2019

A Statistical Analysis of the Ouachita Baptist University Men's Baseball Team

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April 18, 2019

Abstract

In this paper, I use sabermetrics to analyze the Ouachita Baptist University men's baseball team. I run correlation and regression analyses on the hitting and fielding and pitching statistics for games the Tiger baseball team have played from the 2003 season through the 2018 season. Using these analyses plus other information on sabermetrics I have studied, I determine which statistical categories lead to success for the Ouachita baseball team. Using these determinations, I create formulas that analyze player production for position players and pitchers on the 2018 Ouachita Baptist University men's baseball team.

These formulas isolate four important factors for position player success and four important factors for pitcher success. Position player production is driven by on-base percentage (65%), slugging percentage (25%), stealing percentage (5%), and fielding percentage (5%). Pitcher production is driven by not walking or beaning hitters (35%), not giving up extra base hits (35%), striking out hitters (15%), and not giving up home runs (15%).

Introduction

Big data is a "revolution that will transform how we live, work, and think." (Mayer-Schönberger and Cukier, 2013). It has already begun to have an enormous influence within the realm of sports because sports are "subject to standard rules of human behavior and economics just like the rest of us." (Moskowitz and Wertheim 4, 2011) While in attendance at the 2018 MIT Sloan Sports Analytics Conference, I learned that technology is driving the evolution of sports business. (Adams, Collins, Leiweke, Madkour, O'Neil, and Pegula, 2018) The emergence of big data has brought on a sort of age of enlightenment to the field of sports analytics, especially in the sport of baseball through sabermetrics. Sabermetrics is defined as "detailed statistical analysis of baseball data (as for the purposes of evaluating player performance and developing playing strategies)." (Merriam-Webster, 2018) Sabermetrics has changed the game of baseball. Before sabermetrics, baseball scouts only looked at the five tools: the abilities to run, throw, field, hit, and hit with power. (Lewis 3, 2013) The focus has now shifted from not what a player looks like or what he might become, but what he has done. Sabermetrics has been popularized by Michael Lewis's book *Moneyball: The Art of Winning an Unfair Game* and the film *Moneyball* based off the book. Major League Baseball Commissioner Rob Manfred has said that "analytics have made clubs far better at valuing players." (Manfred and Ravech, 2018)

In this paper, I use sabermetrics to analyze the Ouachita Baptist University men's baseball team. I run correlation and regression analyses on the hitting and fielding and pitching statistics for games the Tiger baseball team have played from the 2003 season through the 2018 season. Using these analyses plus other information on sabermetrics I have studied, I determine which statistical categories lead to success for the Ouachita baseball team. Using these

determinations, I create formulas that will analyze player production for position players and pitchers on the 2018 Ouachita Baptist University men's baseball team.

Hitting and Fielding Correlation Analysis

The correlations of the hitting statistics for all of the games that the Ouachita Baptist University baseball team has played from 2003 through 2018 are shown in the chart below. The amount of games played during this time gives us a sample size of 829 games. "Correlation measures the degree to which two phenomena are related to one another." (Wheelan 59, 2013) The main correlations that I observe in this paper are the correlations between certain statistics and wins and losses. I want to find out what causes the Ouachita baseball team to win and lose. I am not saying that correlation implies causation, but I am saying that these correlation associations will help us find causes to wins and losses for the Ouachita baseball team throughout the course of this paper. I analyze the correlations of whether Ouachita was the home or away team, amount of at-bats, runs, hits, runs batted in, doubles, triples, home runs, amount of base on balls, amount of intentional base on balls, stolen bases, amount of times caught stealing, amount of times hit by pitch, sacrifice hits, sacrifice flies, times grounded into double plays, strikeouts, assists, errors, and batting averages to winning or losing. I group these correlations into three categories: positive correlation from strongest to weakest (which statistics are associated with the Ouachita baseball team winning), negative correlation from strongest to weakest (which statistics are associated with the Ouachita baseball team losing), and no correlation. These groupings are shown in this table.

Positive	Negative	No
R	K	GDP
RBI	E	A
H	Location (home code: 0, away code: 1)	
AVG		
BB		
2B		
SB		
HR		
3B		
HBP		
SF		
SH		
IBB		
AB		
CS		

Correlations

		w/l	loc	ab	r	h	rbi	2b	3b	hr	bb	ibb	sb	cs	hbp	sh	sf	gdp	k	po	a	e	avg
w/l	Pearson Correlation	1	-.125**	.133**	.572**	.419**	.547**	.279**	.192**	.250**	.302**	.145**	.256**	.116**	.189**	.157**	.163**	-0.036	-.224**	.202**	-0.007	-.185**	.361**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.305	0.000	0.000	0.832	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
loc	Pearson Correlation	-.125**	1	.130**	-0.007	0.032	-0.026	0.006	-0.050	.078*	-0.064	-0.034	-.163**	.077*	0.013	-0.042	-.093**	.106**	.170**	-.229**	-.084*	0.027	-0.068
	Sig. (2-tailed)	0.000		0.000	0.838	0.364	0.455	0.867	0.148	0.024	0.067	0.328	0.000	0.027	0.702	0.223	0.007	0.002	0.000	0.000	0.016	0.436	0.050
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
ab	Pearson Correlation	.133**	.130**	1	.472**	.702**	.468**	.373**	.147**	.270**	.176**	.078*	.077*	0.028	.109**	.071**	0.015	0.027	.245**	.695**	.304**	.099**	.245**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.027	0.422	0.002	0.042	0.659	0.433	0.000	0.000	0.000	0.004	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
r	Pearson Correlation	.572**	-0.007	.472**	1	.785**	.977**	.516**	.242**	.468**	.515**	.084*	.268**	.131**	.325**	.077*	.291**	-0.016	-.148**	.125**	0.004	-0.007	.466**
	Sig. (2-tailed)	0.000	0.838	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.026	0.000	0.652	0.000	0.000	0.908	0.831	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
h	Pearson Correlation	.419**	0.032	.702**	.785**	1	.786**	.557**	.245**	.391**	.251**	.090**	.173**	.152**	.150**	.117**	.200**	.097**	-.122**	.244**	0.052	0.015	.583**
	Sig. (2-tailed)	0.000	0.364	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.001	0.000	0.005	0.000	0.000	0.133	0.673	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
rbi	Pearson Correlation	.547**	-0.026	.468**	.977**	.786**	1	.523**	.247**	.497**	.492**	.073*	.241**	.119**	.320**	0.064	.285**	-0.027	-.161**	.120**	-0.005	-0.013	.469**
	Sig. (2-tailed)	0.000	0.455	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.036	0.000	0.001	0.000	0.067	0.000	0.436	0.000	0.001	0.877	0.717	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
2b	Pearson Correlation	.279**	0.006	.373**	.516**	.557**	.523**	1	.107**	.188**	.183**	.085*	.081*	.090**	.122**	0.065	.110**	-0.011	-0.068	.109**	0.023	-0.014	.286**
	Sig. (2-tailed)	0.000	0.867	0.000	0.000	0.000	0.000		0.002	0.000	0.000	0.014	0.019	0.009	0.000	0.062	0.002	0.752	0.051	0.002	0.517	0.689	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
3b	Pearson Correlation	.192**	-0.050	.147**	.242**	.245**	.247**	.107**	1	.149**	0.022	-0.033	.074*	.112**	0.054	0.016	0.064	-0.054	-0.001	.069*	0.065	-0.004	.175**
	Sig. (2-tailed)	0.000	0.148	0.000	0.000	0.000	0.000	0.002		0.000	0.527	0.347	0.032	0.001	0.119	0.640	0.066	0.121	0.976	0.048	0.062	0.919	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
hr	Pearson Correlation	.250**	.078*	.270**	.468**	.391**	.497**	.188**	.149**	1	.171**	0.037	0.027	0.057	0.063	-0.065	0.003	0.012	-0.031	0.051	-0.022	-0.012	.299**
	Sig. (2-tailed)	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.293	0.430	0.102	0.070	0.061	0.932	0.741	0.371	0.141	0.520	0.723	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
bb	Pearson Correlation	.302**	-0.064	.176**	.515**	.251**	.492**	.183**	0.022	.171**	1	.157**	.256**	.150**	.198**	.069*	.205**	0.007	-0.025	.217**	0.041	-0.027	.164**
	Sig. (2-tailed)	0.000	0.067	0.000	0.000	0.000	0.000	0.000	0.527	0.000		0.000	0.000	0.000	0.000	0.048	0.000	0.850	0.474	0.000	0.234	0.441	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
ibb	Pearson Correlation	.145**	-0.034	.078*	.084*	.090**	.073*	.085*	-0.033	0.037	.157**	1	0.059	0.051	0.023	.081*	0.006	0.000	-0.003	.111**	0.018	0.057	0.066
	Sig. (2-tailed)	0.000	0.328	0.025	0.015	0.010	0.036	0.014	0.347	0.293	0.000		0.088	0.141	0.517	0.019	0.855	0.993	0.936	0.001	0.595	0.098	0.058
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
sb	Pearson Correlation	.256**	-.163**	.077*	.268**	.173**	.241**	.081*	.074*	0.027	.256**	0.059	1	0.037	.169**	-.106**	.125**	-0.025	-.103**	.069*	-0.033	-.105**	.157**
	Sig. (2-tailed)	0.000	0.000	0.027	0.000	0.000	0.000	0.019	0.032	0.430	0.000	0.088		0.293	0.000	0.002	0.000	0.477	0.003	0.047	0.339	0.002	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
cs	Pearson Correlation	.116**	.077*	0.028	.131**	.152**	.119**	.090**	.112**	0.057	.150**	0.051	0.037	1	0.053	0.028	0.007	-0.032	0.018	0.061	0.026	-0.026	.080*
	Sig. (2-tailed)	0.001	0.027	0.422	0.000	0.000	0.001	0.009	0.001	0.102	0.000	0.141	0.293		0.124	0.428	0.841	0.354	0.612	0.081	0.447	0.447	0.021
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
hbp	Pearson Correlation	.189**	0.013	.109**	.325**	.150**	.320**	.122**	0.054	0.063	.198**	0.023	.169**	0.053	1	.097**	.126**	.072*	-0.057	.116**	0.007	-0.040	.114**
	Sig. (2-tailed)	0.000	0.702	0.002	0.000	0.000	0.000	0.000	0.119	0.070	0.000	0.517	0.000	0.124		0.005	0.000	0.039	0.099	0.001	0.843	0.245	0.001
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
sh	Pearson Correlation	.157**	-0.042	.071*	.077*	.117**	0.064	0.065	0.016	-0.065	.069*	.081*	-.106**	0.028	.097**	1	0.051	-.108**	-0.026	.261**	.097**	-0.045	.079*
	Sig. (2-tailed)	0.000	0.223	0.042	0.026	0.001	0.067	0.062	0.640	0.061	0.048	0.019	0.002	0.428	0.005		0.143	0.002	0.455	0.000	0.005	0.197	0.023
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
sf	Pearson Correlation	.163**	-.093**	0.015	.291**	.200**	.285**	.110**	0.064	0.003	.205**	0.006	.125**	0.007	.126**	0.051	1	0.000	-.134**	0.056	-0.008	-0.024	.174**
	Sig. (2-tailed)	0.000	0.007	0.659	0.000	0.000	0.000	0.002	0.066	0.932	0.000	0.855	0.000	0.841	0.000	0.143		0.991	0.000	0.108	0.819	0.488	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
gdp	Pearson Correlation	-0.036	.106**	0.027	-0.016	.097**	-0.027	-0.011	-0.054	0.012	0.007	0.000	-0.025	-0.032	.072*	-.108**	0.000	1	-.091**	-0.009	-0.054	-0.009	.090**
	Sig. (2-tailed)	0.305	0.002	0.433	0.652	0.005	0.436	0.752	0.121	0.741	0.850	0.993	0.477	0.354	0.039	0.002	0.991		0.008	0.798	0.121	0.786	0.009
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
k	Pearson Correlation	-.224**	.170**	.245**	-.148**	-.122**	-.161**	-0.068	-0.001	-0.031	-0.025	-0.003	-.103**	0.018	-0.057	-0.026	-.134**	-.091**	1	.251**	.182**	.132**	-.233**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.976	0.371	0.474	0.936	0.003	0.612	0.099	0.455	0.000	0.008		0.000	0.000	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
a	Pearson Correlation	-0.007	-.084*	.304**	0.004	0.052	-0.005	0.023	0.065	-0.022	0.041	0.018	-0.033	0.026	0.007	.097**	-0.008	-0.054	.182**	.426**	1	0.062	-0.057
	Sig. (2-tailed)	0.832	0.016	0.000	0.908	0.133	0.877	0.517	0.062	0.520	0.234	0.595	0.339	0.447	0.843	0.005	0.819	0.121	0.000	0.000		0.072	0.103
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
e	Pearson Correlation	-.185**	0.027	.099**	-0.007	0.015	-0.013	-0.014	-0.004	-0.012	-0.027	0.057	-.105**	-0.026	-0.040	-0.045	-0.024	-0.009	.132**	0.011	0.062	1	-0.064
	Sig. (2-tailed)	0.000	0.436	0.004	0.831	0.673	0.717	0.689	0.919	0.723	0.441	0.098	0.002	0.447	0.245	0.197	0.488	0.786	0.000	0.741	0.072		0.066
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
avg	Pearson Correlation	.361**	-0.068	.245**	.466**	.583**	.469**	.286**	.175**	.299**	.164**	0.066	.157**	.080*	.114**	.079*	.174**	.090**	-.233**	0.008	-0.057	-0.064	1
	Sig. (2-tailed)	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.000	0.021	0.001	0.023	0.000	0.009	0.000	0.826	0.103	0.066	
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Location Regression Analysis

"Regression analysis allows us to quantify the relationship between a particular variable and an outcome that we care about while *controlling for other factors*." (Wheelan 186, 2013) The outcome that I care about in this paper is winning baseball games. In these next couple of sections, I analyze the regressions of the statistics that are positively correlated with Ouachita winning baseball games to see how significant the effects of these statistics on winning baseball games really are. The adjusted r square for the relationship between playing home games and winning for the Ouachita baseball team is 0.015. This means that Ouachita has a 1.5% higher chance of winning a baseball game if it is the home team instead of the away team.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.125[a]	0.016	0.015	0.497

a. Predictors: (Constant), loc

At-Bats Regression Analysis

The adjusted r square for the relationship between the number of at-bats Ouachita has and winning is 0.017. This means that Ouachita having more at-bats has a 1.7% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.133[a]	0.018	0.017	0.496

a. Predictors: (Constant), ab

Runs Regression Analysis

The adjusted r square for the relationship between the number of runs Ouachita gets and winning is 0.327. This means that Ouachita having more runs has a 32.7% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.572[a]	0.328	0.327	0.410

a. Predictors: (Constant), r

Hits Regression Analysis

The adjusted r square for the relationship between the number of hits Ouachita gets and winning is 0.175. This means that Ouachita having more hits has a 17.5% positive effect on Ouachita's probability of winning a baseball game.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.419[a]	0.176	0.175	0.454
a. Predictors: (Constant), h				

Runs Batted In Regression Analysis

The adjusted r square for the relationship between the number of runs batted in Ouachita gets and winning is 0.298. This means that Ouachita having more runs batted in has a 29.8% positive effect on Ouachita's probability of winning a baseball game.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.547[a]	0.299	0.298	0.419
a. Predictors: (Constant), rbi				

Doubles Regression Analysis

The adjusted r square for the relationship between the number of doubles Ouachita gets and winning is 0.077. This means that Ouachita having more doubles has a 7.7% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.279[a]	0.078	0.077	0.481

a. Predictors: (Constant), 2b

Triples Regression Analysis

The adjusted r square for the relationship between the number of triples Ouachita gets and winning is 0.036. This means that Ouachita having more triples has a 3.6% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.192[a]	0.037	0.036	0.491

a. Predictors: (Constant), 3b

Home Runs Regression Analysis

The adjusted r square for the relationship between the number of home runs Ouachita gets and winning is 0.062. This means that Ouachita having more home runs has a 6.2% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.250[a]	0.063	0.062	0.485

a. Predictors: (Constant), hr

Base on Balls Regression Analysis

The adjusted r square for the relationship between the amount of base on balls Ouachita gets and winning is 0.09. This means that Ouachita having more base on balls has a 9% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.302[a]	0.091	0.090	0.477

a. Predictors: (Constant), bb

Intentional Base on Balls Regression Analysis

The adjusted r square for the relationship between the amount of intentional base on balls Ouachita gets and winning is 0.02. This means that Ouachita having more intentional base on balls has a 2% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.145[a]	0.021	0.020	0.495

a. Predictors: (Constant), ibb

Stolen Bases Regression Analysis

The adjusted r square for the relationship between the number of stolen bases Ouachita gets and winning is 0.064. This means that Ouachita having more stolen bases has a 6.4% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.256[a]	0.065	0.064	0.484

a. Predictors: (Constant), sb

Caught Stealing Regression Analysis

The adjusted r square for the relationship between the number of times Ouachita is caught stealing and winning is 0.012. This means that Ouachita getting caught stealing more has a 1.2% positive effect on Ouachita's probability of winning a baseball game. This does not make much

sense since getting caught stealing has a negative result. I think the reason the results turned out like this is because Ouachita wins more when they are more aggressive stealing bases.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.116[a]	0.014	0.012	0.497

a. Predictors: (Constant), cs

Hit by Pitch Regression Analysis

The adjusted r square for the relationship between the number of times Ouachita is hit by a pitch and winning is 0.034. This means that Ouachita getting hit by pitches more has a 3.4% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.189[a]	0.036	0.034	0.492

a. Predictors: (Constant), hbp

Sacrifice Hits Regression Analysis

The adjusted r square for the relationship between the number of sacrifice hits Ouachita gets and winning is 0.023. This means that Ouachita having more sacrifice hits has a 2.3% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.157[a]	0.025	0.023	0.494

a. Predictors: (Constant), sh

Sacrifice Flies Regression Analysis

The adjusted r square for the relationship between the number of sacrifice flies Ouachita gets and winning is 0.025. This means that Ouachita having more sacrifice flies has a 2.5% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.163[a]	0.027	0.025	0.494

a. Predictors: (Constant), sf

Times Grounded into Double Plays Regression Analysis

The adjusted r square for the relationship between the number of times Ouachita grounded into double plays and winning is 0. This means that Ouachita grounding into double plays has virtually no effect on Ouachita's chance of winning a baseball game. This does not make much sense since grounding into a double play has a negative result. I think the reason the results turned out like this is because grounding into double plays means that Ouachita is not struggling with getting the ball into play rather than having a lot of strikeouts.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.036[a]	0.001	0.000	0.500

a. Predictors: (Constant), gdp

Strikeouts Regression Analysis

The adjusted r square for the relationship between Ouachita having less strikeouts and winning is 0.049. This means that Ouachita having more strikeouts has a 4.9% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.224[a]	0.050	0.049	0.488

a. Predictors: (Constant), k

Assists Regression Analysis

The adjusted r square for the relationship between the number of assists Ouachita gets and winning is -0.001. This means that the number of assists Ouachita gets has virtually no effect on whether Ouachita wins a baseball game or not.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.007[a]	0.000	-0.001	0.501

a. Predictors: (Constant), a

Errors Regression Analysis

The adjusted r square for the relationship between the less errors Ouachita commits and winning is 0.033. This means that Ouachita having more errors has a 3.3% negative effect on Ouachita's probability of winning a baseball game.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.185[a]	0.034	0.033	0.492
a. Predictors: (Constant), e				

Batting Average Regression Analysis

The adjusted r square for the relationship between Ouachita's batting averages and winning is 0.129. This means that Ouachita having higher batting averages has a 12.9% positive effect on Ouachita's probability of winning a baseball game.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.361[a]	0.130	0.129	0.467
a. Predictors: (Constant), avg				

Pitching Correlation Analysis

The correlations of the pitching statistics for all of the games that the Ouachita Baptist University baseball team has played from 2003 through 2018 are shown in the chart below. I analyze the correlations of the amount of hits, runs, earned runs, base on balls, strikeouts, doubles, triples, home runs, wild pitches, balks, hit by pitches, intentional walks, and earned run

averages for Ouachita pitchers to winning or losing. I group these correlations into three categories: positive correlation from strongest to weakest (which statistics are associated with the Ouachita baseball team winning), negative correlation from strongest to weakest (which statistics are associated with the Ouachita baseball team losing), and no correlation. These groupings are shown in this table.

Positive	Negative	No
SO	R	BK
	ER	IBB
	H	
	ERA	
	2B	
	BB	
	WP	
	HBP	
	HR	
	3B	

Correlations

		w/l	loc	h	r	er	bb	so	2b	3b	hr	wp	bk	hbp	ibb	OBU Score	Opponent Score	era
w/l	Pearson Correlation	1	-.125**	-.416**	-.548**	-.501**	-.287**	.251**	-.313**	-.187**	-.200**	-.256**	-0.034	-.220**	0.000	.572**	-.548**	-.394**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.324	0.000	0.999	0.000	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
loc	Pearson Correlation	-.125**	1	0.055	.084*	.091**	-0.033	-0.053	0.049	0.047	0.048	.126**	0.052	0.026	.123**	-0.007	.084*	.114**
	Sig. (2-tailed)	0.000		0.116	0.016	0.008	0.340	0.131	0.156	0.174	0.167	0.000	0.137	0.457	0.000	0.838	0.015	0.001
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
h	Pearson Correlation	-.416**	0.055	1	.790**	.765**	.228**	-.175**	.568**	.202**	.352**	.259**	.091**	.176**	0.044	-0.004	.790**	.424**
	Sig. (2-tailed)	0.000	0.116		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.205	0.905	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
r	Pearson Correlation	-.548**	.084*	.790**	1	.939**	.466**	-.209**	.538**	.240**	.424**	.350**	.087*	.349**	-0.010	-0.035	1.000**	.607**
	Sig. (2-tailed)	0.000	0.016	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.765	0.309	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
er	Pearson Correlation	-.501**	.091**	.765**	.939**	1	.466**	-.191**	.506**	.230**	.461**	.328**	.089*	.359**	0.006	-0.022	.938**	.620**
	Sig. (2-tailed)	0.000	0.008	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.867	0.521	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
bb	Pearson Correlation	-.287**	-0.033	.228**	.466**	.466**	1	-0.030	.195**	0.041	.095**	.249**	.072*	.238**	0.007	-0.048	.466**	.312**
	Sig. (2-tailed)	0.000	0.340	0.000	0.000	0.000		0.385	0.000	0.239	0.006	0.000	0.038	0.000	0.840	0.167	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
so	Pearson Correlation	.251**	-0.053	-.175**	-.209**	-.191**	-0.030	1	-.107**	-0.046	-0.044	0.000	-0.051	0.005	-0.061	.125**	-.209**	-.205**
	Sig. (2-tailed)	0.000	0.131	0.000	0.000	0.000	0.385		0.002	0.188	0.204	1.000	0.140	0.887	0.080	0.000	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
2b	Pearson Correlation	-.313**	0.049	.568**	.538**	.506**	.195**	-.107**	1	.078*	.122**	.154**	0.066	.126**	-0.021	-0.040	.538**	.373**
	Sig. (2-tailed)	0.000	0.156	0.000	0.000	0.000	0.000	0.002		0.025	0.000	0.000	0.058	0.000	0.537	0.249	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
3b	Pearson Correlation	-.187**	0.047	.202**	.240**	.230**	0.041	-0.046	.078*	1	0.036	.091**	-0.027	0.047	-0.012	-0.030	.240**	.171**
	Sig. (2-tailed)	0.000	0.174	0.000	0.000	0.000	0.239	0.188	0.025		0.303	0.009	0.430	0.175	0.733	0.389	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
hr	Pearson Correlation	-.200**	0.048	.352**	.424**	.461**	.095**	-0.044	.122**	0.036	1	.079*	0.012	0.028	-0.003	0.031	.424**	.200**
	Sig. (2-tailed)	0.000	0.167	0.000	0.000	0.000	0.006	0.204	0.000	0.303		0.024	0.740	0.429	0.935	0.371	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
wp	Pearson Correlation	-.256**	.126**	.259**	.350**	.328**	.249**	0.000	.154**	.091**	.079*	1	0.029	.199**	-0.012	-0.049	.349**	.243**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.009	0.024		0.409	0.000	0.737	0.158	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
bk	Pearson Correlation	-0.034	0.052	.091**	.087*	.089*	.072*	-0.051	0.066	-0.027	0.012	0.029	1	-0.016	-0.037	-0.012	.086*	.086*
	Sig. (2-tailed)	0.324	0.137	0.009	0.013	0.011	0.038	0.140	0.058	0.430	0.740	0.409		0.643	0.288	0.730	0.013	0.013
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
hbp	Pearson Correlation	-.220**	0.026	.176**	.349**	.359**	.238**	0.005	.126**	0.047	0.028	.199**	-0.016	1	0.036	-0.041	.349**	.220**
	Sig. (2-tailed)	0.000	0.457	0.000	0.000	0.000	0.000	0.887	0.000	0.175	0.429	0.000	0.643		0.294	0.242	0.000	0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
ibb	Pearson Correlation	0.000	.123**	0.044	-0.010	0.006	0.007	-0.061	-0.021	-0.012	-0.003	-0.012	-0.037	0.036	1	0.032	-0.010	0.009
	Sig. (2-tailed)	0.999	0.000	0.205	0.765	0.867	0.840	0.080	0.537	0.733	0.935	0.737	0.288	0.294		0.361	0.763	0.788
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
OBU Score	Pearson Correlation	.572**	-0.007	-0.004	-0.035	-0.022	-0.048	.125**	-0.040	-0.030	0.031	-0.049	-0.012	-0.041	0.032	1	-0.036	-.090**
	Sig. (2-tailed)	0.000	0.838	0.905	0.309	0.521	0.167	0.000	0.249	0.389	0.371	0.158	0.730	0.242	0.361		0.305	0.010
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
Opponent Score	Pearson Correlation	-.548**	.084*	.790**	1.000**	.938**	.466**	-.209**	.538**	.240**	.424**	.349**	.086*	.349**	-0.010	-0.036	1	.607**
	Sig. (2-tailed)	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.763	0.305		0.000
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829
era	Pearson Correlation	-.394**	.114**	.424**	.607**	.620**	.312**	-.205**	.373**	.171**	.200**	.243**	.086*	.220**	0.009	-.090**	.607**	1
	Sig. (2-tailed)	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.788	0.010	0.000	
	N	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Hits Regression Analysis

The adjusted r square for the relationship between Ouachita giving up less hits and winning is 0.172. This means that Ouachita giving up more hits has a 17.2% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.416[a]	0.173	0.172	0.455

a. Predictors: (Constant), h

Runs Regression Analysis

The adjusted r square for the relationship between Ouachita giving up less runs and winning is 0.299. This means that Ouachita giving up more runs has a 29.9% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.548[a]	0.300	0.299	0.419

a. Predictors: (Constant), r

Earned Runs Regression Analysis

The adjusted r square for the relationship between Ouachita giving up less earned runs and winning is 0.25. This means that Ouachita giving up more earned runs has a 25% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.501[a]	0.251	0.250	0.433

a. Predictors: (Constant), er

Base on Balls Regression Analysis

The adjusted r square for the relationship between Ouachita pitching less base on balls and winning is 0.082. This means that Ouachita pitching more base on balls has an 8.2% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.287[a]	0.083	0.082	0.479

a. Predictors: (Constant), bb

Strikeouts Regression Analysis

The adjusted r square for the relationship between Ouachita pitching more strikeouts and winning is 0.062. This means that Ouachita pitching more strikeouts has a 6.2% positive effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.251[a]	0.063	0.062	0.485

a. Predictors: (Constant), so

Doubles Regression Analysis

The adjusted r square for the relationship between Ouachita giving up less doubles and winning is 0.097. This means that Ouachita giving up more doubles has a 9.7% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.313[a]	0.098	0.097	0.476

a. Predictors: (Constant), 2b

Triples Regression Analysis

The adjusted r square for the relationship between Ouachita giving up less triples and winning is 0.034. This means that Ouachita giving up more triples has a 3.4% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.187[a]	0.035	0.034	0.492

a. Predictors: (Constant), 3b

Home Runs Regression Analysis

The adjusted r square for the relationship between Ouachita giving up less home runs and winning is 0.039. This means that Ouachita giving up more home runs has a 3.9% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.200[a]	0.040	0.039	0.490

a. Predictors: (Constant), hr

Wild Pitches Regression Analysis

The adjusted r square for the relationship between Ouachita throwing fewer wild pitches and winning is 0.065. This means that Ouachita throwing more wild pitches has a 6.5% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.256[a]	0.066	0.065	0.484

a. Predictors: (Constant), wp

Balks Regression Analysis

The adjusted r square for the relationship between the amount of balks Ouachita commits and winning is 0. This means that the number of balks Ouachita commits has virtually no effect on Ouachita's chance of winning a baseball game. This does not make much sense since committing a balk is a negative thing. I think the reason that the results turned out like this is that Ouachita does not commit many balks.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.034[a]	0.001	0.000	0.500

a. Predictors: (Constant), bk

Hit by Pitch Regression Analysis

The adjusted r square for the relationship between Ouachita beaning less batters and winning is 0.047. This means that Ouachita beaning more batters has a 4.7% negative effect on Ouachita's probability of winning a baseball game.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.220[a]	0.049	0.047	0.488

a. Predictors: (Constant), hbp

Intentional Walk Regression Analysis

The adjusted r square for the relationship between the number of intentional walks Ouachita throws and winning is -0.001. This means that intentional walks have virtually no effect on whether Ouachita wins or loses a baseball game. While intentional walks have a negative result, managers call for intentional walks when they believe that the negative result of an intentional walk will help the team avoid an even more negative result. This result shows that the intentional walks that Ouachita managers have called for have neither helped nor hurt the team.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.000[a]	0.000	-0.001	0.501
a. Predictors: (Constant), ibb				

Earned Run Average Regression Analysis

The relationship between Ouachita having a lower earned run average and winning is 0.154. This means that Ouachita having a higher earned run average has a 15.4% negative effect on Ouachita's probability of winning a baseball game.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.394[a]	0.155	0.154	0.460
a. Predictors: (Constant), era				

Player Production Formula for Position Players

My formula for player production for position players on the Ouachita baseball team is 0.65(On-Base Percentage) + 0.25(Slugging Percentage) + 0.05(Stealing Percentage) + 0.05(Fielding Percentage). My correlation and regression analyses along with my reading into sabermetrics help me shape this formula.

There are numerous reasons that I weigh on-base percentage as 65% of a position player's value. All the statistics that involved Ouachita players getting on base had significantly positive effects on whether Ouachita would win a baseball game. Former Major League Baseball executive Sandy Alderson once concluded that "the number of runs a team scored bore little relation to that team's batting average. It correlated much more exactly with a team's on-base and slugging percentages." (Lewis 57, 2013) Former aerospace engineer turned baseball writer Eric Walker said that "the most important isolated (one-dimensional) offensive statistic is the on-base percentage." (Lewis 58, 2013) Former Major League Baseball executive Paul DePodesta had a model that weighed an extra point of on-base percentage at about three times an extra point of slugging percentage. (Lewis 128, 2013)

There are numerous reasons that I weigh slugging percentage as 25% of a position player's value. As touched on in the paragraph before, slugging percentage is very important to any team winning a baseball game, including Ouachita. As seen in my correlation and regression analyses, batting average and extra base hits have significantly positive effects on whether Ouachita wins a baseball game.

There are numerous reasons that I weigh stealing percentage as 5% of a position player's value. I want to use a statistic that can help me measure a player's speed, so I can better value that player. As seen in my correlation and regression analyses earlier, stolen bases do have a significantly positive effect on whether Ouachita wins a baseball game.

There are numerous reasons that I weigh fielding percentage as 5% of a position player's value. I want to use a statistic that can help me measure a player's ability to field, but I do not want to overweigh that value. Dan Turkenkopf, director of baseball research and development for the Milwaukee Brewers, has said that "despite WARP treating both hitting and fielding as

equally reliable components, the more a rating is influenced by its fielding component, the more skeptical we should be." (Carty, Dawkins, Fast, Glass, Goldman, Goldstein, Jaffe, Jazayerli, Kahrl, Lindbergh, Parks, Turkenkopf, and Wyers 339, 2012) He has said that "the scarcity of offensive talent makes it more economically valuable than fielding talent." (Carty, Dawkins, Fast, Glass, Goldman, Goldstein, Jaffe, Jazayerli, Kahrl, Lindbergh, Parks, Turkenkopf, and Wyers 340, 2012) He has also said that "there is a lot more distance between the best hitter and the average hitter than between the best fielder and the average fielder." (Carty, Dawkins, Fast, Glass, Goldman, Goldstein, Jaffe, Jazayerli, Kahrl, Lindbergh, Parks, Turkenkopf, and Wyers 343, 2012) In addition, Turkenkopf says that maximizing the value of a team is "easier to do by overweighting offense." (Carty, Dawkins, Fast, Glass, Goldman, Goldstein, Jaffe, Jazayerli, Kahrl, Lindbergh, Parks, Turkenkopf, and Wyers 344, 2012) Eric Walker once wrote that fielding was "at most five percent of the game." (Lewis 58, 2013) In my correlation and regression analyses, errors do not have as significant of an effect on Ouachita's outcome in a baseball game as one might think.

Player Production Rankings for Position Players

In this section I analyze and rank the player production for the thirteen position players on the 2018 Ouachita Baptist University men's baseball team that played in at least 20 games using my formula from the previous section.

The first player I analyze is senior catcher Kyle Alexander. Alexander's on-base percentage was 0.387, his slugging percentage was 0.459, his stealing percentage was 1, and his fielding percentage was 0.983. Using my formula, Alexander's value is $0.65(0.387) + 0.25(0.459) + 0.05(1) + 0.05(0.983)$ which equals 0.46545.

The second player I analyze is senior outfielder Chandler Blake. Blake's on-base percentage was 0.292, his slugging percentage was 0.214, his stealing percentage was 0.5, and his fielding percentage was 0.949. Using my formula, Blake's value is 0.65(0.292) + 0.25(0.214) + 0.05(0.5) + 0.05(0.949) which equals 0.31575.

The third player I analyze is redshirt freshman infielder Tarrodd Collier. Collier's on-base percentage was 0.273, his slugging percentage was 0.352, his stealing percentage was 0, and his fielding percentage was 0.966. Using my formula, Collier's value is 0.65(0.273) + 0.25(0.352) + 0.05(0) + 0.05(0.966) which equals 0.31405.

The fourth player I analyze is redshirt senior outfielder Victor Draijer. Draijer's on-base percentage was 0.367, his slugging percentage was 0.311, his stealing percentage was 0.5, and his fielding percentage was 0.966. Using my formula, Draijer's value is 0.65(0.367) + 0.25(0.311) + 0.05(0.5) + 0.05(0.966) which equals 0.3896.

The fifth player I analyze is senior outfielder Jakahari Howell. Howell's on-base percentage was 0.369, his slugging percentage was 0.355, his stealing percentage was 0.93875, and his fielding percentage was 0.905. Using my formula, Howell's value is 0.65(0.369) + 0.25(0.355) + 0.05(0.93875) + 0.05(0.905) which equals 0.42079.

The sixth player I analyze is sophomore utility player Logan Huneycutt. Huneycutt's on-base percentage was 0.312, his slugging percentage was 0.228, his stealing percentage was 0, and his fielding percentage was 0.946. Using my formula, Huneycutt's value is 0.65(0.312) + 0.25(0.228) + 0.05(0) + 0.05(0.946) which equals 0.3071.

The seventh player I analyze is freshman catcher Cade McBride. McBride's on-base percentage was 0.293, his slugging percentage was 0.325, his stealing percentage was 0, and his

fielding percentage was 1. Using my formula, McBride's value is 0.65(0.293) + 0.25(0.325) + 0.05(0) + 0.05(1) which equals 0.3217.

The eighth player I analyze is senior outfielder Ty Owens. Owens's on-base percentage was 0.304, his slugging percentage was 0.296, his stealing percentage was 0.875, and his fielding percentage was 0.972. Using my formula, Owens's value is 0.65(0.304) + 0.25(0.296) + 0.05(0.875) + 0.05(0.972) which equals 0.36395.

The ninth player I analyze is freshman infielder/outfielder Tyler Riebock. Riebock's on-base percentage was 0.369, his slugging percentage was 0.443, his stealing percentage was 0.55556, and his fielding percentage was 0.89. Using my formula, Riebock's value is 0.65(0.369) + 0.25(0.443) + 0.05(0.55556) + 0.05(0.89) which equals 0.42288.

The tenth player I analyze is senior first baseman Preston Speers. Speers's on-base percentage was 0.346, his slugging percentage was 0.468, his stealing percentage was 1, and his fielding percentage was 0.961. Using my formula, Speers's value is 0.65(0.346) + 0.25(0.468) + 0.05(1) + 0.05(0.961) which equals 0.43995.

The eleventh player I analyze is freshman outfielder Louis Steen. Steen's on-base percentage was 0.348, his slugging percentage was 0.495, his stealing percentage was 0.4, and his fielding percentage was 0.99. Using my formula, Steen's value is 0.65(0.348) + 0.25(0.495) + 0.05(0.4) + 0.05(0.99) which equals 0.41945.

The twelfth player I analyze is junior infielder Aaron Studdard. Studdard's on-base percentage was 0.337, his slugging percentage was 0.359, his stealing percentage was 0.66667, and his fielding percentage was 0.956. Using my formula, Studdard's value is 0.65(0.337) + 0.25(0.359) + 0.05(0.66667) + 0.05(0.956) which equals 0.38993.

The thirteenth player I analyze is senior catcher Austin White. White's on-base percentage was 0.406, his slugging percentage was 0.444, his stealing percentage was 1, and his fielding percentage was 0.981. Using my formula, White's value is 0.65(0.406) + 0.25(0.444) + 0.05(1) + 0.05(0.981) which equals 0.47395.

Using these values, I rank the player production for the thirteen position players that played most for the 2018 Ouachita Baptist University men's baseball team in this order:

1. Austin White
2. Kyle Alexander
3. Preston Speers
4. Tyler Riebock
5. Jakahari Howell
6. Louis Steen
7. Aaron Studdard
8. Victor Draijer
9. Ty Owens
10. Cade McBride
11. Chandler Blake
12. Tarrodd Collier
13. Logan Huneycutt

Player Production Formula for Pitchers

My formula for player production for pitchers on the Ouachita baseball team is 0.35[1 – (BB + HBP)/IP] + 0.35[1 – (2B + 3B)/IP] + 0.15(K/IP) + 0.15(1 – HR/IP). My correlation and regression analyses along with my reading into sabermetrics help me shape this formula.

In the book *Moneyball*, Michael Lewis has a chapter titled "Anatomy of an Undervalued Pitcher." In this chapter, Lewis speaks about former Chicago paralegal turned sabermetrician Voros McCracken. Lewis speaks about some of McCracken's findings on pitchers in this chapter. For example, Lewis says, "Voros asked himself another question: from year to year is there *any* correlation in a pitcher's statistics? There was. The number of walks and home runs he gave up, and the number of strikeouts he recorded were, if not predictable, at least understandable. A guy who struck out a lot of hitters one year tended to strike out a lot of hitters the next year. Ditto a guy who gave up a lot of home runs. But when it came to the number of hits per balls in play a pitcher gave up, there was no correlation whatsoever." (Lewis 237, 2013) Lewis also speaks about Paul DePodesta in this chapter. Lewis says that "he (Paul) thought there was one big thing, in addition to walks, strikeouts, and home runs, that a pitcher could control: extra base hits." (Lewis 242, 2013)

Using these findings I read about in *Moneyball*, I construct my formula for pitcher production using only walks, strikeouts, home runs, and extra base hits. I determine how strongly I weigh these four categories by looking at the effects of these statistical categories in my correlation and regression analyses of the past sixteen seasons of Ouachita baseball.

Player Production Rankings for Pitchers

In this section I analyze and rank the player production for the twelve pitchers on the 2018 Ouachita Baptist University baseball team that pitched at least ten innings using my formula from the previous section.

The first player I analyze is junior pitcher Adam Bahloul. Bahloul's base on balls + hit by pitches per inning pitched was 0.80597, his extra base hits given up per inning pitched was 0.22388, his strikeouts per inning pitched was 0.70149, and his home runs given up per inning pitched was 0.029851. Using my formula, Bahloul's value is 0.35(0.19403) + 0.35(0.77612) + 0.15(0.70149) + 0.15(0.97015) which equals 0.59029.

The second player I analyze is sophomore pitcher Tyler Duck. Duck's base on balls + hit by pitches per inning pitched was 0.53846, his extra base hits given up per inning pitched was 0.32692, his strikeouts per inning pitched was 0.61538, and his home runs given up per inning pitched was 0.038462. Using my formula, Duck's value is 0.35(0.46154) + 0.35(0.67308) + 0.15(0.61538) + 0.15(0.96154) which equals 0.63366.

The third player I analyze is freshman pitcher Noah Fowler. Fowler's base on balls + hit by pitches per inning pitched was 1.27072, his extra base hits given up per inning pitched was 0.49724, his strikeouts per inning pitched was 0.71823, and his home runs given up per inning pitched was 0.16575. Using my formula, Fowler's value is 0.35(-0.27072) + 0.35(0.50276) + 0.15(0.71823) + 0.15(0.83425) which equals 0.31409.

The fourth player I analyze is sophomore pitcher Brandon Matros. Matros's base on balls + hit by pitches per inning pitched was 0.64935, his extra base hits given up per inning pitched was 0.17316, his strikeouts per inning pitched was 0.60606, and his home runs given up

per inning pitched was 0.12987. Using my formula, Matros's value is 0.35(0.35065) + 0.35(0.82684) + 0.15(0.60606) + 0.15(0.87013) which equals 0.63355.

The fifth player I analyze is senior pitcher John Franklin Matros. Matros's base on balls + hit by pitches per inning pitched was 0.45349, his extra base hits given up per inning pitched was 0.25581, his strikeouts per inning pitched was 0.84884, and his home runs given up per inning pitched was 0.023256. Using my formula, Matros's value is 0.35(0.54651) + 0.35(0.74419) + 0.15(0.84884) + 0.15(0.97674) which equals 0.72559.

The sixth player I analyze is sophomore third baseman/pitcher Sheldon McCown. McCown's base on balls + hit by pitches per inning pitched was 0.45977, his extra base hits given up per inning pitched was 0.34483, his strikeouts per inning pitched was 0.34483, and his home runs given up per inning pitched was 0.26820. Using my formula, McCown's value is 0.35(0.54023) + 0.35(0.65517) + 0.15(0.34483) + 0.15(0.7318) which equals 0.57989.

The seventh player I analyze is freshman pitcher Ben Miller. Miller's base on balls + hit by pitches per inning pitched was 0.88123, his extra base hits given up per inning pitched was 0.22989, his strikeouts per inning pitched was 0.42146, and his home runs given up per inning pitched was 0.15326. Using my formula, Miller's value is 0.35(0.11877) + 0.35(0.77011) + 0.15(0.42146) + 0.15(0.84674) which equals 0.50134.

The eighth player I analyze is freshman pitcher Luke Scaggs. Scaggs's base on balls + hit by pitches per inning pitched was 1.13122, his extra base hits given up per inning pitched was 0.31674, his strikeouts per inning pitched was 0.49774, and his home runs given up per inning pitched was 0.090498. Using my formula, Scaggs's value is 0.35(-0.13122) + 0.35(0.68326) + 0.15(0.49774) + 0.15(0.9095) which equals 0.4043.

The ninth player I analyze is freshman pitcher Michael Shepherd. Shepherd's base on balls + hit by pitches per inning pitched was 0.64356, his extra base hits given up per inning pitched was 0.49505, his strikeouts per inning pitched was 0.79208, and his home runs given up per inning pitched was 0. Using my formula, Shepherd's value is 0.35(0.35644) + 0.35(0.50495) + 0.15(0.79208) + 0.15(1) which equals 0.57029.

The tenth player I analyze is junior outfielder/pitcher Bo Sutton. Sutton's base on balls + hit by pitches per inning pitched was 1.5566, his extra base hits given up per inning pitched was 0.33019, his strikeouts per inning pitched was 0.70755, and his home runs given up per inning pitched was 0.04717. Using my formula, Sutton's value is 0.35(-0.5566) + 0.35(0.66981) + 0.15(0.70755) + 0.15(0.95283) which equals 0.28867.

The eleventh player I analyze is freshman pitcher Kaden Tollett. Tollett's base on balls + hit by pitches per inning pitched was 0.9375, his extra base hits given up per inning pitched was 0.0625, his strikeouts per inning pitched was 0.75, and his home runs given up per inning pitched was 0.0625. Using my formula, Tollett's value is 0.35(0.0625) + 0.35(0.9375) + 0.15(0.75) + 0.15(0.9375) which equals 0.60314.

The twelfth player I analyze is sophomore pitcher Carter Wade. Wade's base on balls + hit by pitches per inning pitched was 0.77465, his extra base hits given up per inning pitched was 0.42254, his strikeouts per inning pitched was 0.6338, and his home runs given up per inning pitched was 0. Using my formula, Wade's value is 0.35(0.22535) + 0.35(0.57746) + 0.15(0.6338) + 0.15(1) which equals 0.52605.

Using these values, I rank the player production for the twelve pitchers that played most for the 2018 Ouachita Baptist University men's baseball team in this order:

1. John Franklin Matros
2. Tyler Duck
3. Brandon Matros
4. Kaden Tollett
5. Adam Bahloul
6. Sheldon McCown
7. Michael Shepherd
8. Carter Wade
9. Ben Miller
10. Luke Scaggs
11. Noah Fowler
12. Bo Sutton

Conclusion

Two years ago, I could not even have imagined what I would write about for my senior thesis. Thanks to some online searches on sports books and guidance and support from the wonderful faculty at Ouachita Baptist University, I became interested in sabermetrics. I am now very intrigued with this field of study. I have enjoyed becoming an amateur sabermetrician and sharing my findings on the Ouachita Baptist University men's baseball team through the crafting of this thesis. I have figured out what causes the Ouachita baseball team to win and lose using data from their past sixteen seasons. Using these findings, I have created extremely simple, yet accurate formulas for analyzing player production in baseball. These formulas are not only applicable to the Ouachita baseball team, but to any level of baseball. Complicated wins above replacement formulas and rankings are available for Major League Baseball. Wins above

replacement is beneficial for analyzing player production in Major League Baseball. Wins above replacement formulas are so complicated, though, that the average baseball fan is not able to apply these formulas to other levels of baseball. This is where my formulas come in. My formulas can be used by any baseball fan to analyze player production at any level of baseball. Because of this, my formulas have the chance to impact a great number of people within baseball. They are just another small piece in the big data revolution.

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