Softball 2022 Hitting: AUM vs. Gulf South Conference

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Nashville
Knoxville
Greensbo
TENNESSEE
Pigeon Forge
Asheville
Charlotte
Birmingham
Atlanta
SOUTH CAROLINA
ALABAMA
GEORGIA
Charleston
Columbus
Savannah
Mobile
Tallahassee
Jacksonville
New Orleans
Panama City Beach
St. Augustine
Orlando
UNION
LEE
UWG
UWA TIGERS
STATE
WEST FLORIDA


GULF SOUTH
GSC
CONFERENCE

In 2022, the softball team representing Auburn University at Montgomery were regular season and tournament champions in the Gulf South Conference. They went on to become NCAA regional champions and super-regional champions, and went on to Denver to represent AUM(Auburn University at Montgomery) at the NCAA D2 Softball World Series.

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This project will analyze overall Gulf South Conference(GSC) hitter data through a method of sabermetrics to explore trends that led to how AUM became 2022 Conference Champions. This presentation will compare statistics to compare the year's offensive performance between AUM and GSC listed from data

scraped directly from the Gulf South Conference's own website.Publicly posted MLB weights will be used to calculate and add a column for 2022 weights in order to calculate WOBA(weighted on-base average).Furthermore, AUM and UAH(University of Alabama-Huntsville) will be directly compared, since the teams faced off in the GSC tournament final and the NCAA Super Regional final.

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My hypothesis is that the hitting data will present trends that indicate how AUM dominated their competition. It should be noted that defensive and pitching data are not currently being analyzed in this project. Thus, if the hypothesis is significantly contradicted this could be pointing to that the defensive/pitching could explain AUM's success. Likely through analysis beyond the current scope of this presentation, all three categories play key roles in the 2022 season.

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Sabermetrics

In sports analytics, sabermetrics (originally SABRmetrics) is the empirical analysis of baseball, especially baseball statistics that measure in-game activity. Sabermetricians collect and summarize the relevant data from this in-game activity to answer specific questions. The term is derived from the acronym SABR, which stands for the Society for American Baseball Research, founded in 1971. The term "sabermetrics" was coined by Bill James, who is one of its pioneers and is often considered its most prominent advocate and public face.(SOURCE: WIKIPEDIA)

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Definitions provided by mlb.com

Batting Average(AVG)-

batting average is determined by dividing a player's hits by his total at-bats for a number between zero (shown as .000) and one (1.000)

On-base Plus Slugging(OPS)-

adds on-base percentage and slugging percentage to get one number that unites the two. It's meant to combine how well a hitter can reach base, with how well he can hit for average and for power

At Bat(AB)-

An official at-bat comes when a batter reaches base via a fielder's choice, hit or an error (not including catcher's interference) or when a batter is put out on a non-sacrifice. (Whereas a plate appearance refers to each completed turn batting, regardless of the result.)

Run(R)-

A player is awarded a run if he crosses the plate to score his team a run

Hit(H)-

credited to a batter when the batter safely reaches or passes first base after hitting the ball into fair territory with neither the benefit of an error nor a fielder's choice

Double(X2B)-

A batter is credited with a double when he hits the ball into play and reaches second base without the help of an intervening error or attempt to put out another baserunner

Triple(X3B)-

a triple occurs when a batter hits the ball into play and reaches third base without the help of an intervening error or attempt to put out another baserunner

Home Run(HR)-

A home run occurs when a batter hits a fair ball and scores on the play without being put out or without the benefit of an error

Runs Batted In(RBI)-

A batter is credited with an RBI in most cases where the result of his plate appearance is a run being scored. There are a few exceptions, however. A player does not receive an RBI when the run scores as a result of an error or ground into double play.

Total Bases(TB)-

Total bases refer to the number of bases gained by a batter through his hits. A batter records one total base for a single, two total bases for a double, three total bases for a triple and four total bases for a home run

Slugging Perecentag(SLG%)-

Slugging percentage represents the total number of bases a player records per at-bat. Unlike on-base percentage, slugging percentage deals only with hits and does not include walks and hit-by-pitches in its equation

Walk(BB)-

A walk (or base on balls) occurs when a pitcher throws four pitches out of the strike zone, none of which are swung at by the hitter. After refraining from swinging at four pitches out of the zone, the batter is awarded first base

Hit By Pitch(HBP)-

A hit-by-pitch occurs when a batter is struck by a pitched ball without swinging at it. He is awarded first base as a result. Strikes supersede hit-by-pitches, meaning if the umpire rules that the pitch was in the strike zone or that the batter swung, the HBP is nullified.

Strikeout(SO)-

A strikeout occurs when a pitcher throws any combination of three swinging or looking strikes to a hitter. (A foul ball counts as a strike, but it cannot be the third and final strike of the at-bat. A foul tip, which is caught by the catcher, is considered a third strike.)

##Ground-rule Double Play(GDP)- occurs when a player hits a ground ball that results in multiple outs on the bases. The most common double plays are ground balls where a forceout is made on the player running from first to second base, then another forceout is made on the batter running to first base.

On Base Percentage(OB%)-

OB% refers to how frequently a batter reaches base per plate appearance. Times on base include hits, walks and hit-by-pitches, but do not include errors, times reached on a fielder's choice or a dropped third strike

Sacrafice fly(SF)-

A sacrifice fly occurs when a batter hits a fly-ball out to the outfield or foul territory that allows a runner to score. The batter is given credit for an RBI.

Sacrifice hit (SH)-

A sacrifice bunt occurs when a player is successful in his attempt to advance a runner (or multiple runners) at least one base with a bunt. In this vein, the batter is sacrificing himself (giving up an out) in order to move another runner closer to scoring.

Weighted on-base average(wOBA)-

provides data points on a hitter's offense based on the outcome of each hit (single vs. triple, etc), and the linear weights of the equation are determined by the year-to-year value of each outcome.

Data Summary

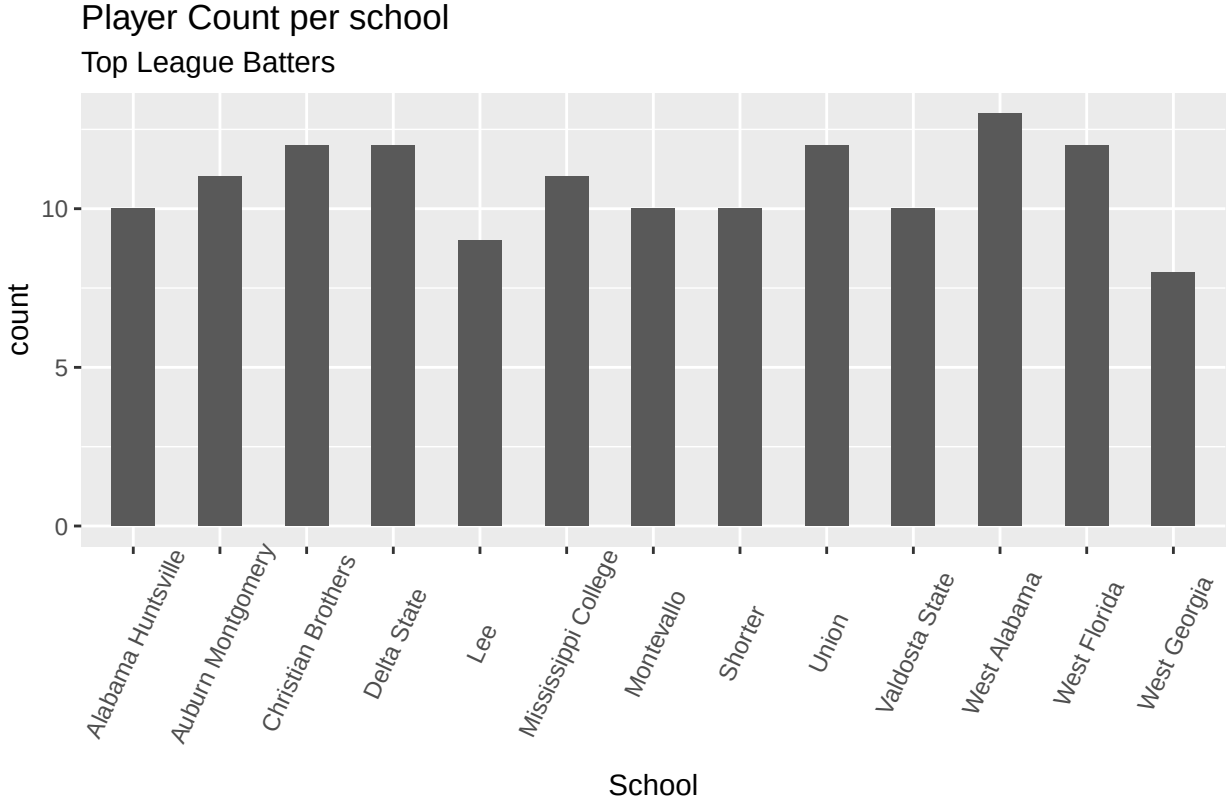
```
##               Player             School   AVG   OPS  AB  R  H X2B X3B HR RBI
## 1:      Teala Howard       West Florida 0.435 1.097 168 46 73   9   6  4  19
## 2:        R.J. Janke       West Georgia 0.434 1.378  76 14 33   8   0  9  29
## 3:    Cassie Matlock       West Alabama 0.423 1.104 168 48 71  13   6  3  37
## 4:     Shelby Booker Alabama Huntsville 0.420 0.997 188 52 79   5   7  1  23
## 5: Sierra Easterwood         Montevallo 0.395 1.364 162 52 64  14   4 20  59
## 6:     Kaylee Vaught Alabama Huntsville 0.393 1.030 196 44 77  14   4  6  43
##     TB  SLG. BB HPB SO GDP   OB. SF SH      wOBA  PA     BABIP       RC
## 1: 106 0.631  4   6 11   0 0.466  0  0 0.4279944 178 0.4207317 47.45349
## 2:  68 0.895  6   3 13   0 0.483  2  0 0.4910353  85 0.3582090 32.34146
## 3: 105 0.625 19   2 12   0 0.479  3  2 0.3783927 191 0.4121212 50.53476
## 4: 101 0.537 10   4 14   0 0.460  0  8 0.3628476 210 0.4171123 45.39899
## 5: 146 0.901 20   4 14   0 0.463  4  1 0.4536578 187 0.3098592 67.38462
## 6: 117 0.597 16   0 16   1 0.433  3  0 0.3799340 212 0.3736842 51.32547
##           SA       ISO
## 1: 0.2202381 0.1964286
## 2: 0.5394737 0.4605263
```

```
## 3: 0.3154762 0.2023810
## 4: 0.1702128 0.1170213
## 5: 0.6296296 0.5061728
## 6: 0.2857143 0.2040816
```

```
##     Player             School               AVG              OPS        
##  Length:140         Length:140         Min.   :0.0830   Min.   :0.3740  
##  Class :character   Class :character   1st Qu.:0.2425   1st Qu.:0.6580  
##  Mode  :character   Mode  :character   Median :0.2810   Median :0.7775  
##                                        Mean   :0.2821   Mean   :0.7952  
##                                        3rd Qu.:0.3160   3rd Qu.:0.9032  
##                                        Max.   :0.4350   Max.   :1.3780  
##        AB              R               H              X2B        
##  Min.   : 16.0   Min.   : 1.00   Min.   : 2.00   Min.   : 0.000  
##  1st Qu.: 85.0   1st Qu.:13.00   1st Qu.:22.00   1st Qu.: 2.000  
##  Median :120.0   Median :22.00   Median :34.00   Median : 5.000  
##  Mean   :113.1   Mean   :22.81   Mean   :33.49   Mean   : 5.807  
##  3rd Qu.:141.0   3rd Qu.:31.00   3rd Qu.:43.00   3rd Qu.: 9.000  
##  Max.   :196.0   Max.   :52.00   Max.   :79.00   Max.   :18.000  
##       X3B              HR              RBI              TB       
##  Min.   :0.0000   Min.   : 0.000   Min.   : 0.00   Min.   :  3.00  
##  1st Qu.:0.0000   1st Qu.: 0.750   1st Qu.:10.00   1st Qu.: 33.00  
##  Median :0.0000   Median : 2.000   Median :19.00   Median : 48.00  
##  Mean   :0.9286   Mean   : 3.471   Mean   :20.71   Mean   : 51.57  
##  3rd Qu.:1.0000   3rd Qu.: 6.000   3rd Qu.:27.25   3rd Qu.: 68.00  
##  Max.   :7.0000   Max.   :20.000   Max.   :59.00   Max.   :146.00  
##       SLG.              BB              HPB              SO        
##  Min.   :0.1540   Min.   : 0.00   Min.   : 0.000   Min.   : 0.00  
##  1st Qu.:0.3362   1st Qu.: 7.00   1st Qu.: 1.000   1st Qu.:12.00  
##  Median :0.4290   Median :12.50   Median : 2.000   Median :16.50  
##  Mean   :0.4300   Mean   :13.16   Mean   : 2.714   Mean   :17.28  
##  3rd Qu.:0.5165   3rd Qu.:18.00   3rd Qu.: 4.000   3rd Qu.:22.25  
##  Max.   :0.9010   Max.   :42.00   Max.   :17.000   Max.   :34.00  
##       GDP              OB.              SF              SH        
##  Min.   :0.0000   Min.   :0.1880   Min.   :0.00   Min.   : 0.000  
##  1st Qu.:0.0000   1st Qu.:0.3160   1st Qu.:0.00   1st Qu.: 1.000  
##  Median :0.0000   Median :0.3725   Median :1.00   Median : 2.000  
##  Mean   :0.4286   Mean   :0.3652   Mean   :1.25   Mean   : 2.814  
##  3rd Qu.:1.0000   3rd Qu.:0.4163   3rd Qu.:2.00   3rd Qu.: 4.000  
##  Max.   :4.0000   Max.   :0.5210   Max.   :6.00   Max.   :13.000  
##       wOBA              PA            BABIP              RC        
##  Min.   :0.0607   Min.   : 17.0   Min.   :0.08333   Min.   : 0.5625  
##  1st Qu.:0.2071   1st Qu.:104.2   1st Qu.:0.21798   1st Qu.:10.7364  
##  Median :0.2419   Median :136.5   Median :0.25602   Median :17.7743  
##  Mean   :0.2467   Mean   :131.8   Mean   :0.26076   Mean   :19.5789  
##  3rd Qu.:0.2921   3rd Qu.:167.0   3rd Qu.:0.30220   3rd Qu.:27.4591  
##  Max.   :0.4910   Max.   :222.0   Max.   :0.42073   Max.   :67.3846  
##        SA              ISO        
##  Min.   :0.0000   Min.   :0.0000  
##  1st Qu.:0.1717   1st Qu.:0.0657  
##  Median :0.2322   Median :0.1350  
##  Mean   :0.2654   Mean   :0.1479  
##  3rd Qu.:0.3503   3rd Qu.:0.2224  
##  Max.   :0.6354   Max.   :0.5062
```

Mean Absolute Deviation

```
##         AVG         OPS          AB           R           H         X2B
##  0.05189100  0.18310110 36.32370000 13.34340000 15.56730000  4.44780000
##         X3B          HR         RBI          TB        SLG.          BB
##  0.00000000  2.96520000 13.34340000 26.68680000  0.13491660  8.15430000
##         HPB          SO         GDP         OB.          SF          SH
##  2.96520000  8.15430000  0.00000000  0.07931910  1.48260000  2.96520000
##        wOBA          PA       BABIP          RC          SA         ISO
##  0.06821904 45.96060000  0.06072187 12.26036760  0.13501840  0.11882278
```



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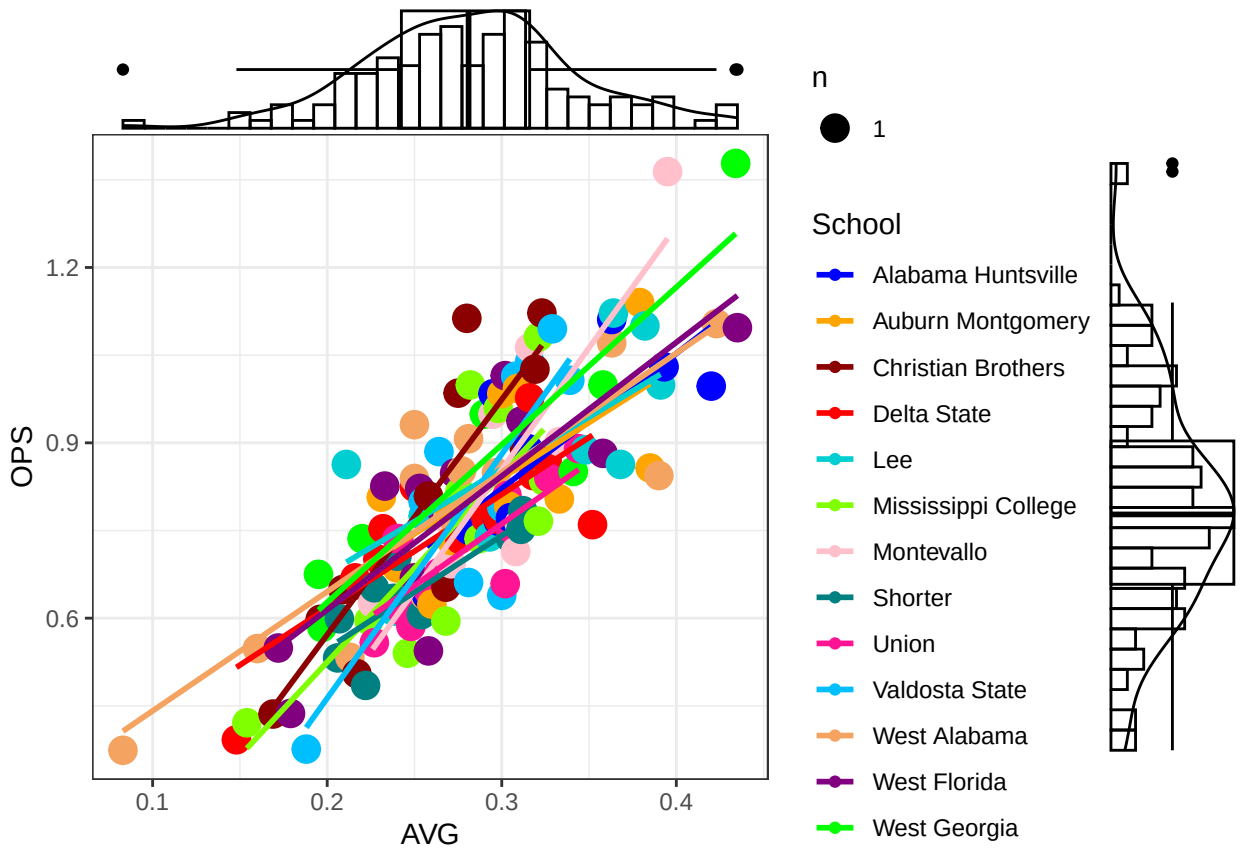
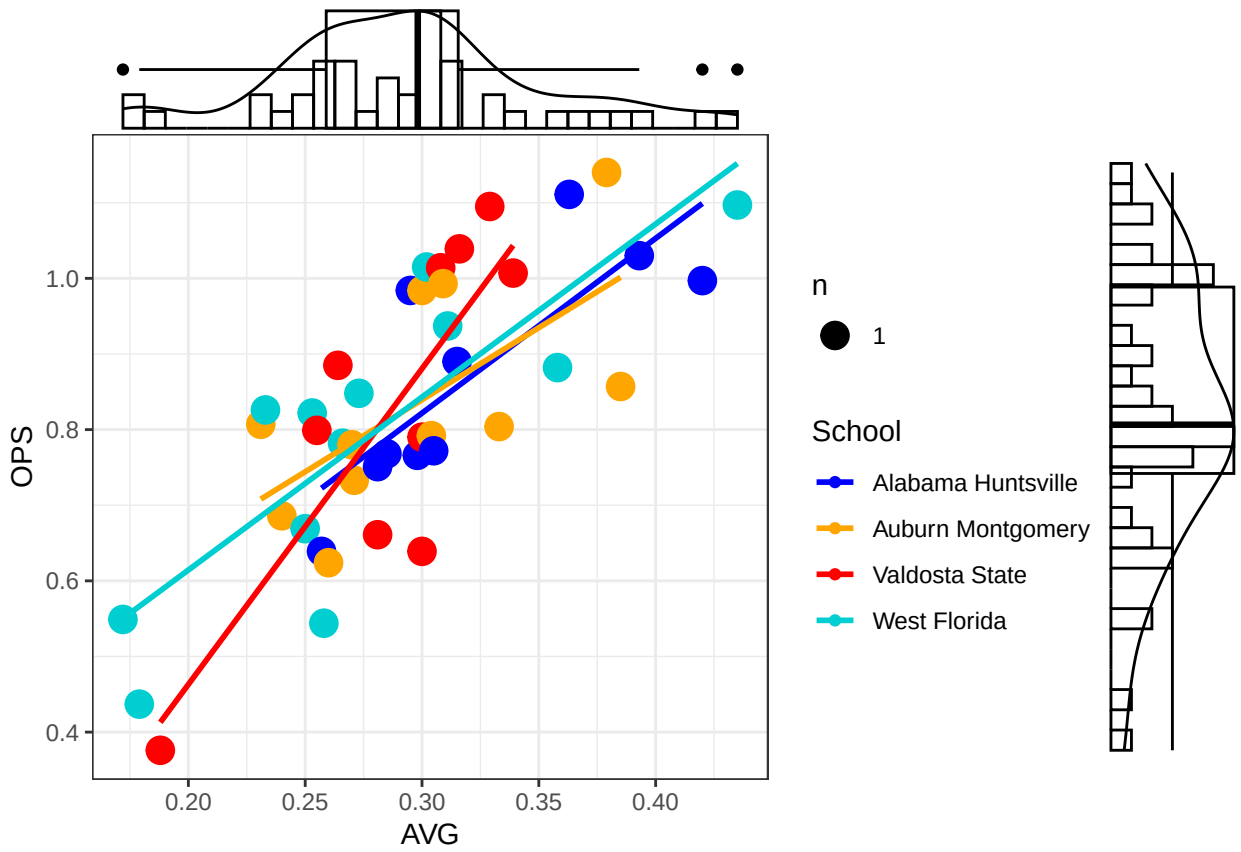

n
1
School
Alabama Huntsville
Auburn Montgomery
Christian Brothers
Delta State
Lee
Mississippi College
Montevallo
Shorter
Union
Valdosta State
West Alabama
West Florida
West Georgia
OPS
1.2
0.9
0.6
0.1
0.2
0.3
0.4
AVG


OPS
1.0
0.8
0.6
0.4
0.20
0.25
0.30
0.35
0.40
AVG
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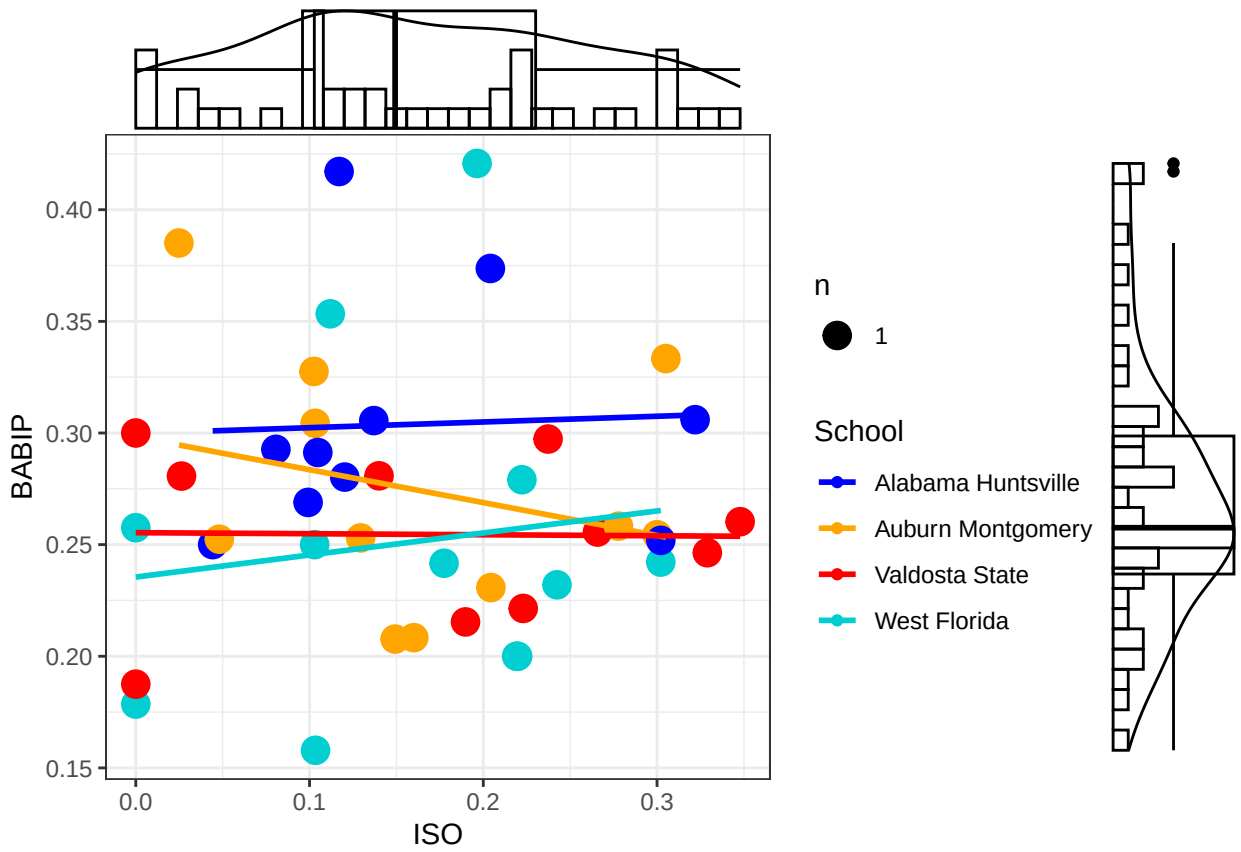
School
Alabama Huntsville
Auburn Montgomery
Valdosta State
West Florida


0.40
0.35
0.30
0.25
0.20
0.15
BABIP
0.0
0.1
0.2
0.3
ISO
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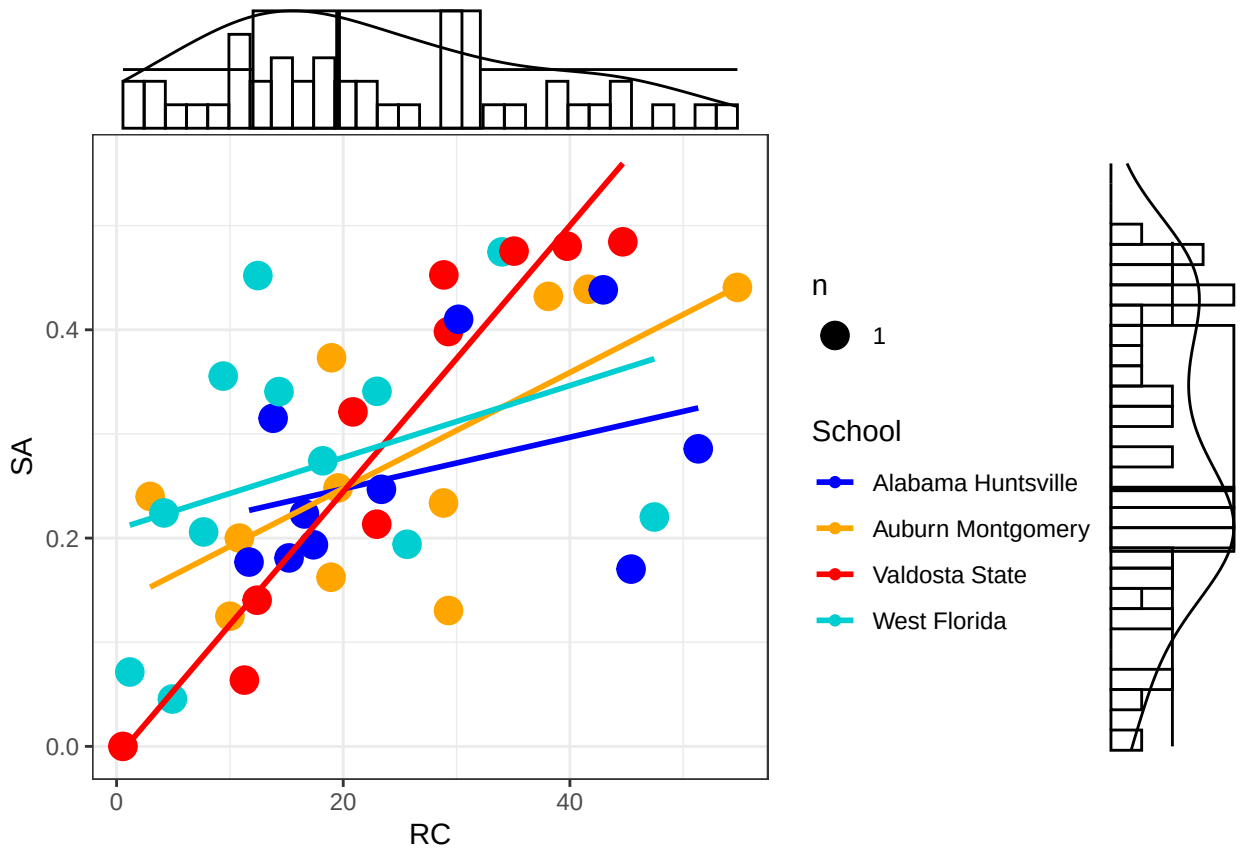
1
School
Alabama Huntsville
Auburn Montgomery
Valdosta State
West Florida


SA
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RC
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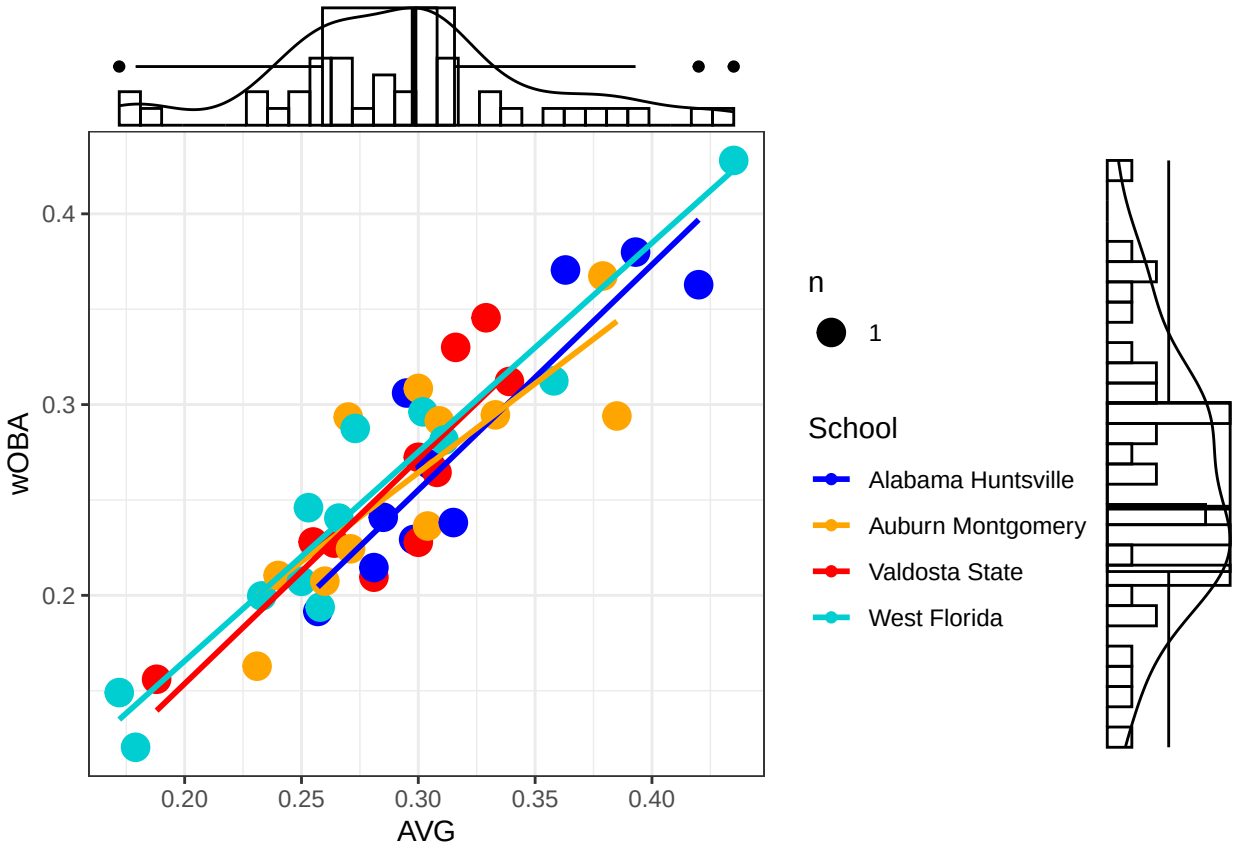
School
Alabama Huntsville
Auburn Montgomery
Valdosta State
West Florida


0.4
0.3
0.2
wOBA
0.20
0.25
0.30
0.35
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AVG
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School
Alabama Huntsville
Auburn Montgomery
Valdosta State
West Florida

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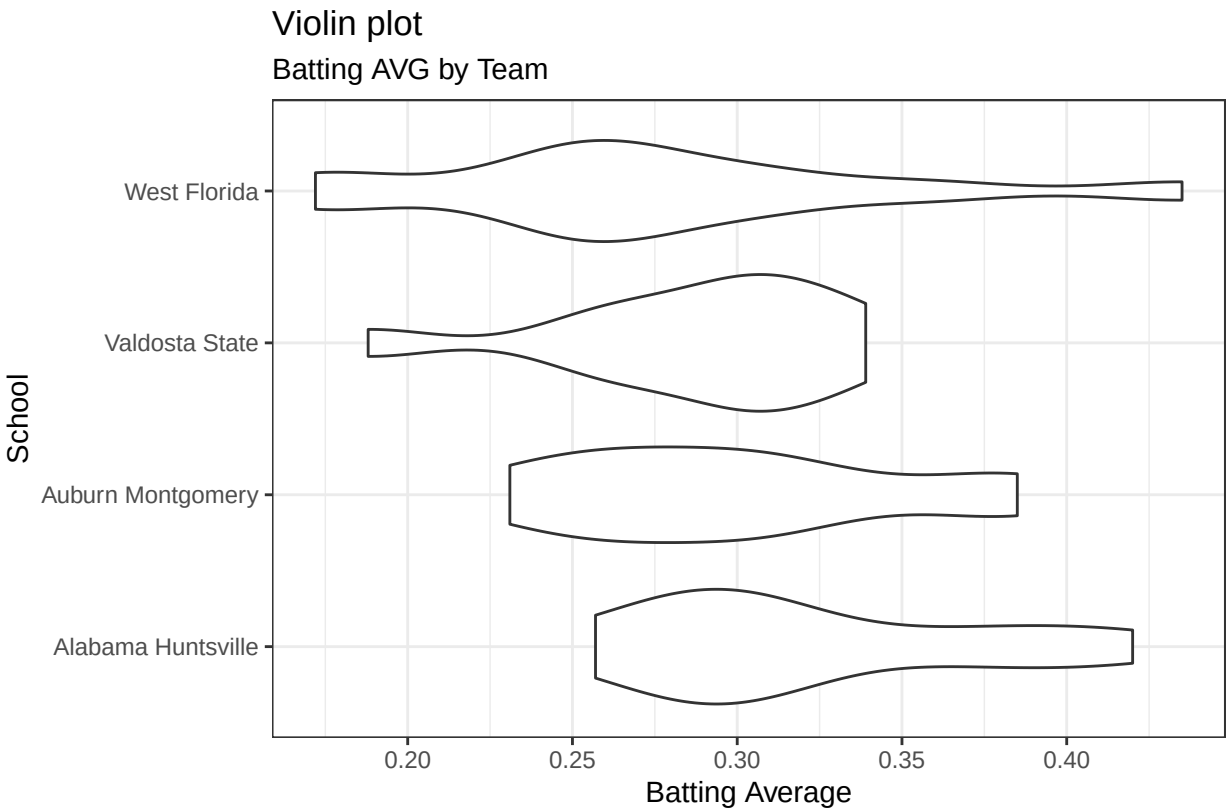
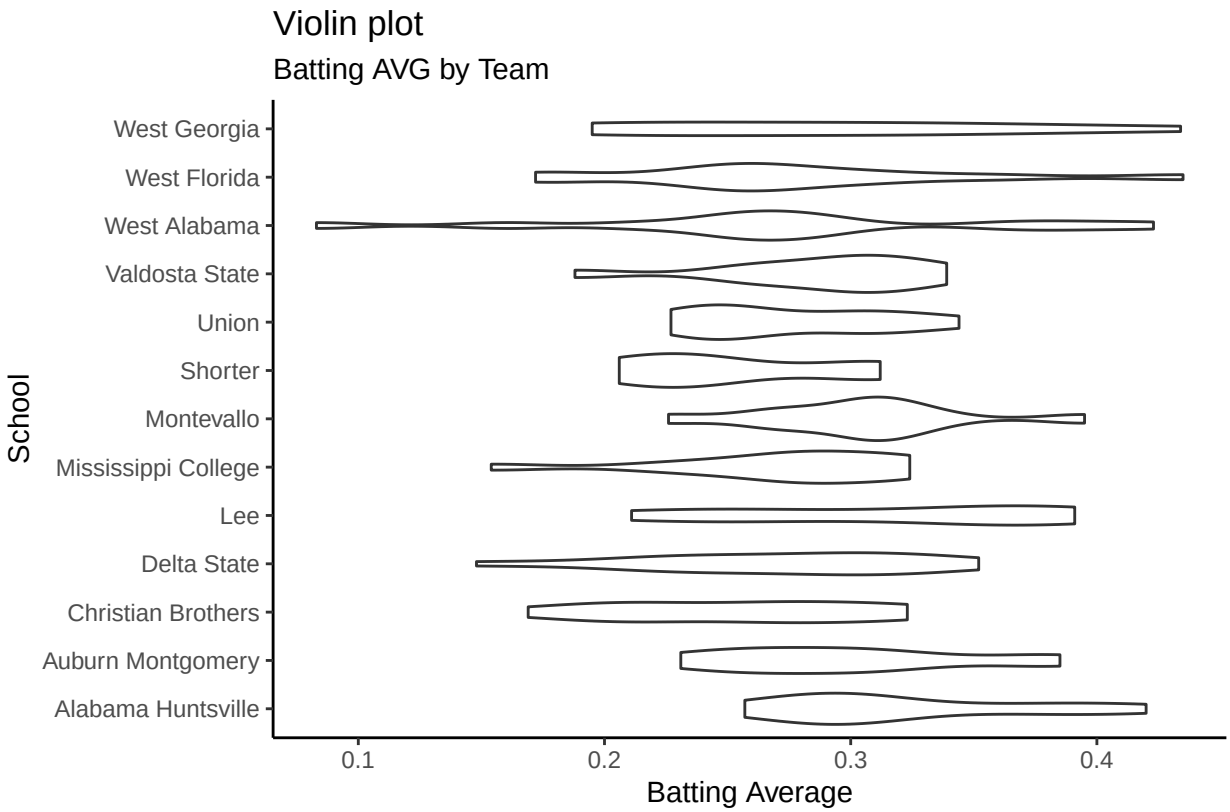

Violin plot
Batting AVG by Team
West Florida
Valdosta State
Auburn Montgomery
Alabama Huntsville
School
0.20
0.25
0.30
0.35
0.40
Batting Average
Source: GSC.com



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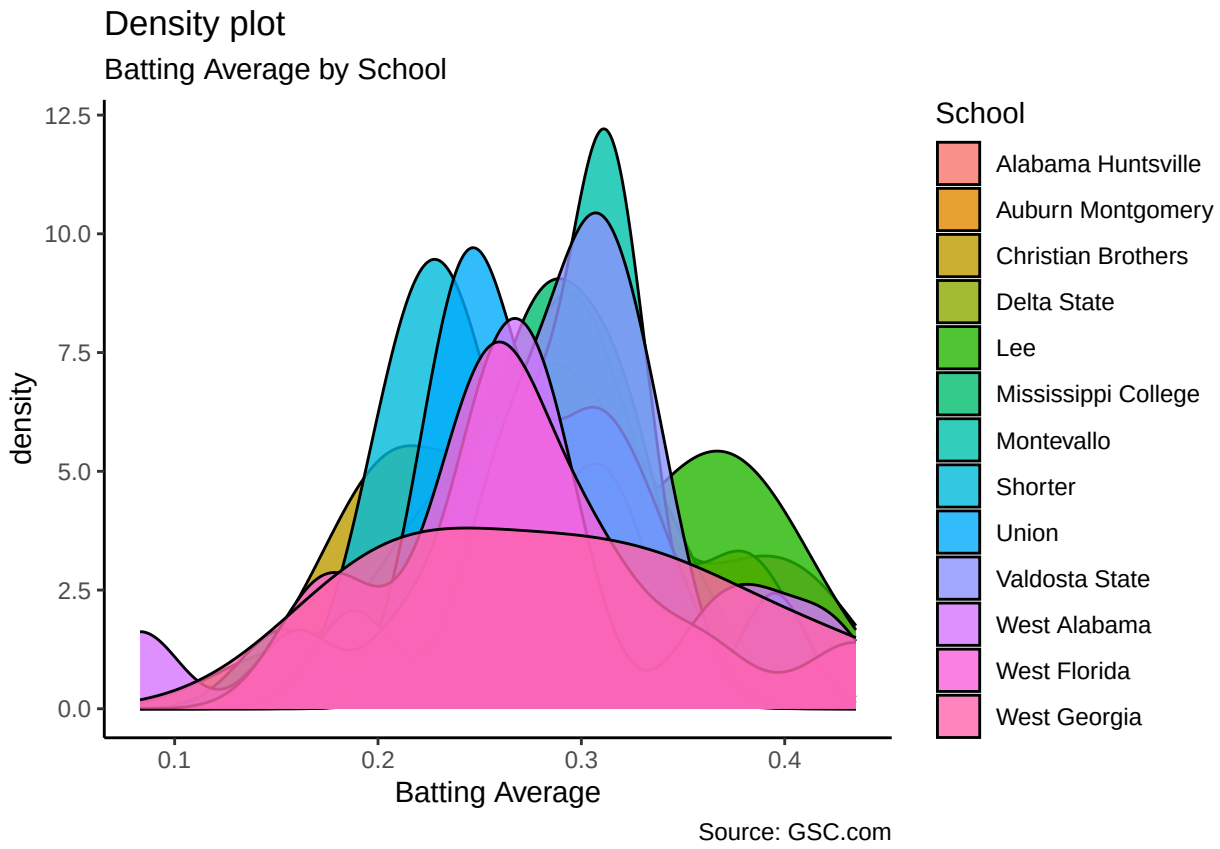
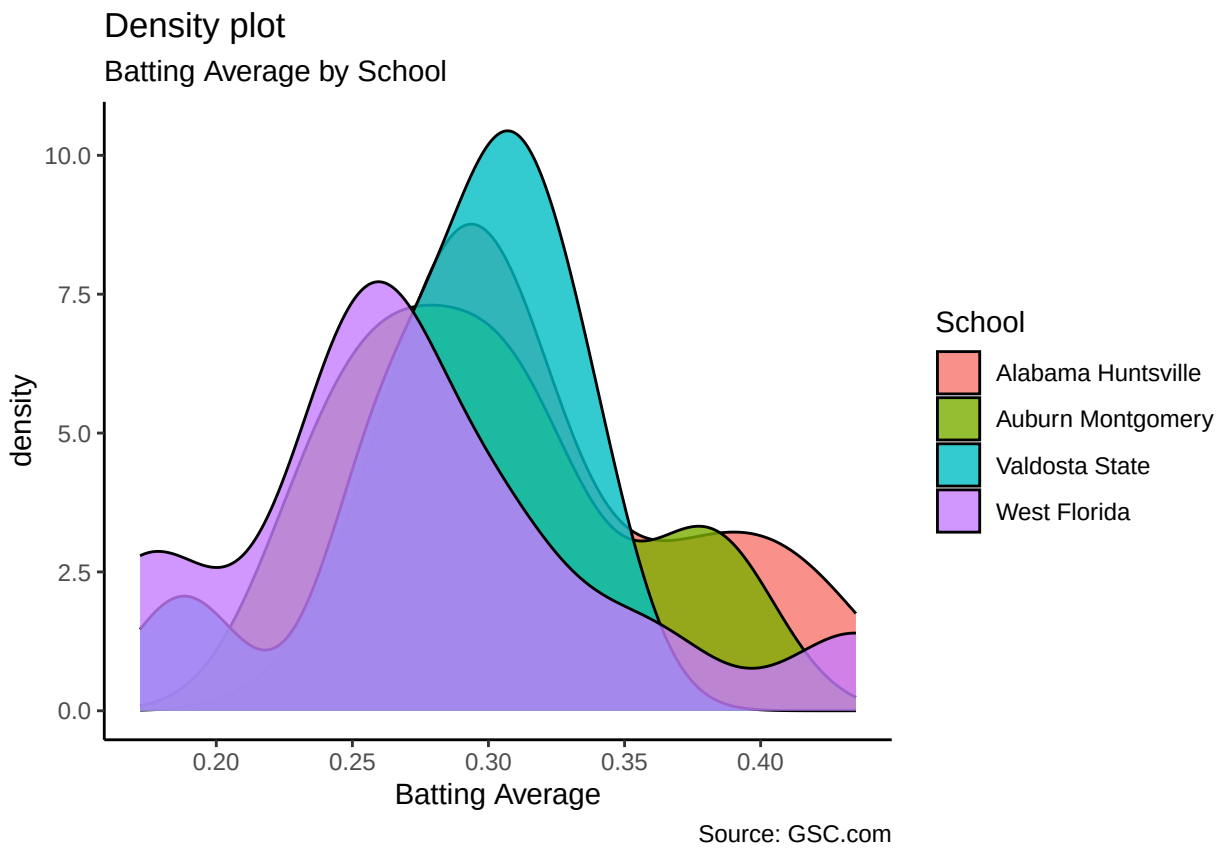
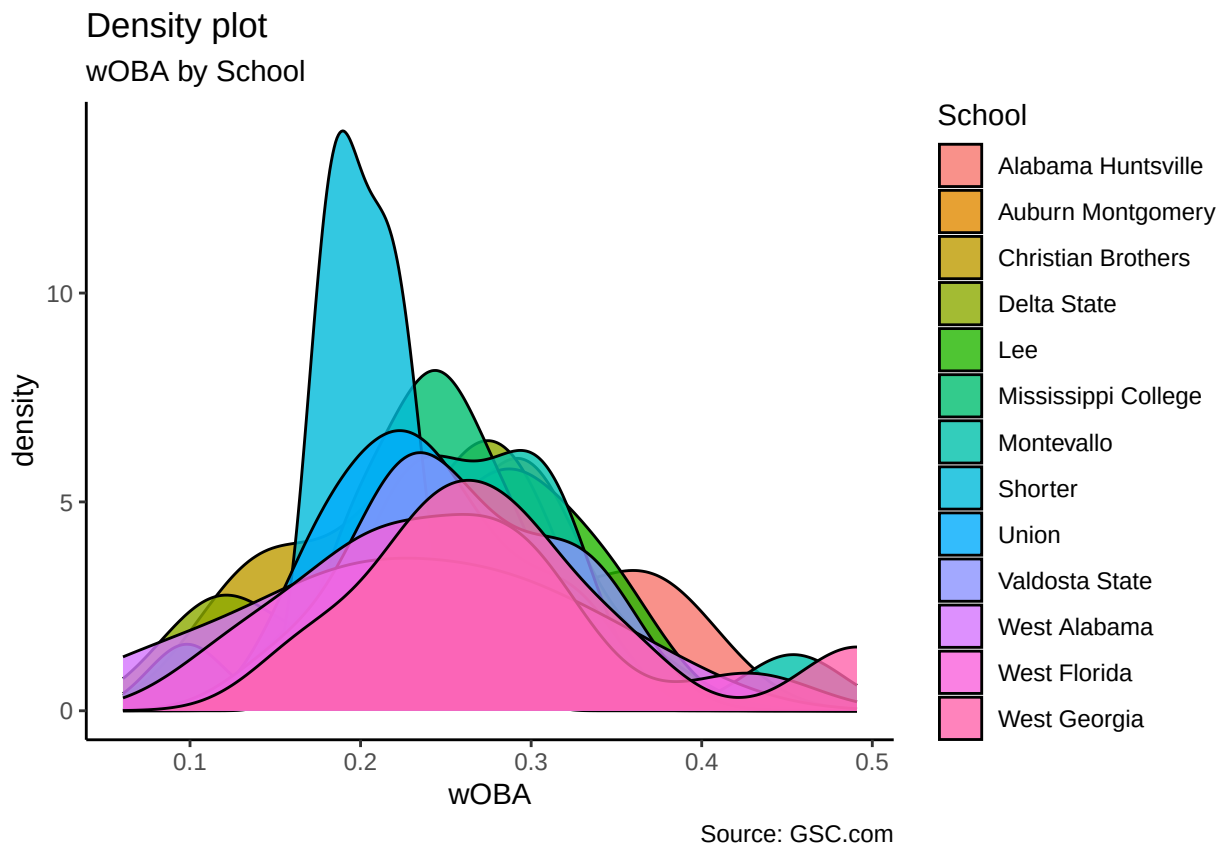
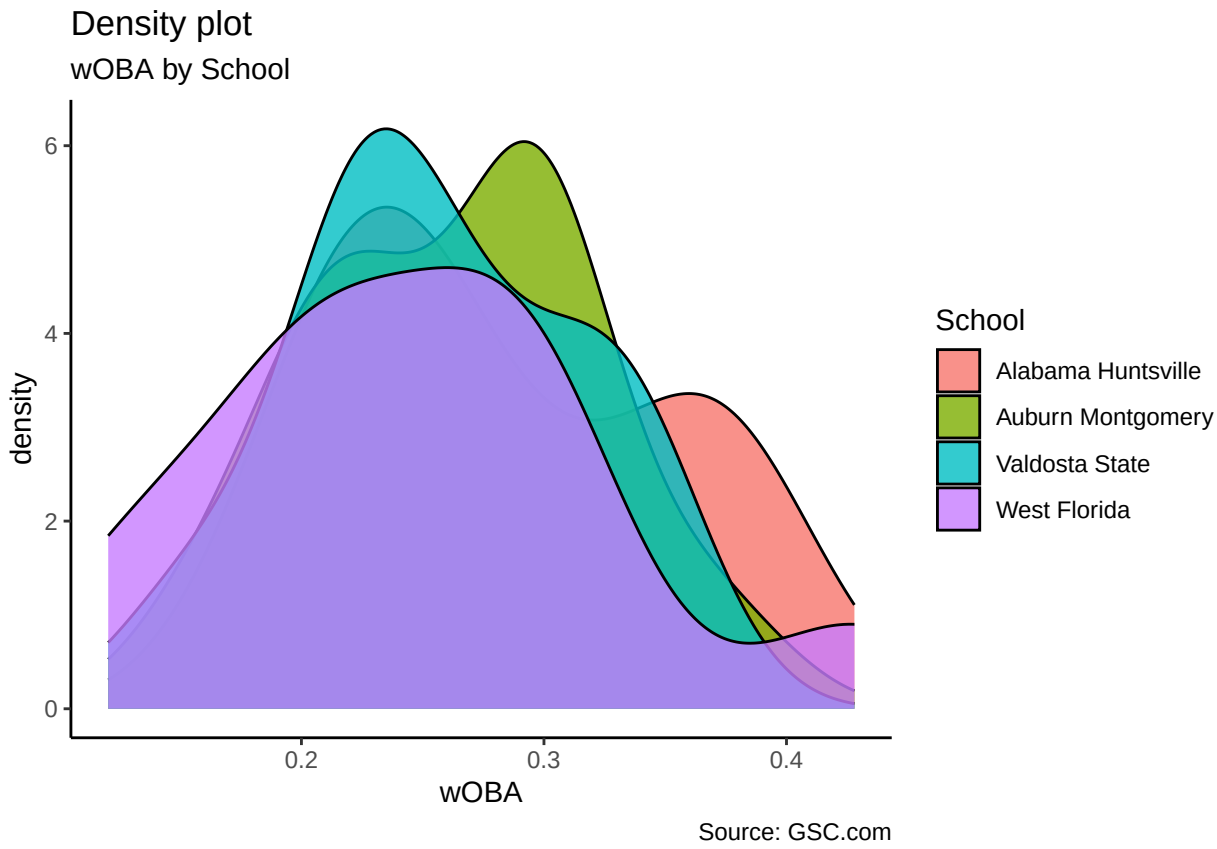
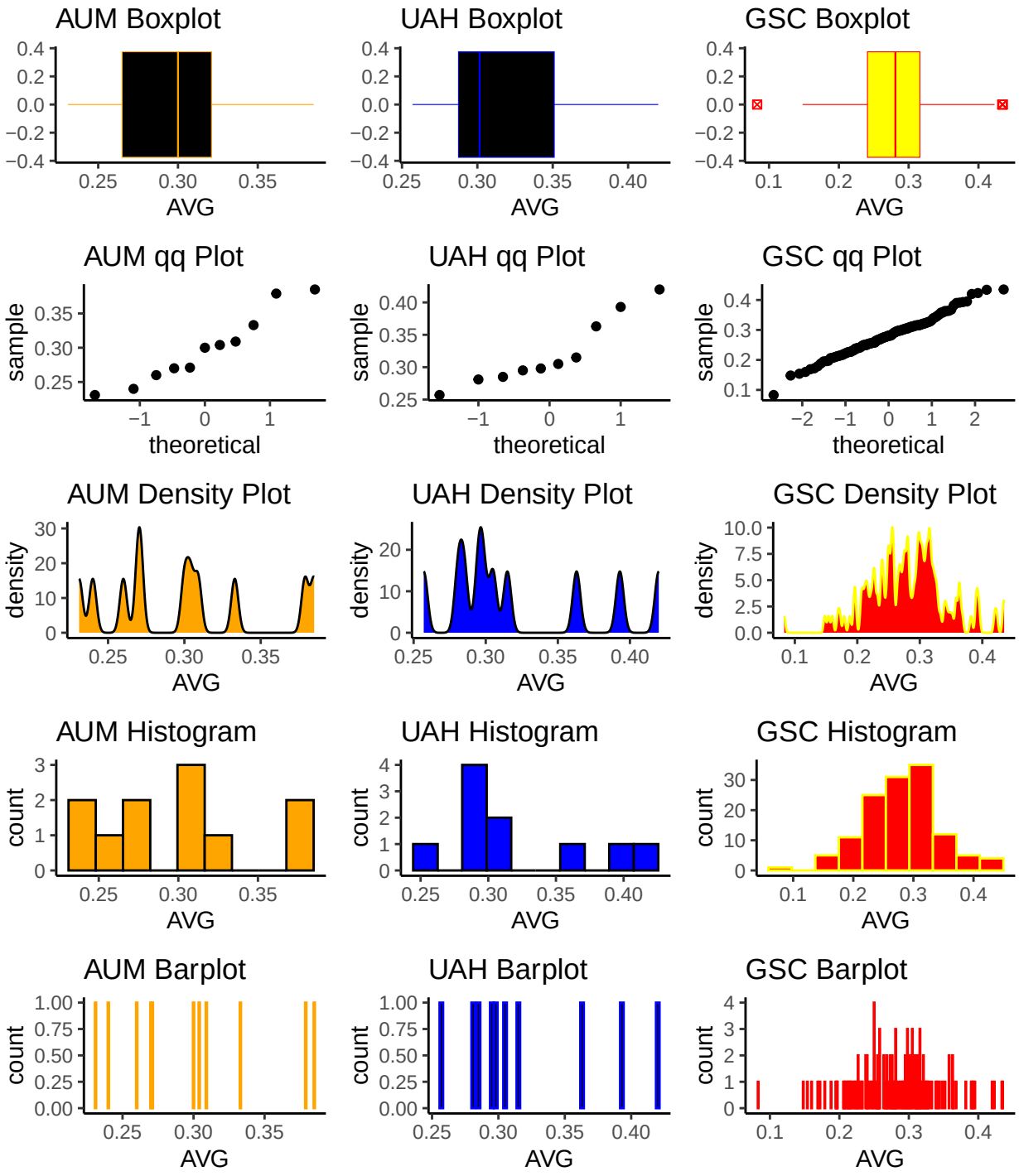

Density plot
Batting Average by School
12.5
10.0
7.5
5.0
2.5
0.0
density
0.1
0.2
0.3
0.4
Batting Average
School
Alabama Huntsville
Auburn Montgomery
Christian Brothers
Delta State
Lee
Mississippi College
Montevallo
Shorter
Union
Valdosta State
West Alabama
West Florida
West Georgia
Source: GSC.com


Density plot
Batting Average by School
density
10.0
7.5
5.0
2.5
0.0
0.20
0.25
0.30
0.35
0.40
Batting Average
School
Alabama Huntsville
Auburn Montgomery
Valdosta State
West Florida
Source: GSC.com


Density plot
wOBA by School
density
10
5
0
0.1
0.2
0.3
0.4
0.5
wOBA
School
Alabama Huntsville
Auburn Montgomery
Christian Brothers
Delta State
Lee
Mississippi College
Montevallo
Shorter
Union
Valdosta State
West Alabama
West Florida
West Georgia
Source: GSC.com


Density plot
wOBA by School
density
6
4
2
0
0.2
0.3
0.4
wOBA
School
Alabama Huntsville
Auburn Montgomery
Valdosta State
West Florida
Source: GSC.com

Leauge-wise Batting Average Visualisation



Leauge-wise OPS Visualisation