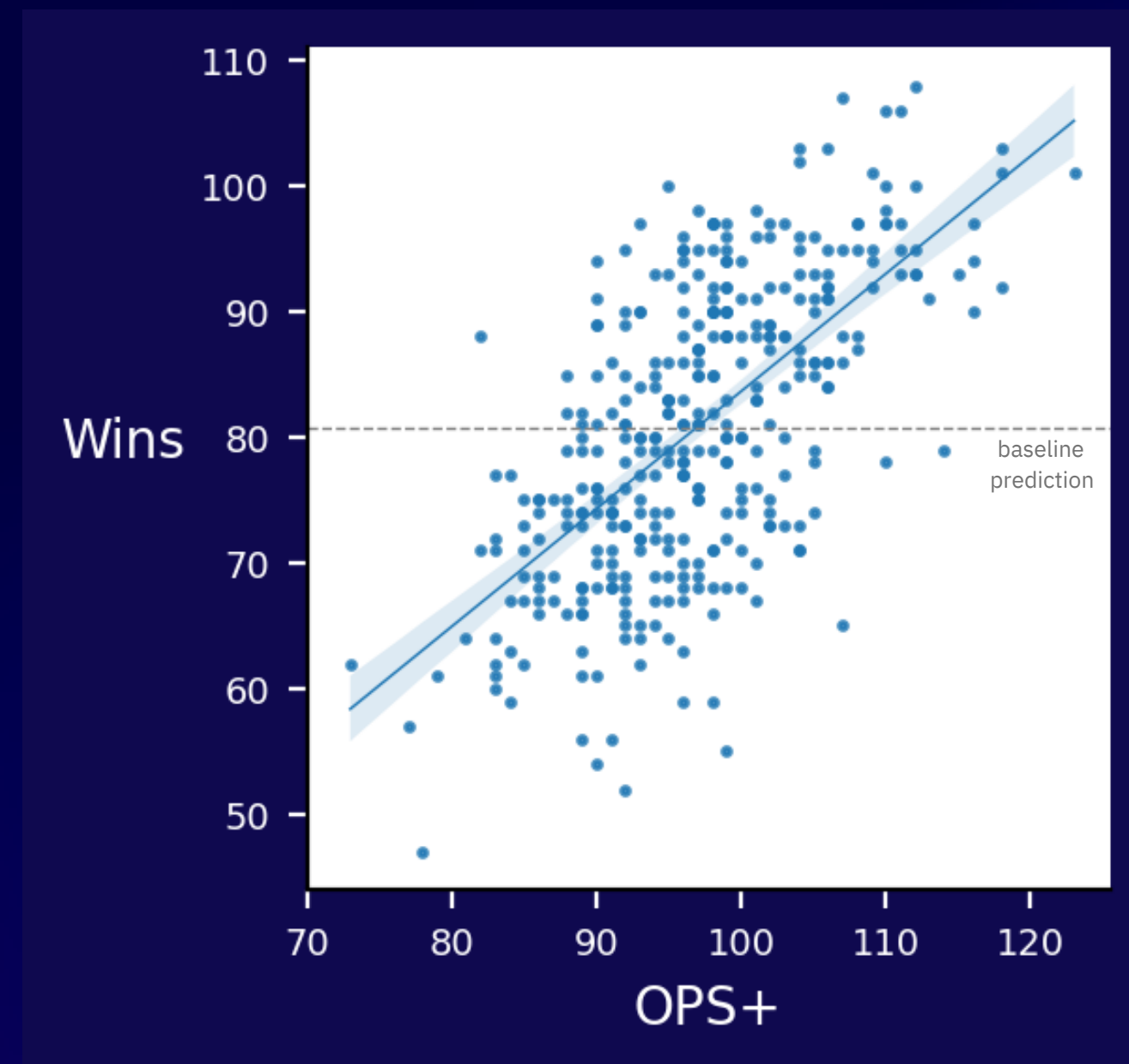
## 6 Independent Features:

- OPS+, WHIP, HRs hit, HR's allowed, Batter Age, Pitcher Age

## Performance

- Prediction Error: 6.2 Wins

Model	$R^2$	RMSE
Baseline	0.0	12.8
Linear Regression	0.77	6.2



# Linear Regression Model

## Scaled Coefficients:

- Feature Importance
- Wins added for having max over min

	Scaled Coeffs	Unscaled Coeffs
OPS+	26.89	0.54
HRs hit	16.30	0.075
Average batter age	8.28	1.02
WHIP	-25.76	-53.01
HRs allowed	-23.64	-0.11
Average pitcher age	1.90	0.24
Intercept	79.47	79.47

## Unscaled Coefficients:

- Wins Added for a unit of the given stat

	Wins Added per Unit	Unit
OPS+	5.4	10 points
HRs hit	.75	10 HRs
Average batter age	1.02	1 yr
WHIP	-5.5	.10
HRs allowed	-1.1	10 HRs
Average pitcher age	.24	1 yr
Intercept	79.4	



# Recommendations

## 2024 Offseason:

- Focus on key stats
- Team needs: C, OF, SP

### Catchers (C)



Catchers	OPS+
Mitch Garver	115
<u>Yan Gomes</u>	107
Travis d'Arnaud	107

	Catchers	OPS+
0	<u>Yan Gomes</u>	107
1	Yasmani Grandal	91
2	Mike Zunino	62
3	Omar Narvaez	57
4	Austin Hedges	27

### Outfielders (OF)



Outfielders	OPS+
Tommy Pham	126
Jorge Soler	123
<u>Adam Duvall</u>	119

Outfielders	OPS+
<u>Adam Duvall</u>	119
Kevin Kiermaier	107
Joey Gallo	99
Harrison Bader	95
Michael A. Taylor	95

# Recommendations

## 2024 Offseason:

- Focus on key stats
- Team needs: C, OF, SP

## Starting Pitchers (SP)



Pitcher	Throws	WHIP (2022)	WHIP (2023)
<u>Clayton Kershaw</u>	L	0.94	1.05
<u>Eduardo Rodriguez*</u>	L	1.33	1.05
Aaron Nola	R	0.96	1.12
Marcus Stroman*	R	1.15	1.24
Sonny Gray	R	1.13	1.27
Blake Snell	L	1.20	1.29

Pitcher	Throws	WHIP (2022)	WHIP (2023)
<u>Tyler Mahle</u>	R	1.04	1.05
Kyle Hendricks*	R	1.29	1.06
Michael Wacha*	R	1.15	1.07
<u>Wade Miley*</u>	L	1.22	1.16
Seth Lugo*	R	1.17	1.19
Julio Urías	L	0.96	1.20
Jordan Montgomery	L	1.09	1.25
Kenta Maeda	R	1.30	1.25
Mike Clevinger*	R	1.20	1.29
Andrew Heaney*	L	1.09	1.30
Ross Stripling*	R	1.02	1.34
German Marquez*	R	1.27	1.37



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[martin-reyes](https://github.com/martin-reyes)



[project link](#)

# Contact Info