Analysis of Admissions Data and its Impact on Student Success.

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December 2020

Observations (Individual Student Records)

Non-Student Athletes, Entry Years 2015 & 2016

151 : Graduated with GPA

21 : Didn't Finish, but have partial WJC GPA

54 : No WJC GPA , but have application information

19 : No Record in eTrieve

Drivers of…

11 Continuous Variables
- High School GPA
- High School Rank
- High School Class Size
- High School Semesters of English
- Transfer Credits
- Zip Distance
- ACT Composite Score
- ACT Math Score
- ACT Science Score
- ACT English Score
- ACT Reading Score

4 (21) Categorical
- High School Type (4)
- Alumni Connections (4)
- Race (7)
- Major Grouping (6)

3 (6) Binary
- Gender
- National Merit Scholar
- Entry Year

…Student Success

WJC GPA

172 observations, continuous,
(151 Grads + 21 Didn't Finish)

or

Graduated vs Didn't Graduate.

WJC Graduates (151)
vs
Didn't Finish, but Had GPA (21)
~~No GPA on Record (54)~~

Data Overview

Grads: Graduated WJC with a GPA
DFBHG: Didn't finish, but had WJC GPA
No GPA: No WJC GPA on record

WJC GPA	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	151	21		172
Mean	3.53	2.82		3.44

HS GPA	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	149	20	53	222
Mean	3.87	3.39	3.64	3.77

HS Rank	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	124	15	36	175
Mean	55.3	148	86	70

HS Class Size	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	127	15	36	178
Mean	294	326	311	300

HS Eng Sem	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	146	20	39	205
Mean	7.6	7.15	8.1	7.7

Transfer Credits	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	151	19	23	193
Mean	16.3	6	8.9	14.4

Zip Distance	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	151	21	54	226
Mean	3970	5275	4393	4192

ACT Composite	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	143	20	52	215
Mean	27.1	26.1	25.2	26.5

ACT Math	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	139	20	47	206
Mean	25.8	23.1	23.4	25.0

ACT Science	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	139	20	47	206
Mean	27	26.1	24.7	26.4

ACT English	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	139	20	47	206
Mean	28	26.5	26.2	27.4

ACT Reading	Grads	DFBHG	NoGPA	Total or WtdAvg
Count	139	20	47	206
Mean	28.4	27.5	26.1	27.8

High School Type	Grads	DFBHG	NoGPA	Total or WtdAvg
Public	124	19	44	187
Private	19	1	9	29
Foreign	4	1	1	6
Home	4	0	0	4

Alumni Connections	Grads	DFBHG	NoGPA	Total or WtdAvg
None	128	18	46	192
One	12	1	6	19
Two	8	2	2	12
Three	3	0	0	3

Race	Grads	DFBHG	NoGPA	Total or WtdAvg
White	117	18	37	172
Black	6	0	2	8
Hispanic	3	0	5	8
Asian	3	0	2	5
2 or more	2	2	1	5
NRA	1	1	1	3
Blank	19	0	6	25

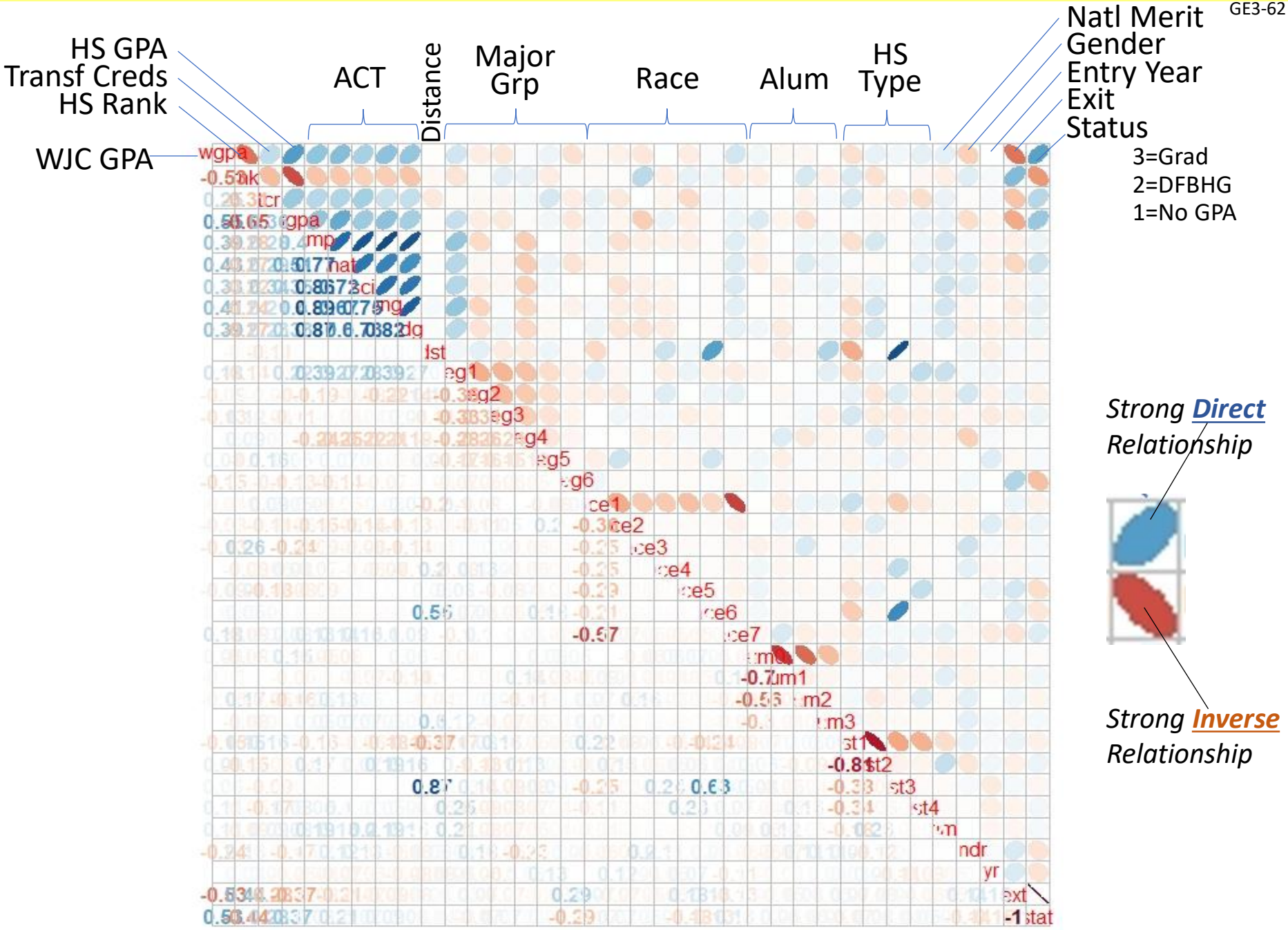
Major Grouping	Grads	DFBHG	NoGPA	Total or WtdAvg
Humanities	43	5	7	55
Pre-Prof	36	7	10	53
Soc Sci	35	3	10	48
Nursing	26	3	8	37
Sciences	11	1	14	26
Undec/Self-Def	0	2	5	7

Gender	Grads	DFBHG	NoGPA	Total or WtdAvg
Female	109	11	34	154
Male	42	10	20	72

National Merit Scholar	Grads	DFBHG	NoGPA	Total or WtdAvg
Yes	3	0	0	3
No	148	21	54	223

Entry Year	Grads	DFBHG	NoGPA	Total or WtdAvg
Year 2015	77	6	15	98
Year 2016	74	15	39	128

GE3-62


HS GPA
Transf Creds
HS Rank
WJC GPA
ACT
Distance
Major Grp
Race
Alum
HS Type
Natl Merit
Gender
Entry Year
Exit Status
3=Grad
2=DFBHG
1=No GPA
wgpa
gpa
mp
hat
dg
lst
eg1
eg2
eg3
eg4
eg5
eg6
ce1
ce2
ce3
ce4
ce5
ce6
ce7
m1
m2
m3
st1
st2
st3
st4
ndr
yr
ext
stat
Strong Direct Relationship
Strong Inverse Relationship

GE3-89

Correlation with

WJC GPA

High School GPA _

High School Rank _

ACT Math_____

ACT English _____

ACT Composite __

ACT Reading ____

ACT Science _____

Transfer Credits __

Gender _____

Humanities Major_

Non-Disclosed Race

Undecided Major_

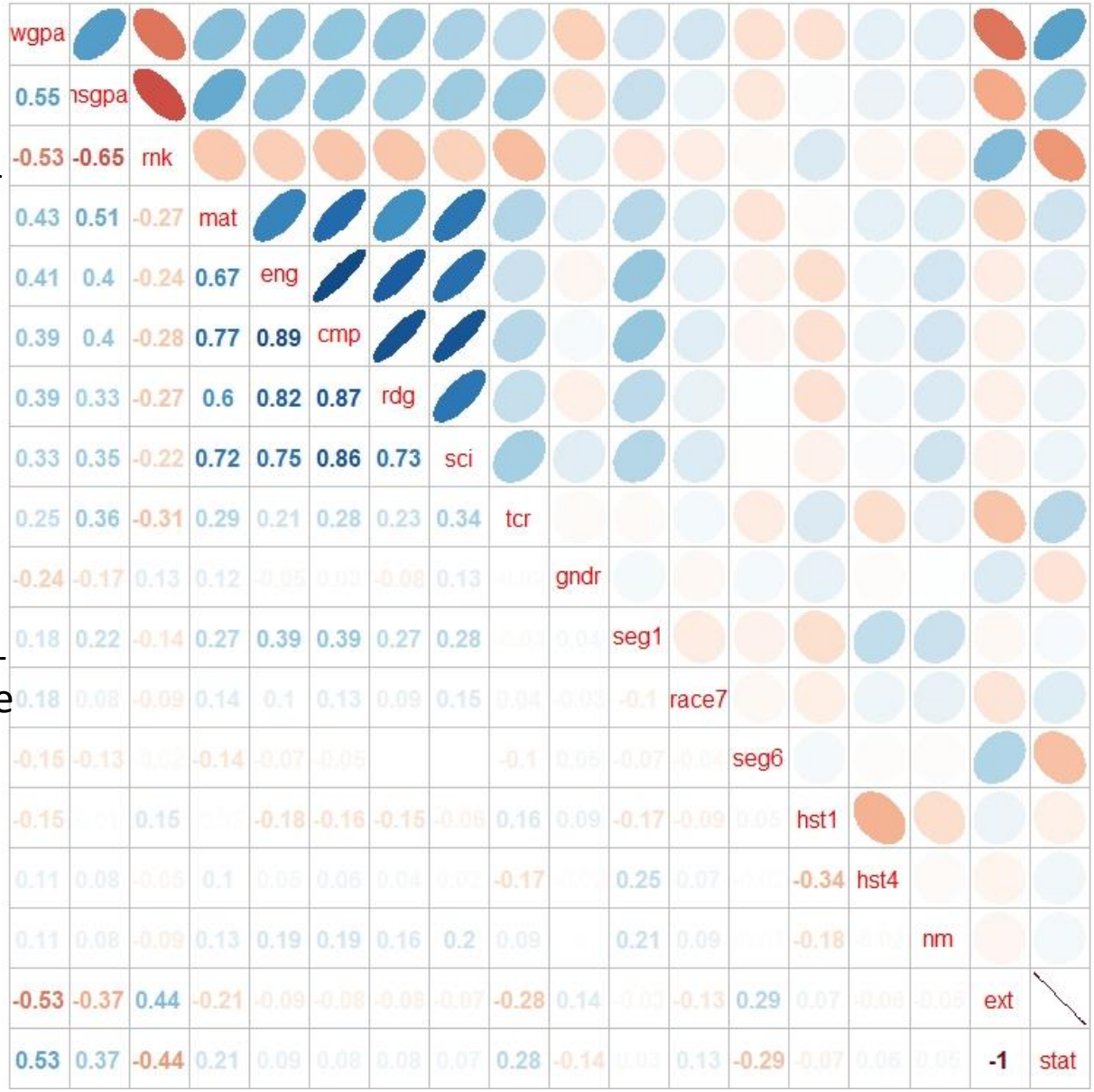
Public School____

Home School____

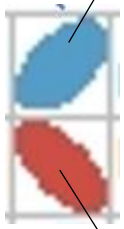
Natl Merit_____

Exit_____

Status_____

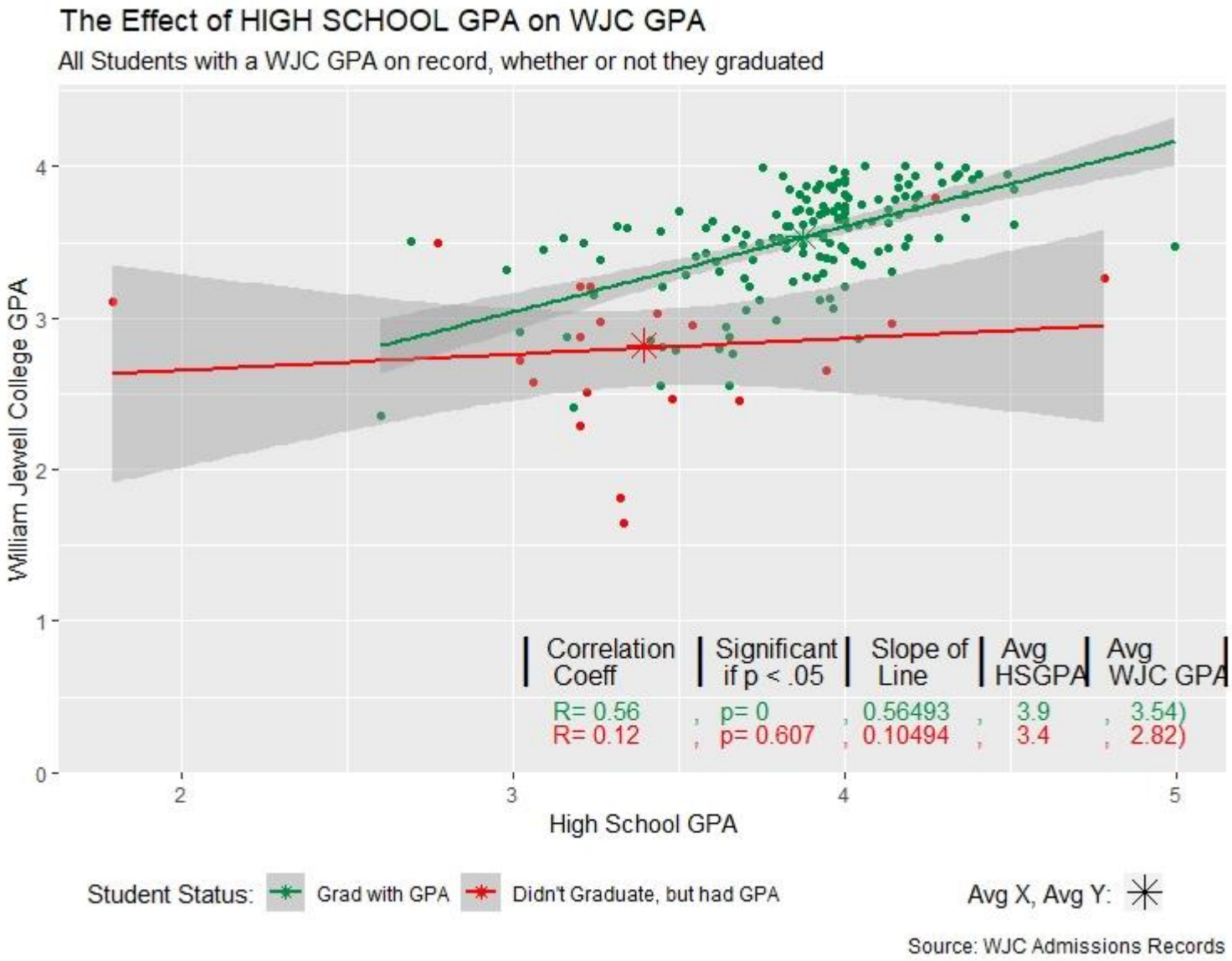


*Strong **Direct** Relationship*



*Strong **Inverse** Relationship*

GE2-686


The Effect of HIGH SCHOOL GPA on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
High School GPA
Correlation Coeff
Significant if p < .05
Slope of Line
Avg HSGPA
Avg WJC GPA
R= 0.56 , p= 0 , 0.56493 , 3.9 , 3.54)
R= 0.12 , p= 0.607 , 0.10494 , 3.4 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

Excel S7S8

Model A : using Statistically Significant Drivers

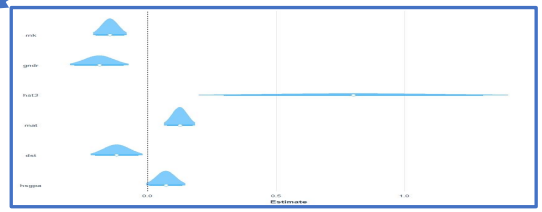
Regression Statistics	
Multiple R	0.674068597
R Square	0.454368474
Adjusted R Square	**43.5%** ← *how much variation in WJC GPA does our model explain.*
Standard Error	0.33040641
Observations	172

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	15.000	2.500	22.900	1.47578E-19
Residual	165	18.013	0.109		
Total	171	33.013			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	2.250	0.335	6.724	0.000000
rnk	-0.002	0.000	4.371	0.000022
gndr	-0.188	0.058	-3.270	0.001310
hst3	0.801	0.305	2.624	0.009503
mat	0.030	0.007	4.112	0.000062
dst	0.000	0.000	-2.330	0.021038
hsgpa	0.172	0.093	1.855	0.065360

should be less than .05



Excel S7S8

Model B : using Classic Drivers

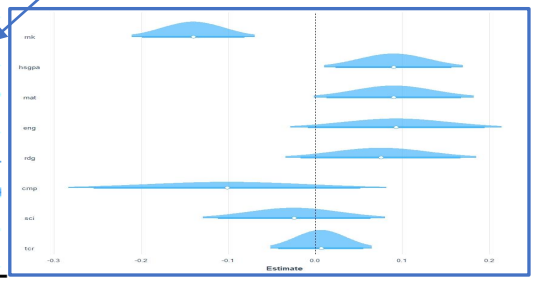
Regression Statistics	
Multiple R	0.646531875
R Square	0.418003465
Adjusted R Square	**38.9%** ← *how much variation in WJC GPA does our model explain.*
Standard Error	0.343326326
Observations	172

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	8	13.799	1.725	14.634	5.17079E-16
Residual	163	19.213	0.118		
Total	171	33.013			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	2.069	0.370	5.596	0.000000
rnk	-0.002	0.001	3.927	0.000127
hsgpa	0.218	0.098	2.233	0.026922
mat	0.021	0.011	1.938	0.054395
eng	0.017	0.012	1.514	0.131852
rdg	0.014	0.010	1.359	0.176124
cmp	-0.023	0.021	-1.094	0.275740
sci	-0.005	0.012	-0.457	0.648183
tcr	0.001	0.002	0.222	0.824952

should be less than .05



Comment about Model B : Classic Drivers:

- Nearly as good as the Statistically Significant Model. Adj R-Sqd 38.9% vs 43.5%.
- Uses predictor variables that are well-known and usable.
- It does have some chaff in it, which might mislead.

GE4-145,152

Probit Model C

Classification Table: Statistically Significant Drivers

wgpa, prnk, hsgpa, tcr, mat

		Exit	Grad	
		Exit-Obs	Grad-Obs	
Exit	Exit-Pred	32	3	35
Grad	Grad-Pred	7	90	97
		39	93	132
	Accuracy	82.1%	96.8%	92.4%

Probit Model D

Classification Table: Pre-Known Drivers

prnk, hsgpa, tcr, mat

		Exit	Grad	
		Exit-Obs	Grad-Obs	
Exit	Exit-Pred	12	6	18
Grad	Grad-Pred	20	112	132
		32	118	150
	Accuracy	37.5%	94.9%	82.7%

Back-Up Slides

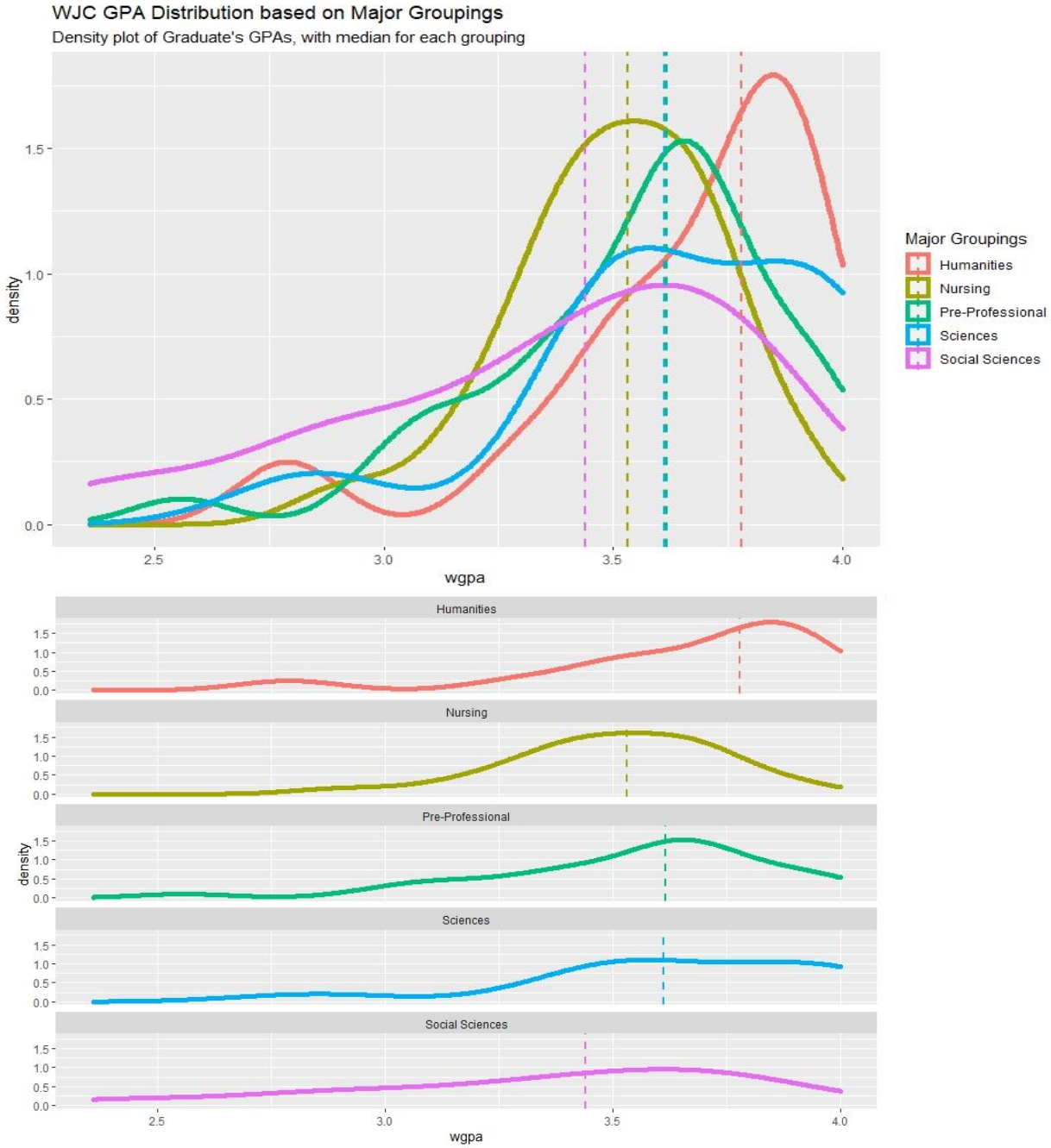
Slides 11-12 : Major Groupings
Slides 13-22 : Continuous Variables, Individual Correlations
Slides 23-30 : Categorical & Binary Variables, Boxplots
Slides 31-35 : Regression Diagnostic Plots
Slides 36-38 : Comparing Statistically Significant vs Classic Drivers

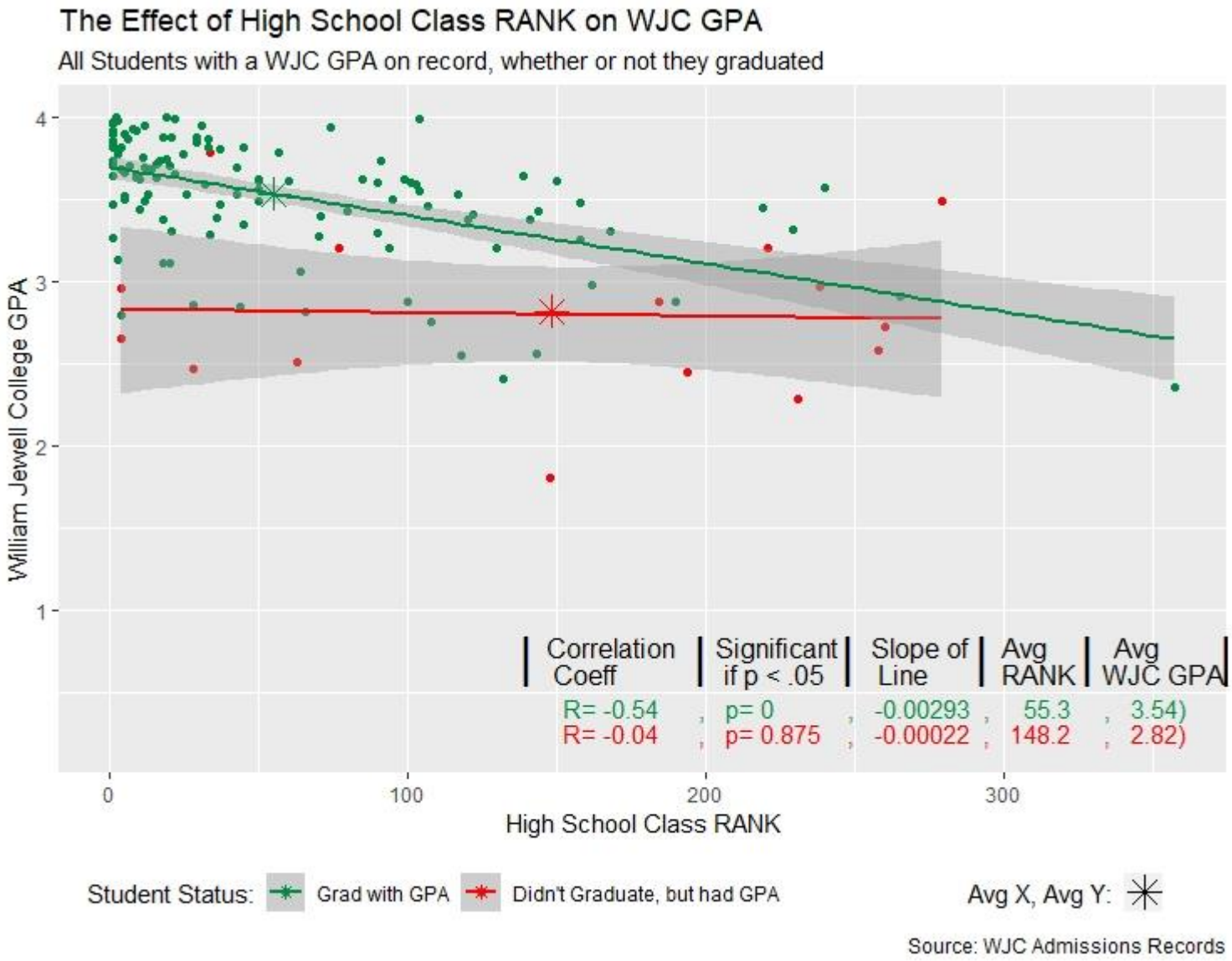
Major Grouping (Segments)

1. **Humanities**: Oxbridge, English, Music, Theater, Spanish, French, Philosophy, IDM/DMC
2. **Pre-Professional**: Business Administration, Accounting, Non-Profit Leadership, Economics, Education, Civil Engineering
3. **Social Sciences**: Psychology, History, Political Science, Intl Rel, Communications, Public Relations
4. **Nursing**
5. **Sciences**: Math, Data Science, Physics, Chemistry, Biology, Bio-Chemistry
6. **Undecided / Self-Designed**

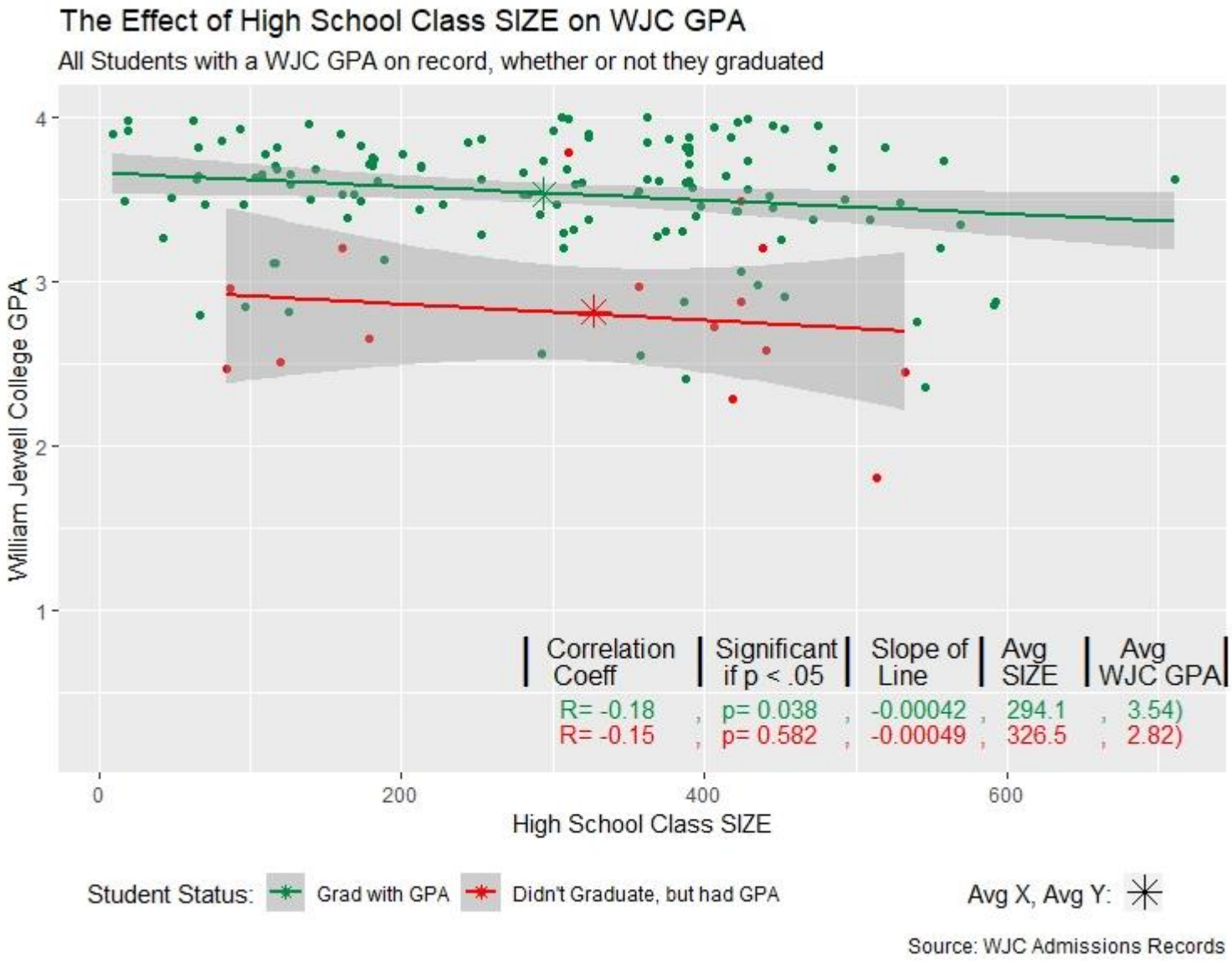
GPA's by Major Groupings

GE2-1858

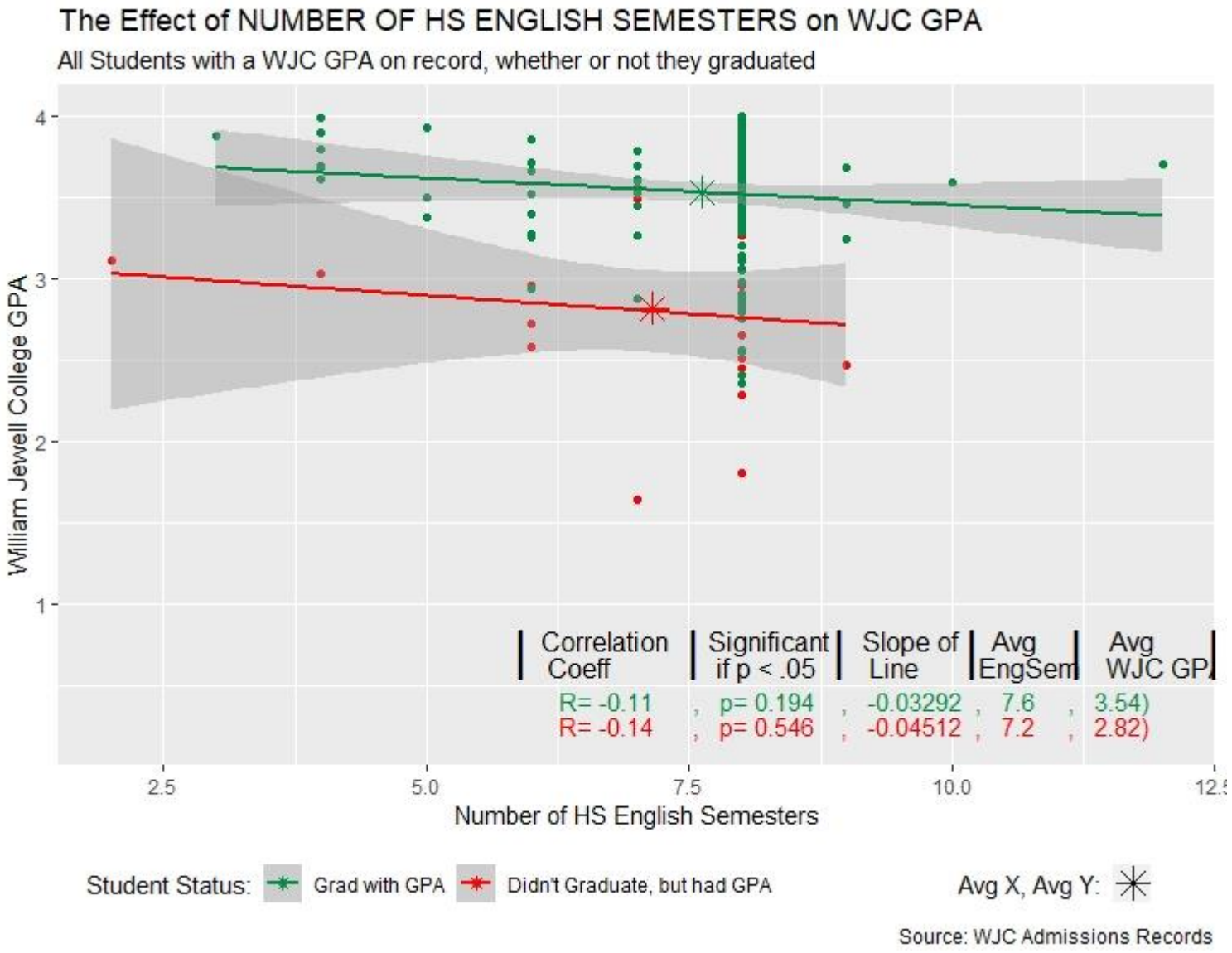



The Effect of High School Class RANK on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
0
100
200
300
High School Class RANK
Correlation Coeff
Significant if p < .05
Slope of Line
Avg RANK
Avg WJC GPA
R= -0.54 , p= 0 , -0.00293 , 55.3 , 3.54)
R= -0.04 , p= 0.875 , -0.00022 , 148.2 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

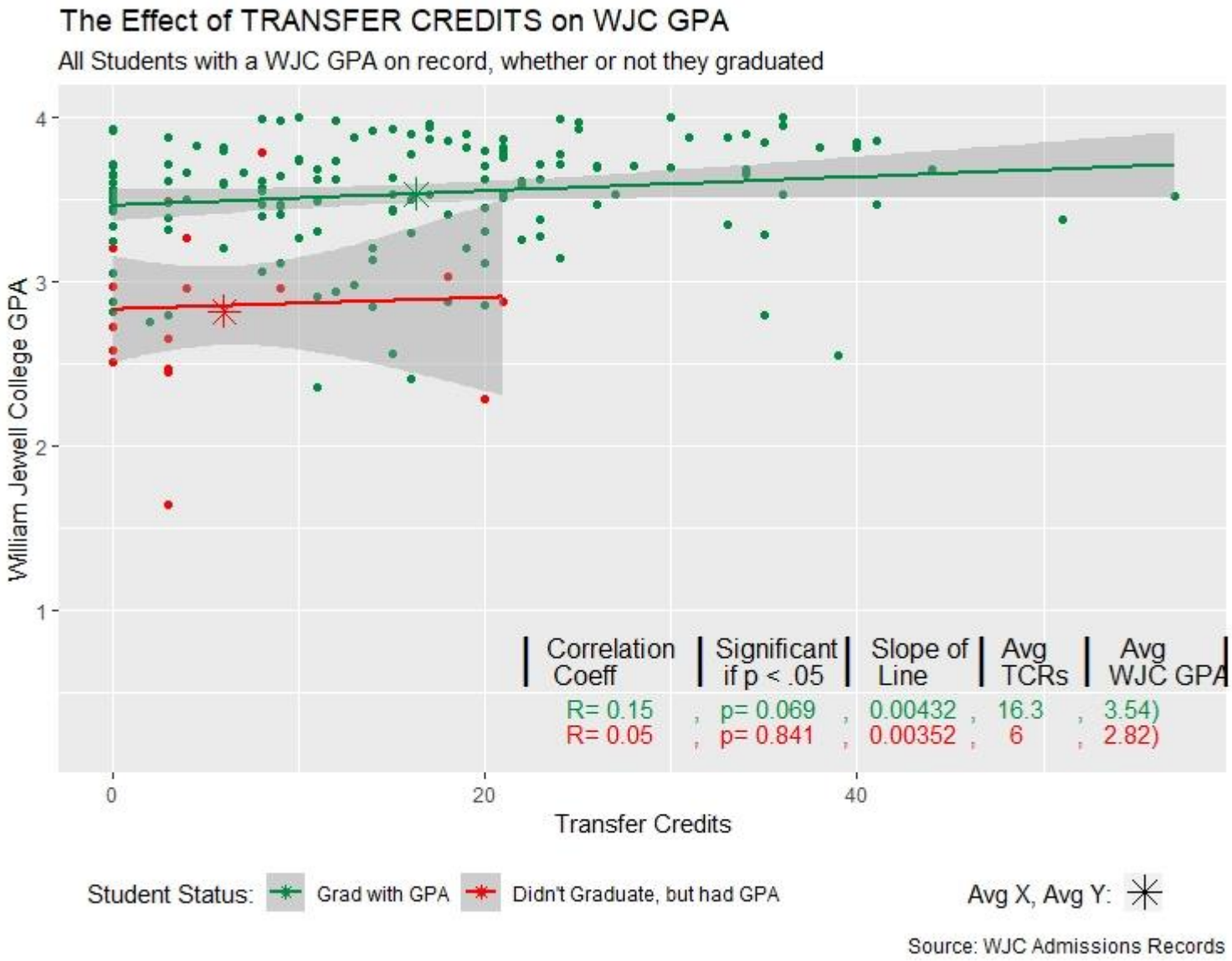
GE2-286


The Effect of High School Class SIZE on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
0
200
400
600
High School Class SIZE
Correlation Coeff
Significant if p < .05
Slope of Line
Avg SIZE
Avg WJC GPA
R= -0.18 , p= 0.038 , -0.00042 , 294.1 , 3.54)
R= -0.15 , p= 0.582 , -0.00049 , 326.5 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

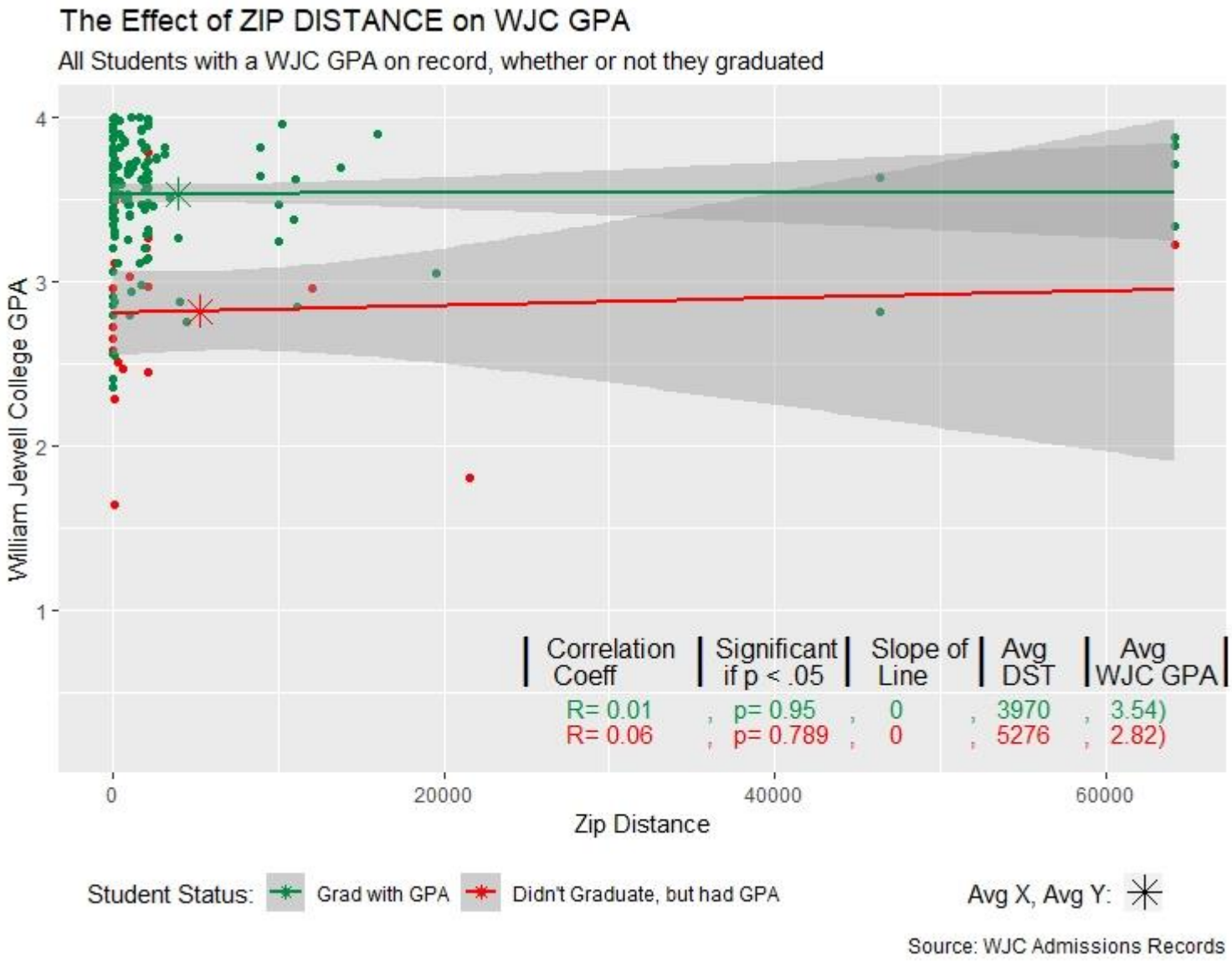
GE2-486


The Effect of NUMBER OF HS ENGLISH SEMESTERS on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
2.5
5.0
7.5
10.0
12.5
Number of HS English Semesters
Correlation Coeff
Significant if p < .05
Slope of Line
Avg EngSem
Avg WJC GP
R= -0.11 , p= 0.194 , -0.03292 , 7.6 , 3.54)
R= -0.14 , p= 0.546 , -0.04512 , 7.2 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

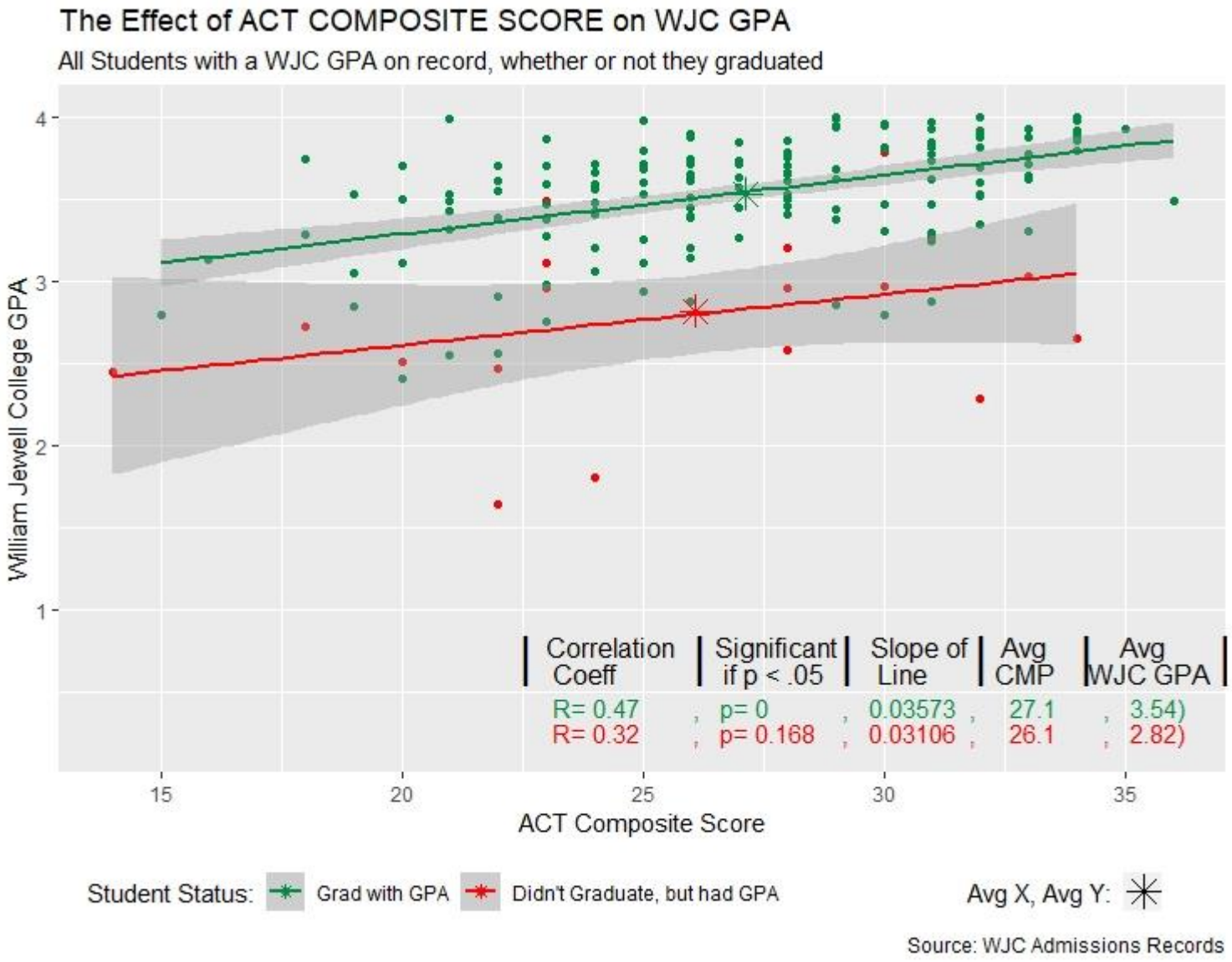
GE2-586


The Effect of TRANSFER CREDITS on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
0
20
40
Transfer Credits
Correlation Coeff
Significant if p < .05
Slope of Line
Avg TCRs
Avg WJC GPA
R= 0.15 , p= 0.069 , 0.00432 , 16.3 , 3.54)
R= 0.05 , p= 0.841 , 0.00352 , 6 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

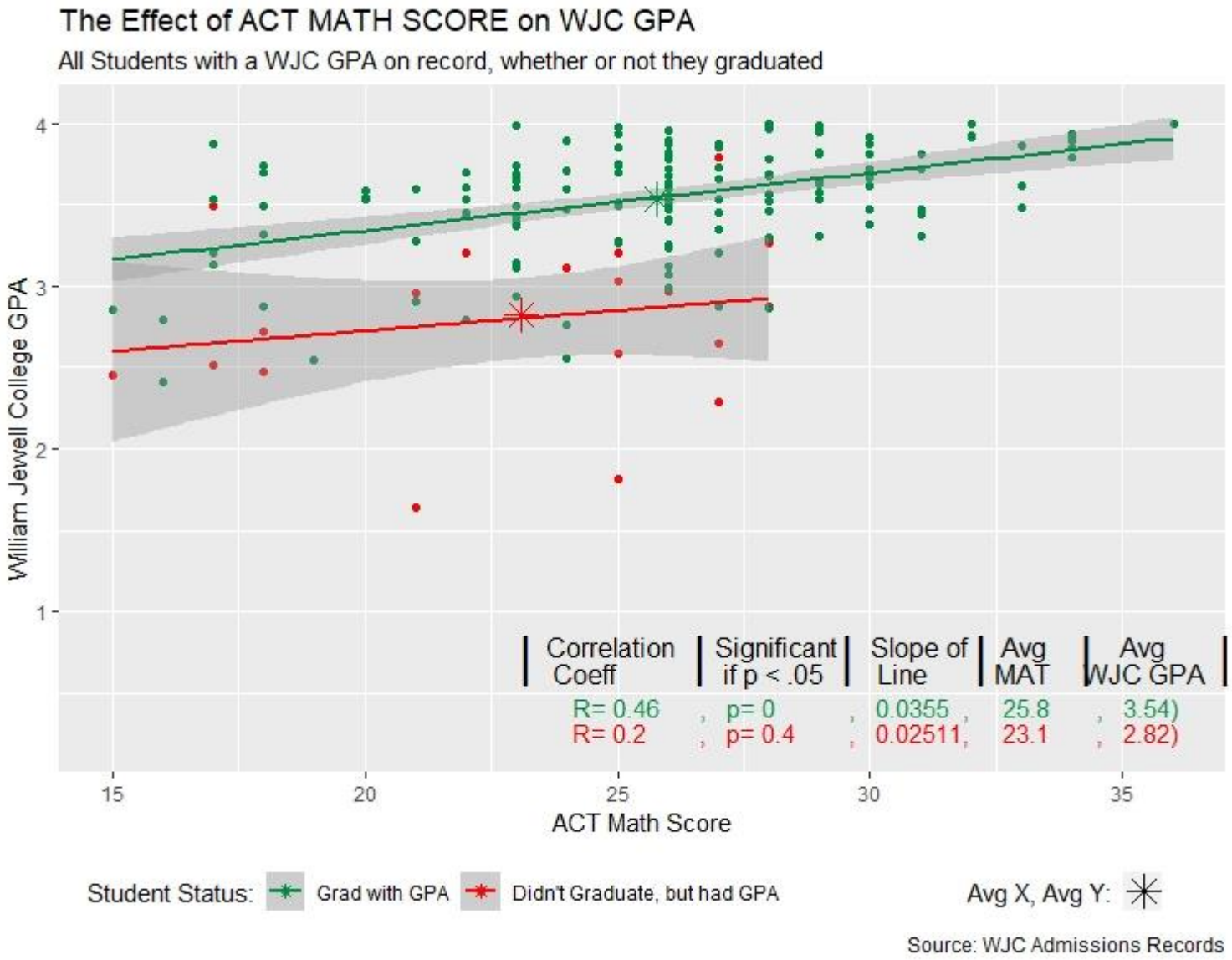
GE2-1286


The Effect of ZIP DISTANCE on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
0
20000
40000
60000
Zip Distance
Correlation Coeff
Significant if p < .05
Slope of Line
Avg DST
Avg WJC GPA
R= 0.01 , p= 0.95 , 0 , 3970 , 3.54)
R= 0.06 , p= 0.789 , 0 , 5276 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

GE2-786

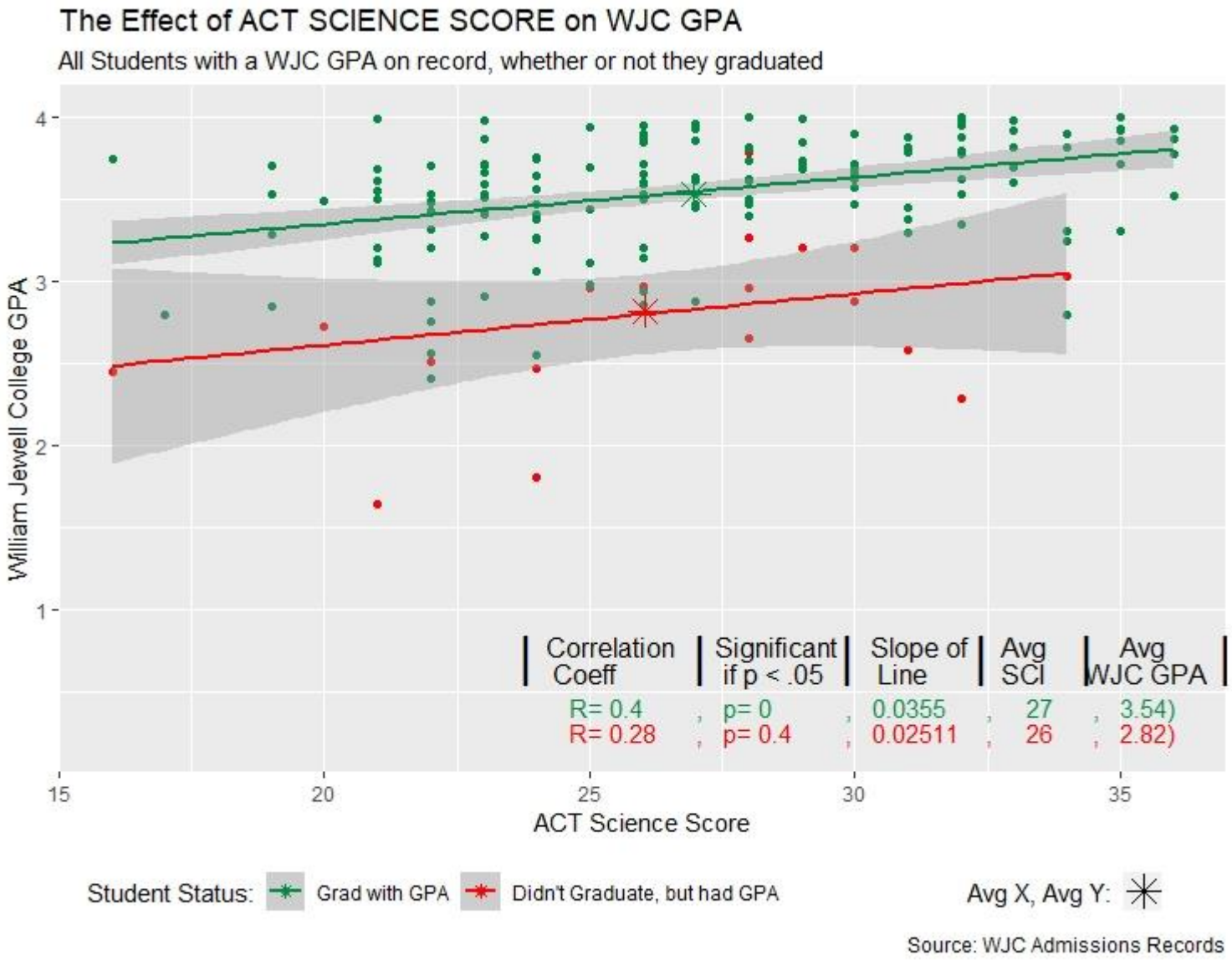

The Effect of ACT COMPOSITE SCORE on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
15
20
25
30
35
ACT Composite Score
Correlation Coeff
Significant if p < .05
Slope of Line
Avg CMP
Avg WJC GPA
R= 0.47 , p= 0 , 0.03573 , 27.1 , 3.54)
R= 0.32 , p= 0.168 , 0.03106 , 26.1 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

GE2-886

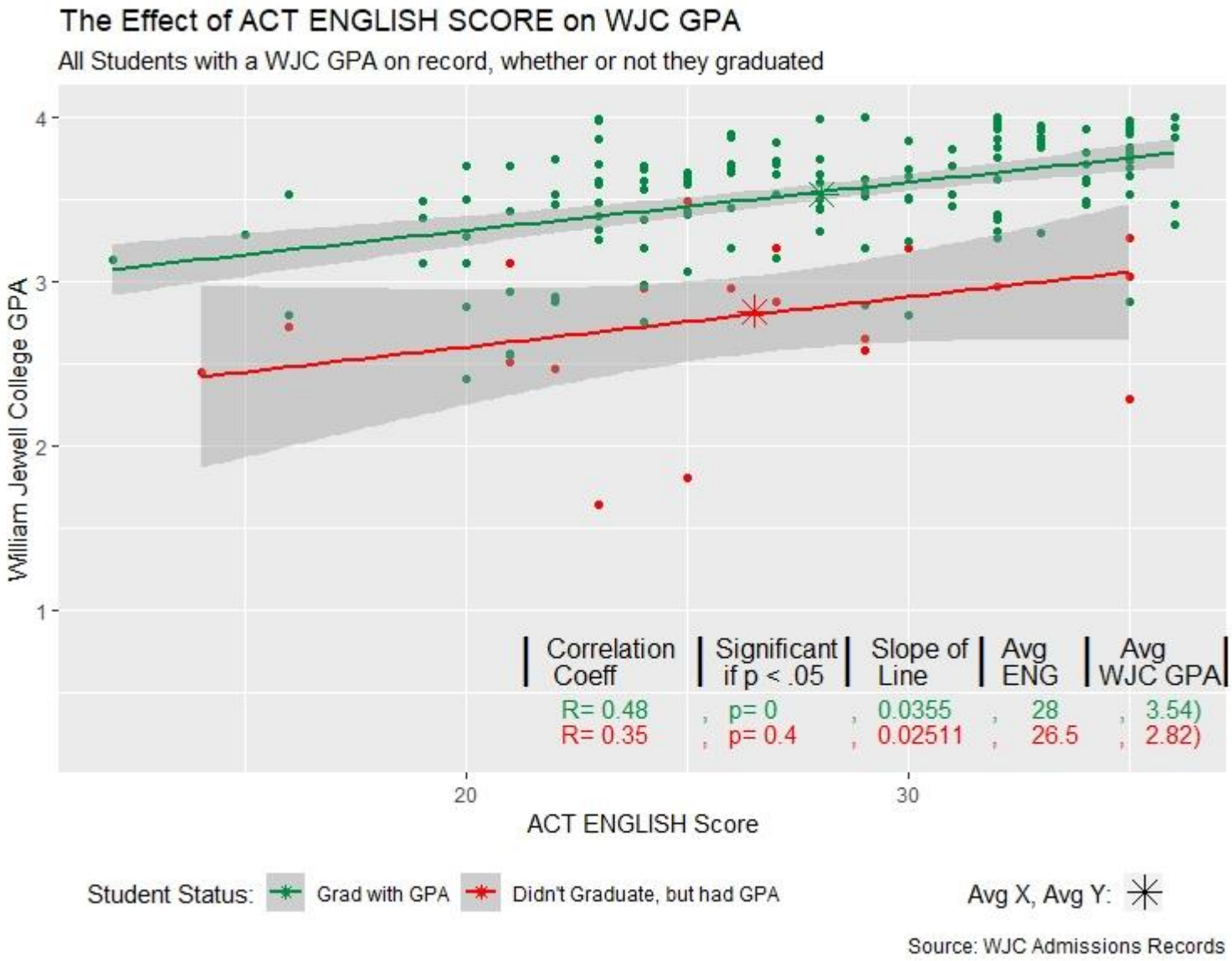


Source: WJC Admissions Records

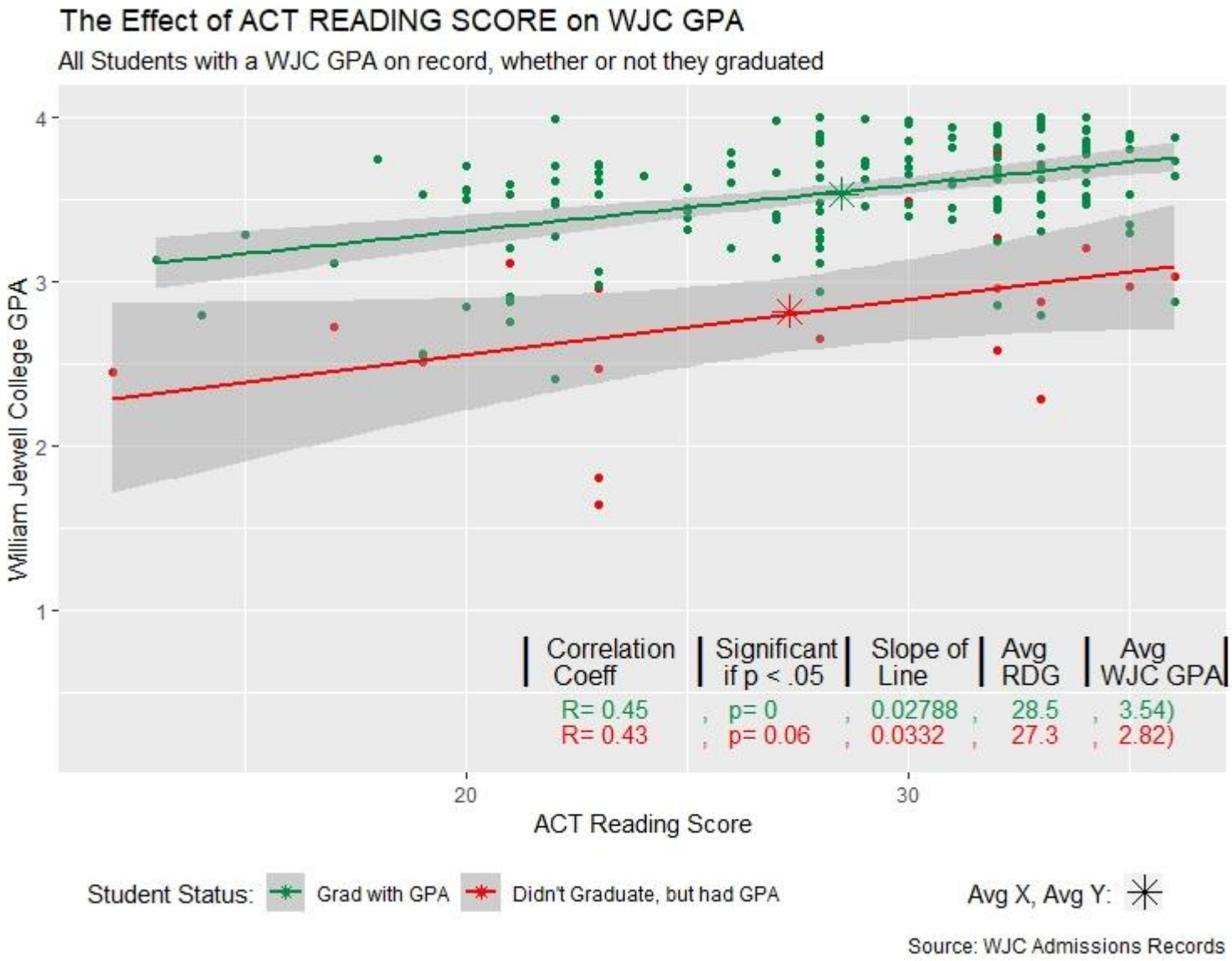
GE2-986


The Effect of ACT SCIENCE SCORE on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
15
20
25
30
35
ACT Science Score
Correlation Coeff
Significant if p < .05
Slope of Line
Avg SCI
Avg WJC GPA
R= 0.4 , p= 0 , 0.0355 , 27 , 3.54)
R= 0.28 , p= 0.4 , 0.02511 , 26 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

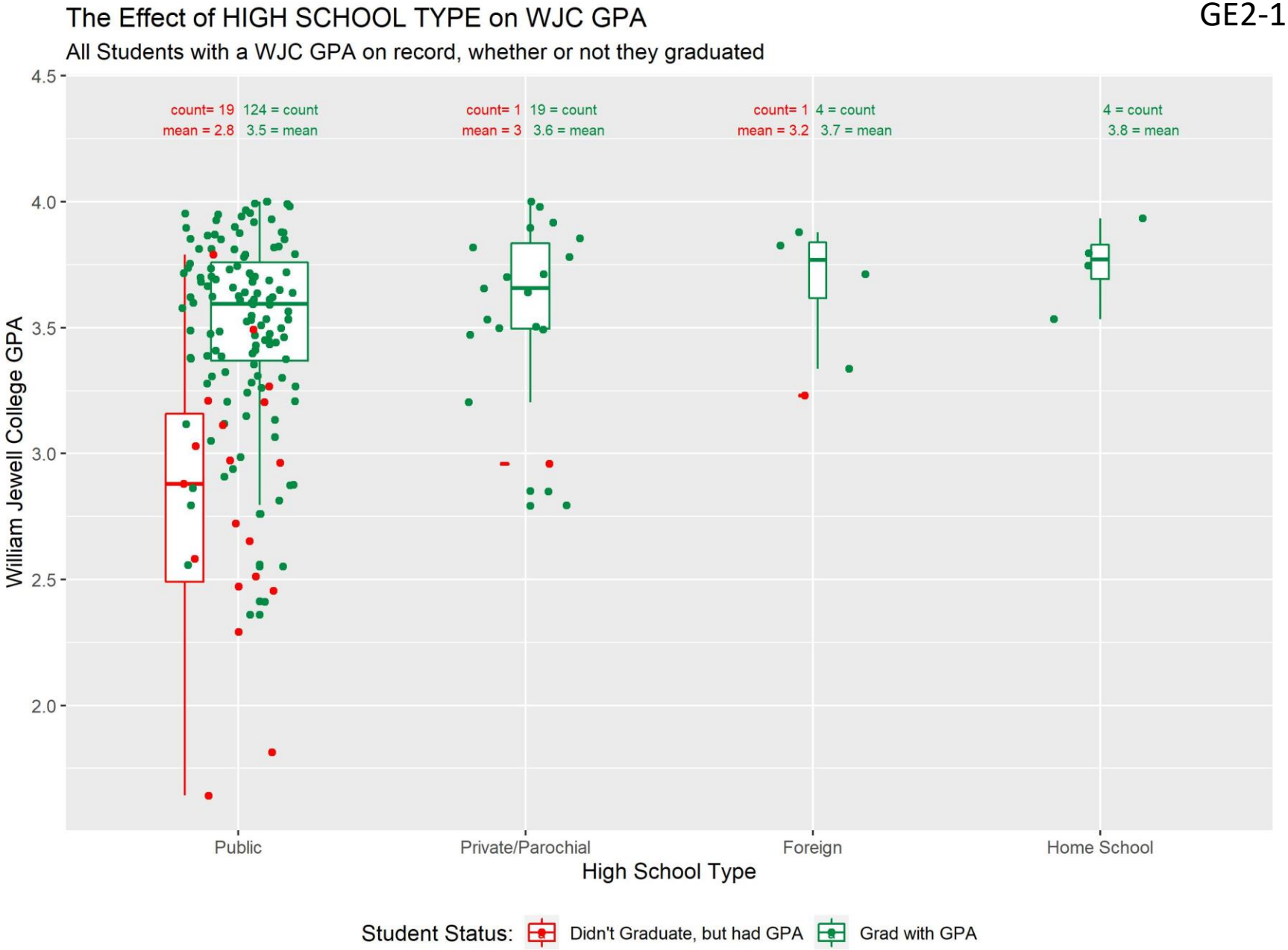
GE2-1086


The Effect of ACT ENGLISH SCORE on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
20
30
ACT ENGLISH Score
Correlation Coeff
Significant if p < .05
Slope of Line
Avg ENG
Avg WJC GPA
R= 0.48 , p= 0 , 0.0355 , 28 , 3.54)
R= 0.35 , p= 0.4 , 0.02511 , 26.5 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

GE2-1186

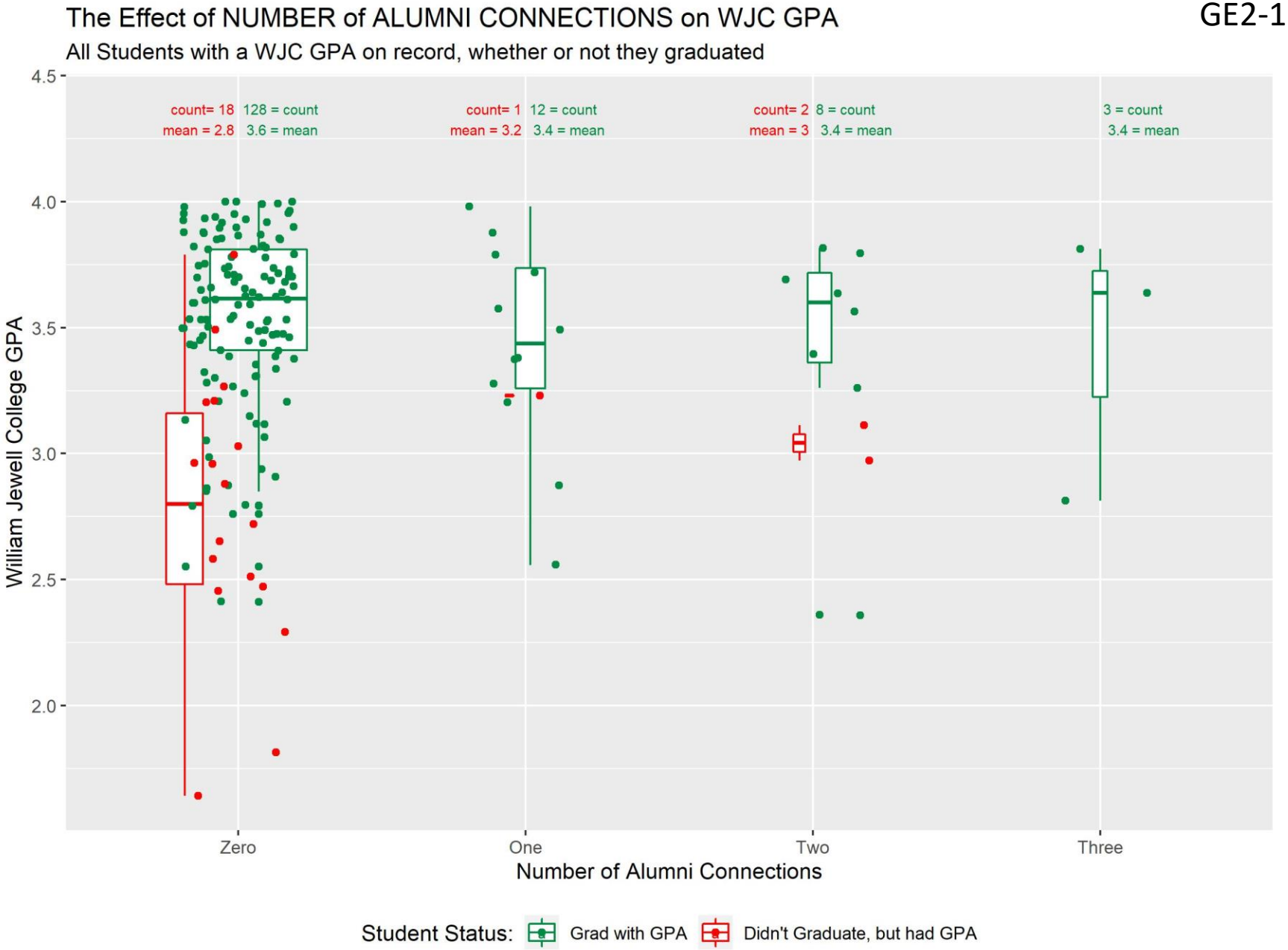

The Effect of ACT READING SCORE on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
William Jewell College GPA
4
3
2
1
20
30
ACT Reading Score
Correlation Coeff
Significant if p < .05
Slope of Line
Avg RDG
Avg WJC GPA
R= 0.45 , p= 0 , 0.02788 , 28.5 , 3.54)
R= 0.43 , p= 0.06 , 0.0332 , 27.3 , 2.82)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Avg X, Avg Y:
Source: WJC Admissions Records

GE2-1530



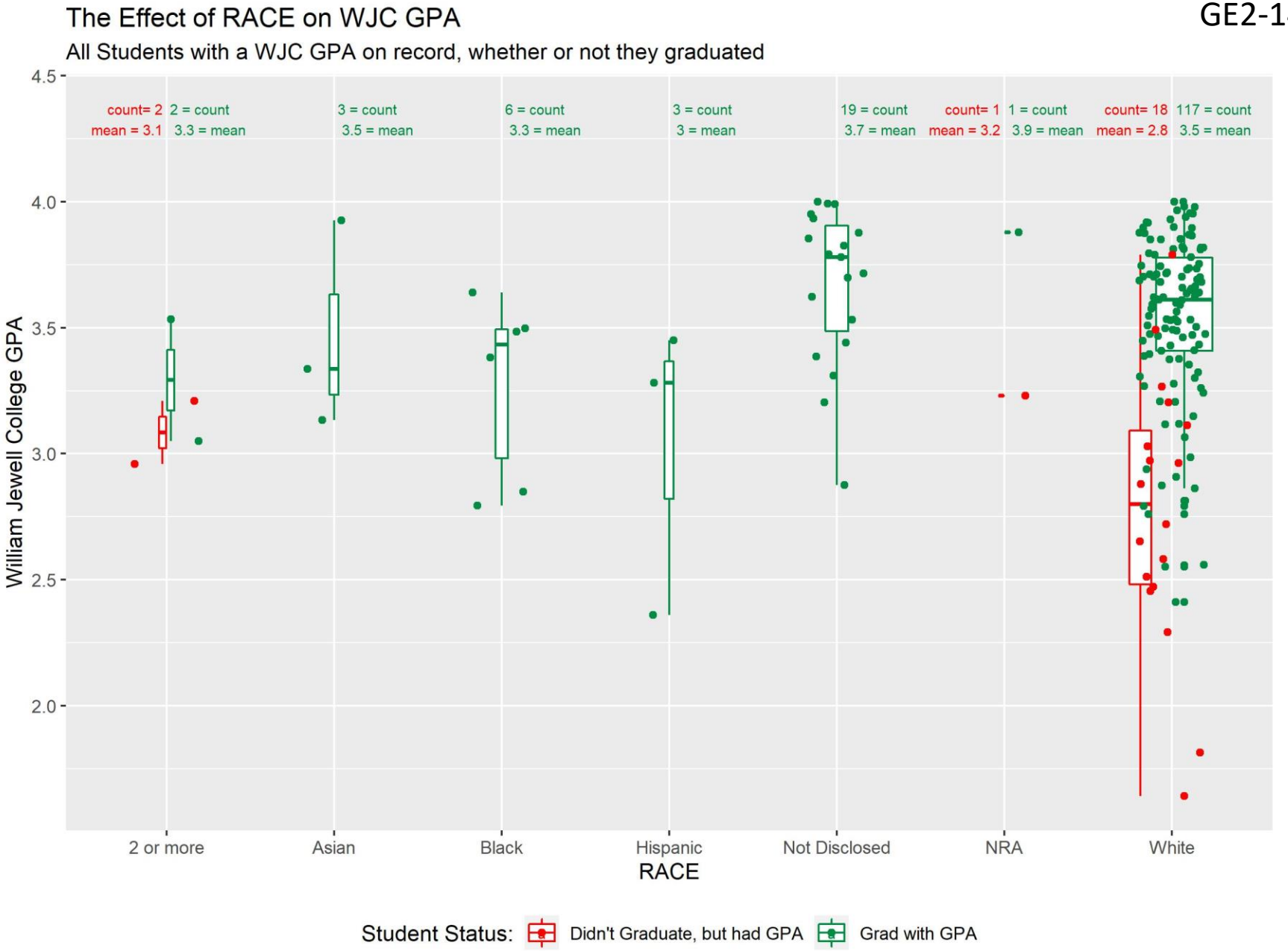
Source: WJC Admissions Records

GE2-1575



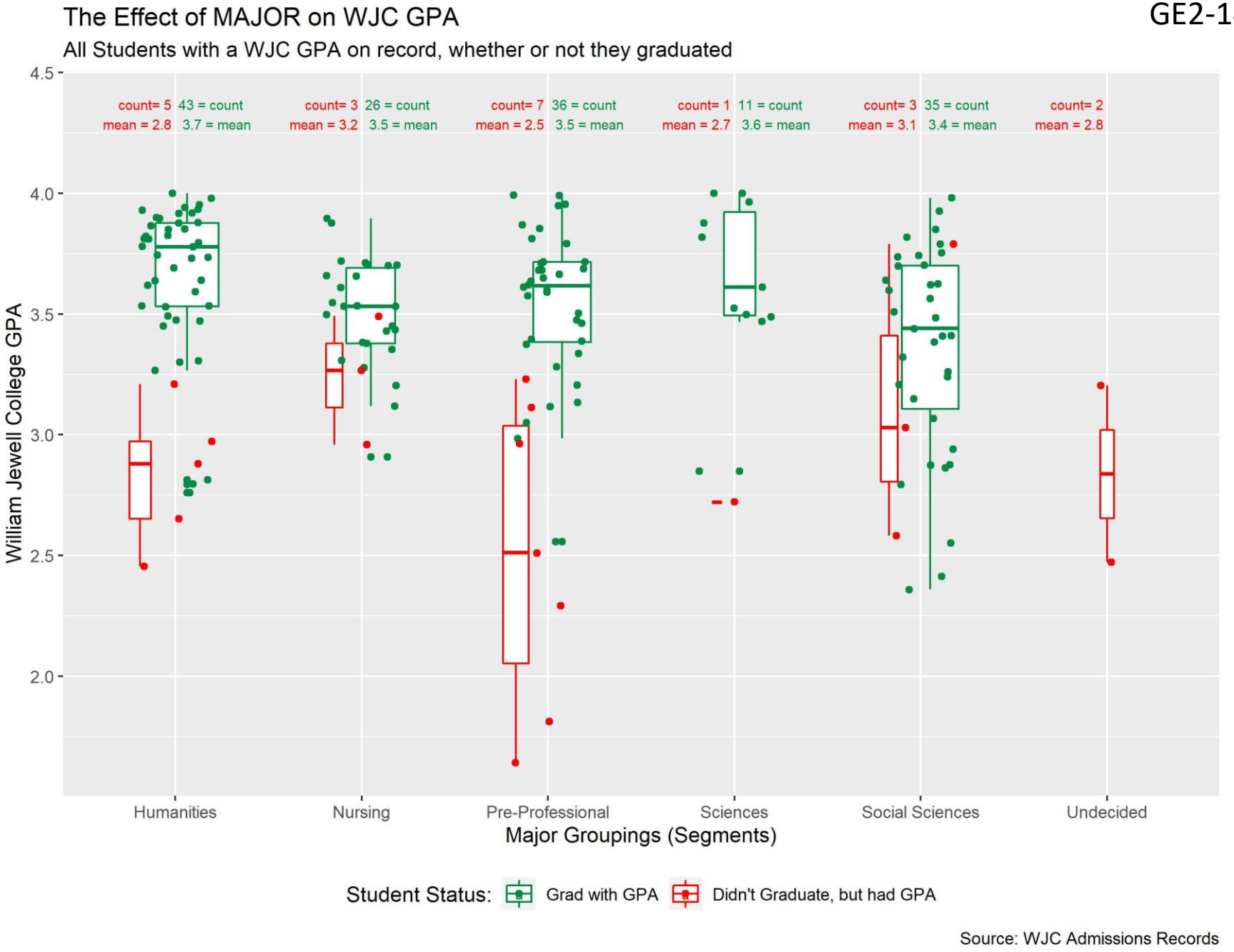
Source: WJC Admissions Records

GE2-1485

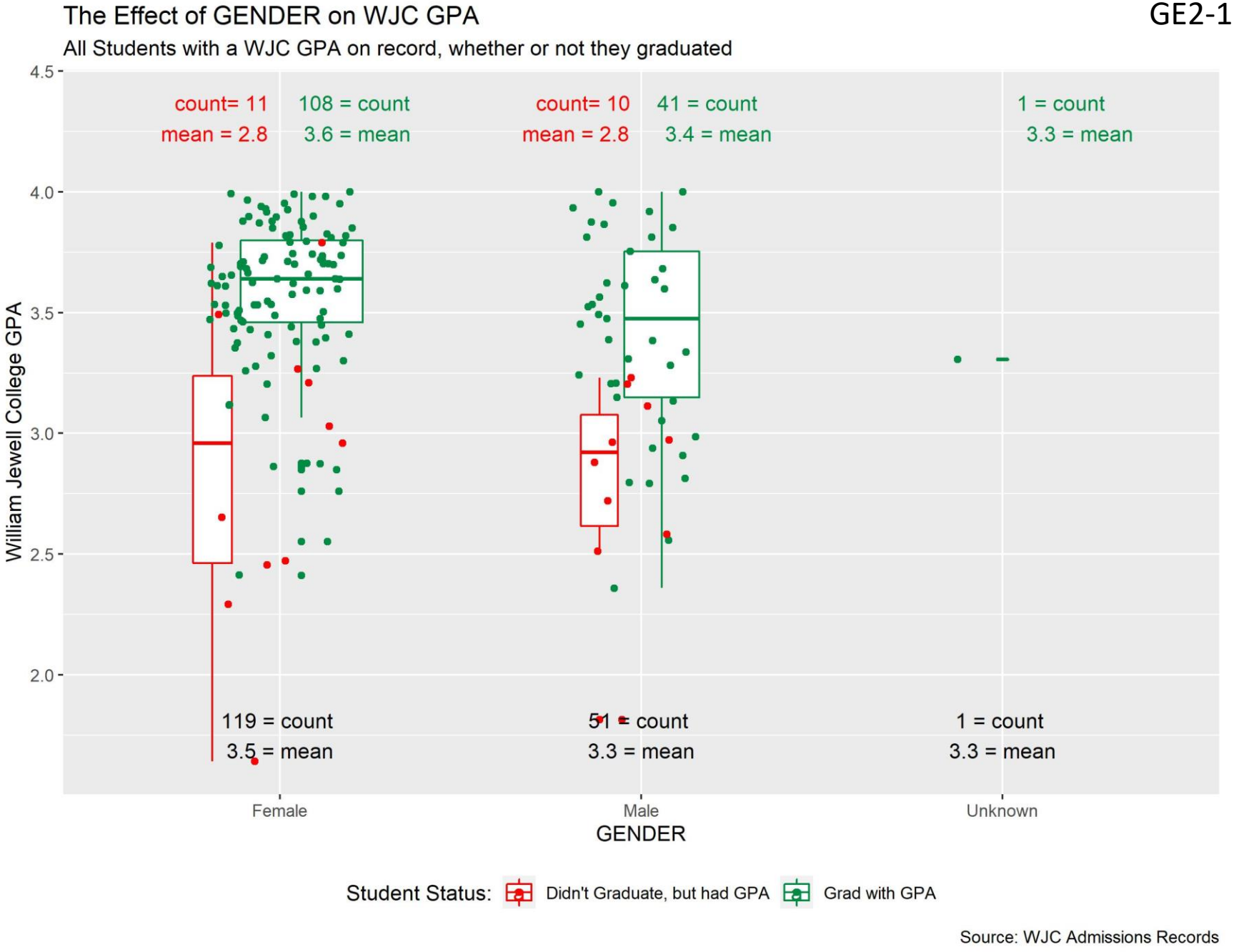


Source: WJC Admissions Records

GE2-1438

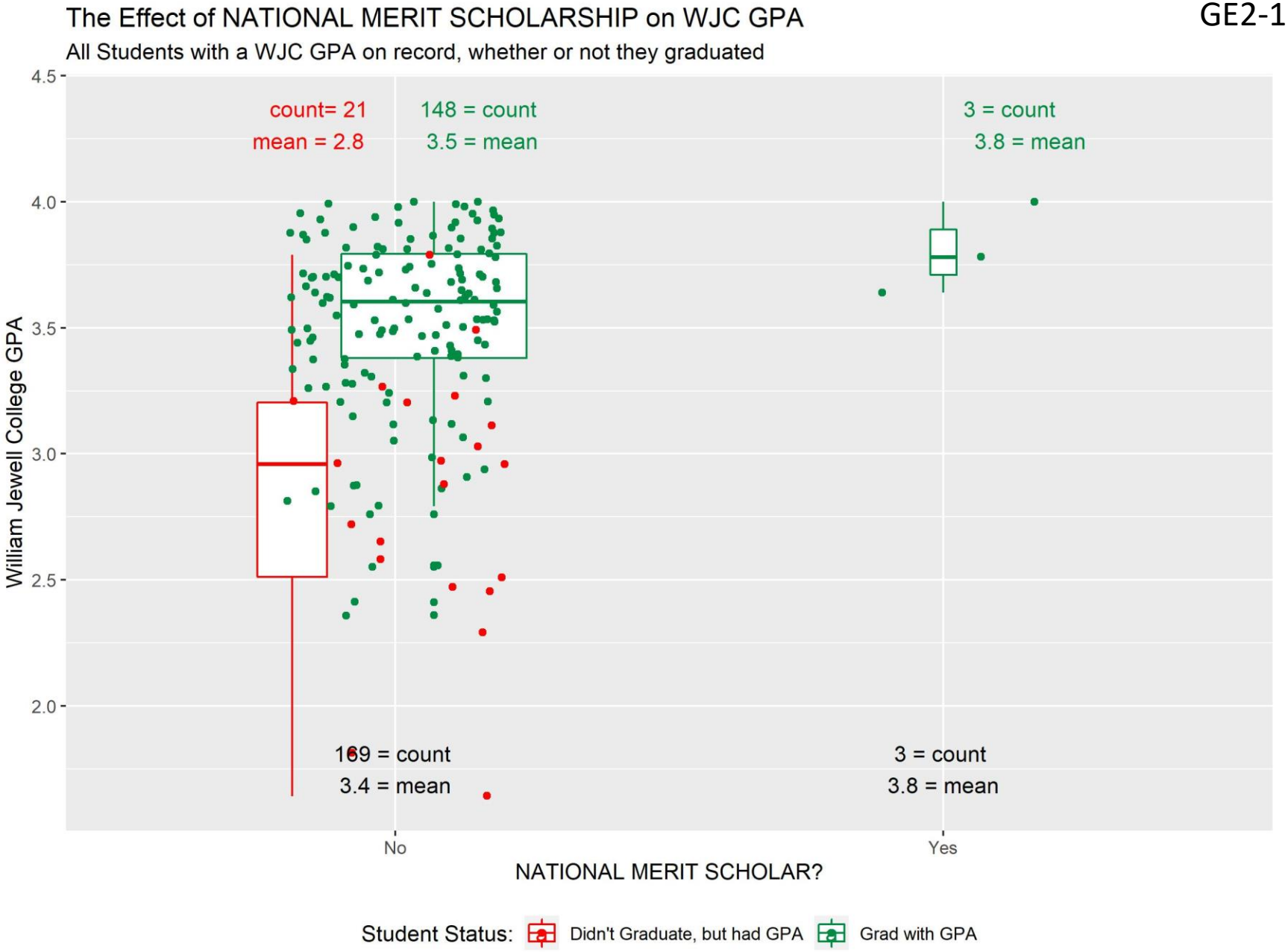

The Effect of MAJOR on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
count= 5 43 = count
mean = 2.8 3.7 = mean
count= 3 26 = count
mean = 3.2 3.5 = mean
count= 7 36 = count
mean = 2.5 3.5 = mean
count= 1 11 = count
mean = 2.7 3.6 = mean
count= 3 35 = count
mean = 3.1 3.4 = mean
count= 2
mean = 2.8
4.5
4.0
3.5
3.0
2.5
2.0
William Jewell College GPA
Humanities
Nursing
Pre-Professional
Sciences
Social Sciences
Undecided
Major Groupings (Segments)
Student Status:
Grad with GPA
Didn't Graduate, but had GPA
Source: WJC Admissions Records

GE2-1718



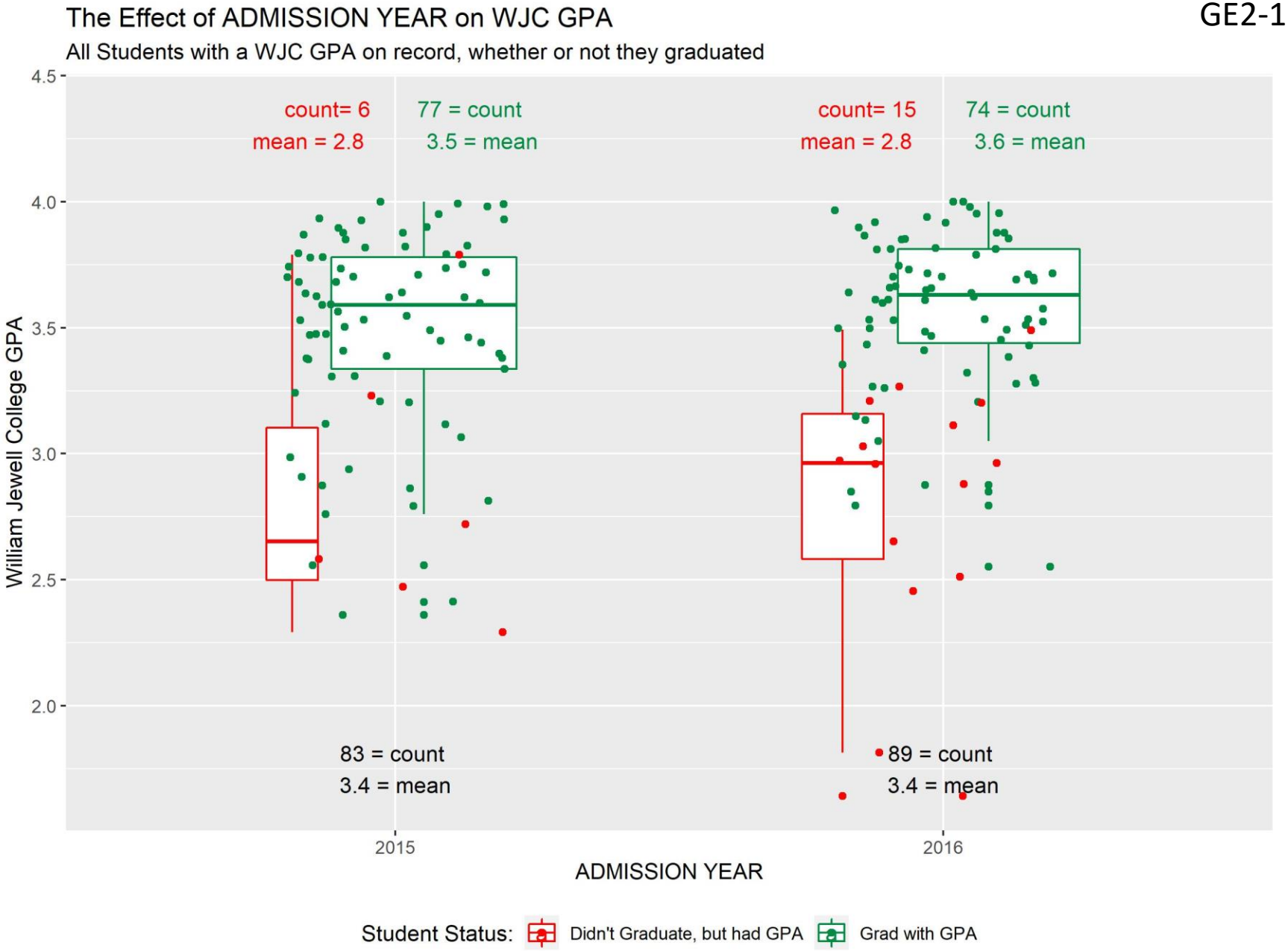
Source: WJC Admissions Records

GE2-1671

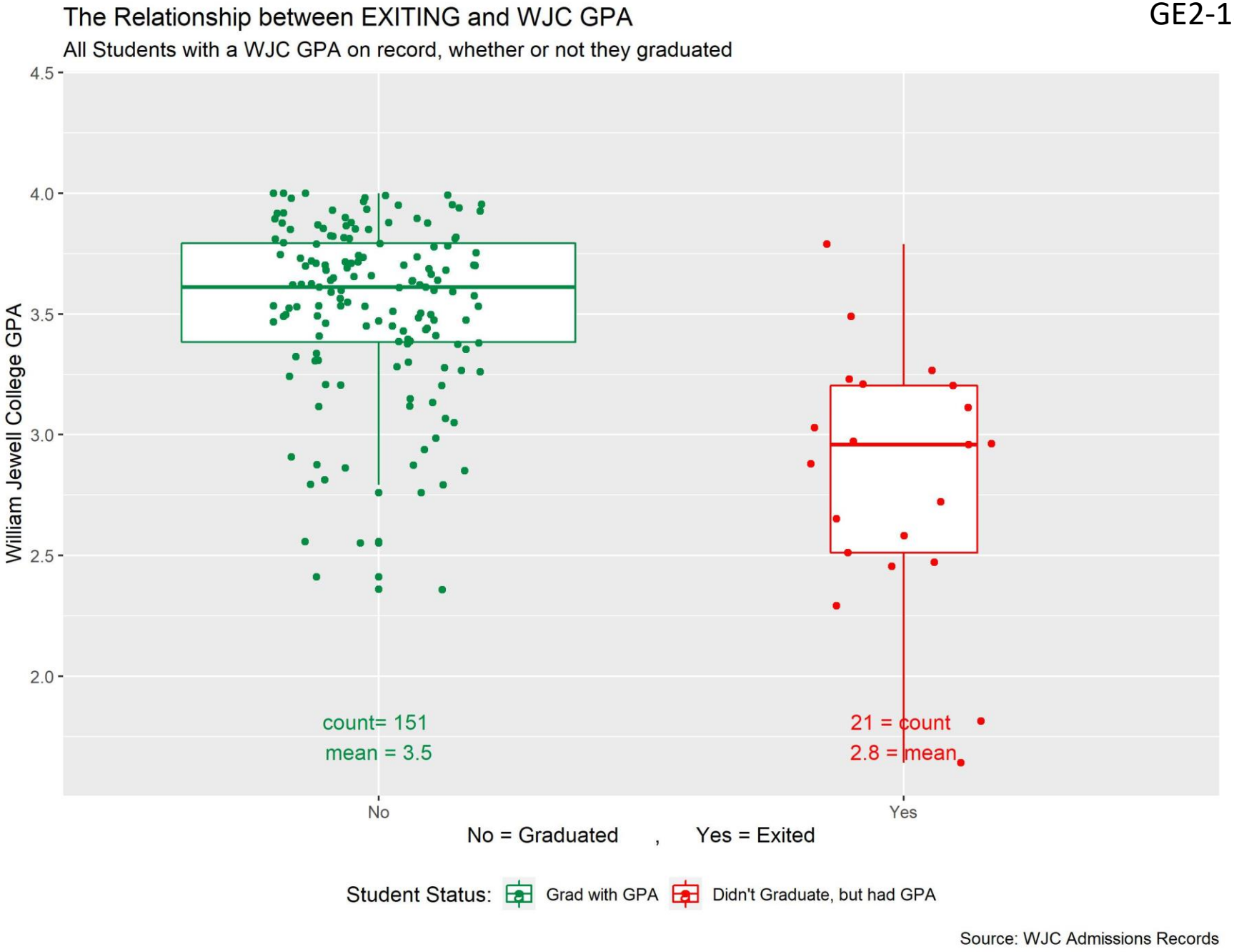


Source: WJC Admissions Records

GE2-1765


The Effect of ADMISSION YEAR on WJC GPA
All Students with a WJC GPA on record, whether or not they graduated
count= 6
mean = 2.8
77 = count
3.5 = mean
count= 15
mean = 2.8
74 = count
3.6 = mean
83 = count
3.4 = mean
89 = count
3.4 = mean
4.5
4.0
3.5
3.0
2.5
2.0
William Jewell College GPA
2015
2016
ADMISSION YEAR
Student Status:
Didn't Graduate, but had GPA
Grad with GPA
Source: WJC Admissions Records

GE2-1812

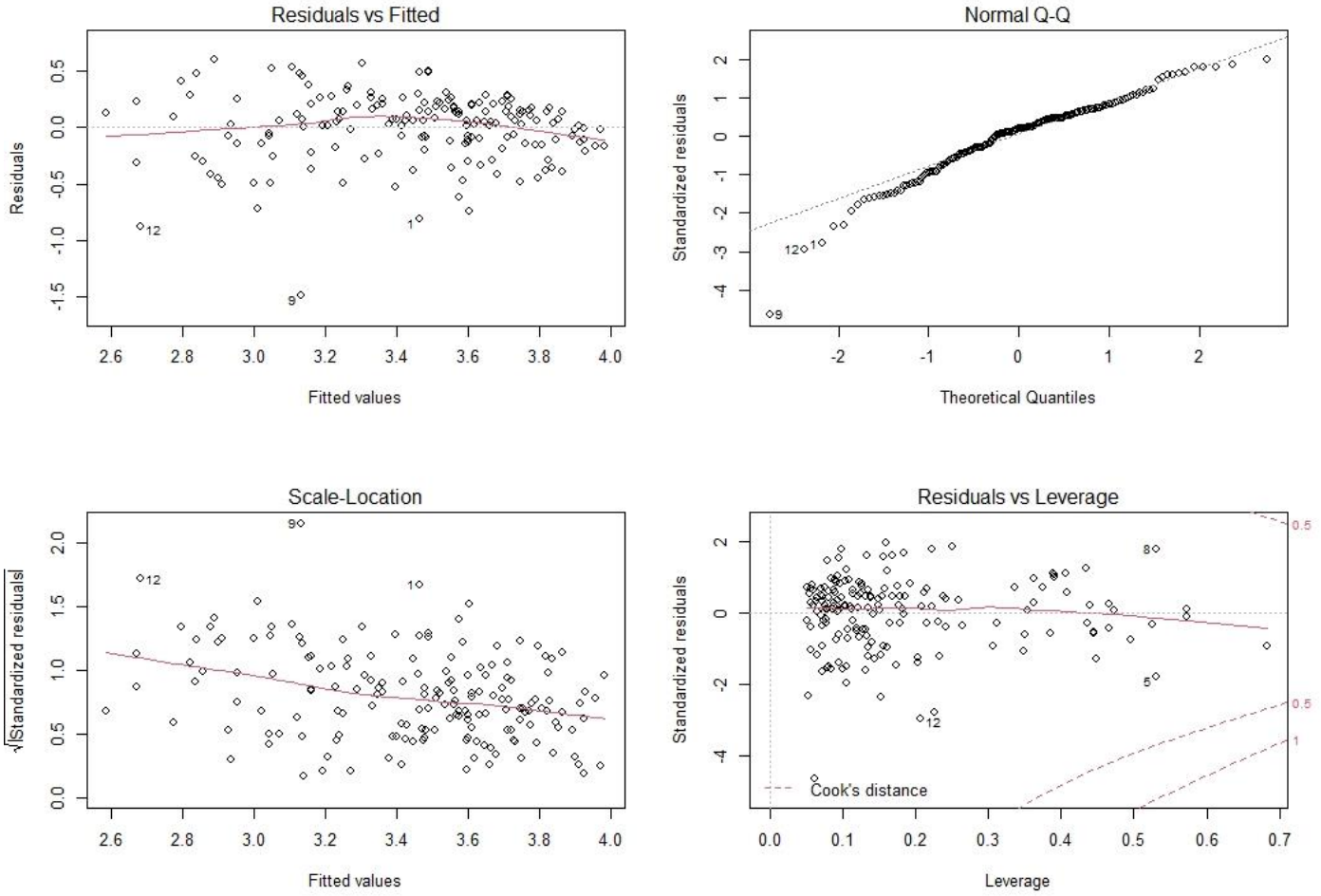


Source: WJC Admissions Records

GE3-142

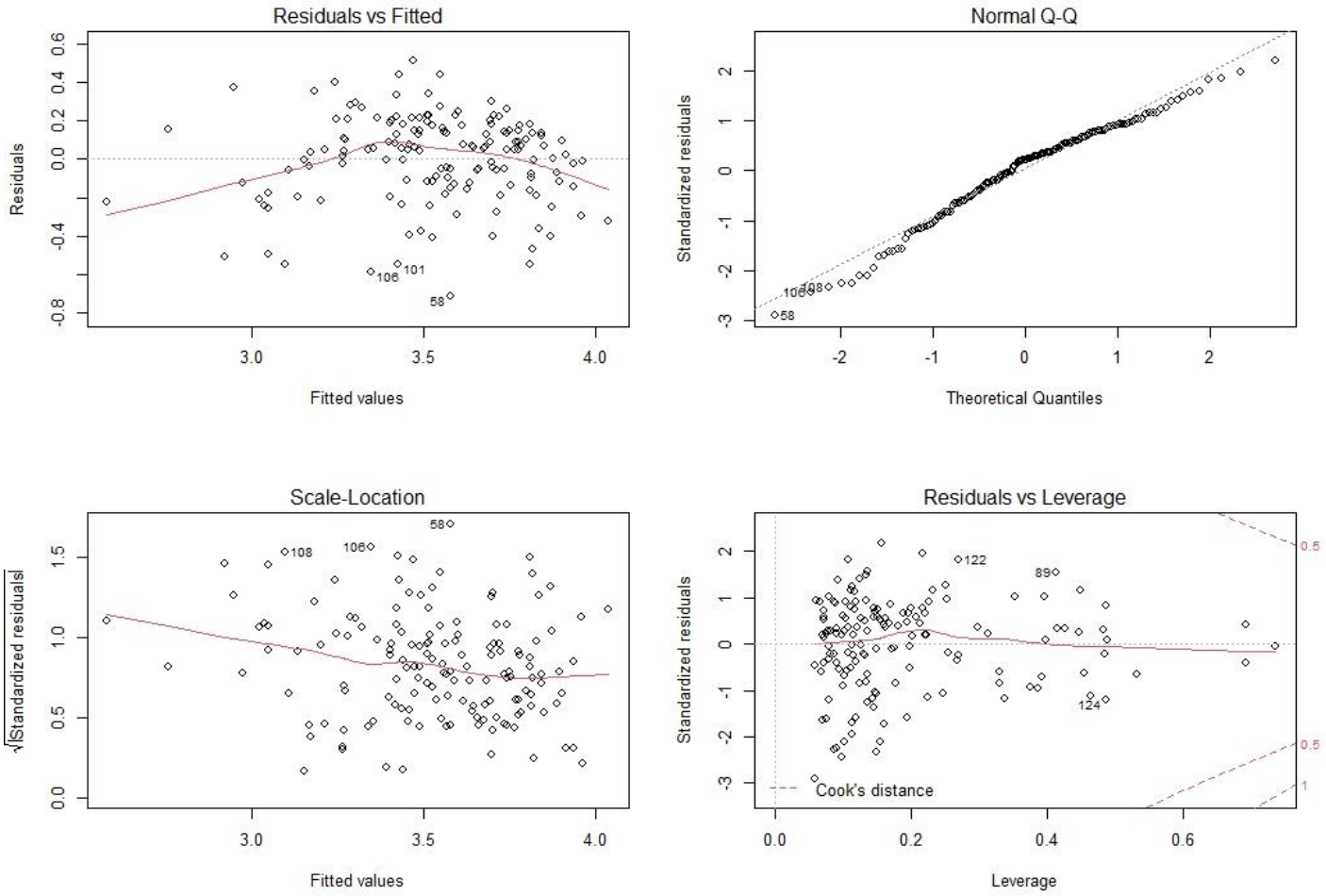
Diagnostic of Full Model , Grads and Exits

```
fullge <- lm(wgpa ~ race2 + race3 + race4 + race5 + race6 + race7 + hst2 + hst3 + hst4
+ alum1 + alum2 + alum3 + seg2 + seg3 + seg4 + seg5 + seg6 + engsem + rnk + tcr +
hsgpa + cmp + mat + sci + eng + rdg + dst + nm + gndr + yr,  GEwgpawfb)
summary(fullge)      #Results:  AdjRsqd = .0.4322
```



GE3-154

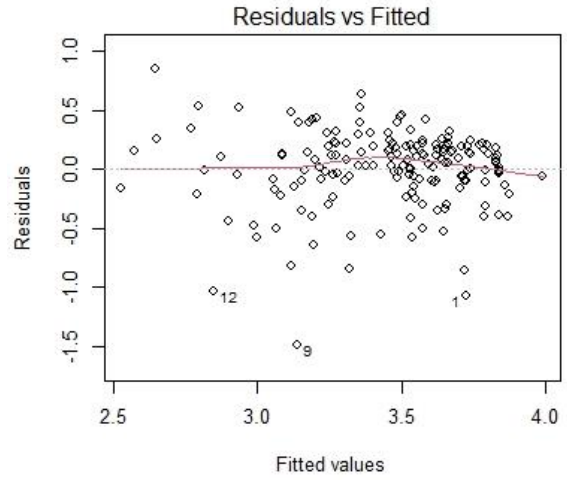
Diagnostic of Full Model , Grads Only fullg <- lm(wgpa ~ race2 + race3 + race4 + race5 + race6 + race7 + hst2 + hst3 + hst4 + alum1 + alum2 + alum3 + seg2 + seg3 + seg4 + seg5 + engsem + rnk + tcr + hsgpa + cmp + mat + sci + eng + rdg + dst + nm + gndr + yr, Gradswfb)
summary(fullg) #Results: AdjRsqd = .0.469

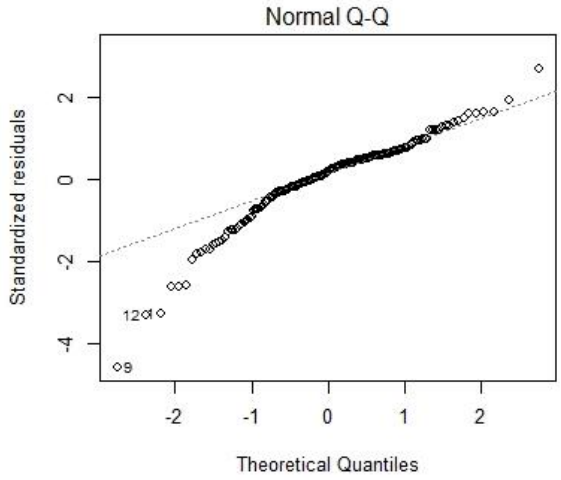


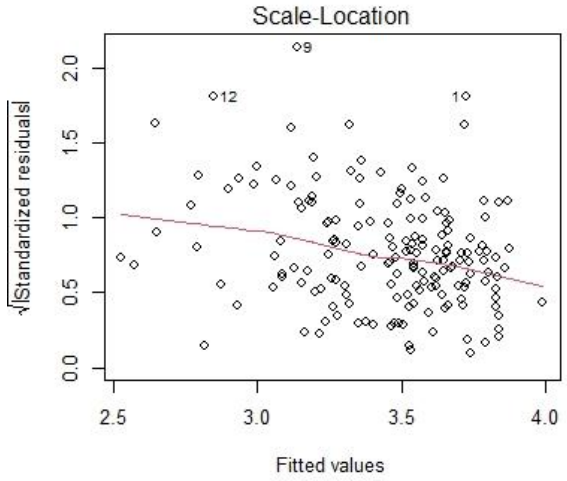
GE3-230

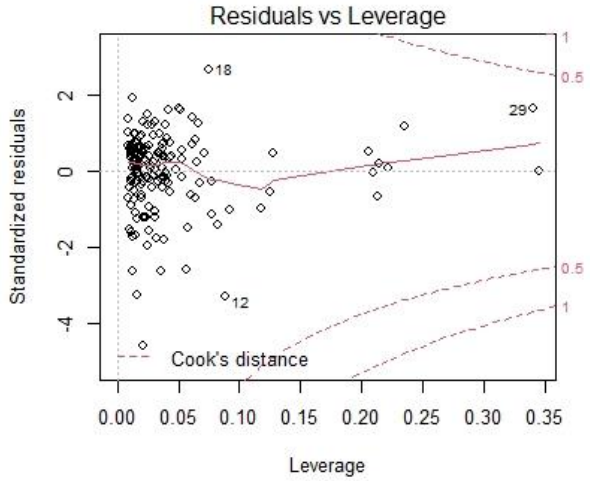
Diagnostic of Statistically Significant IVs , Grads and Exits

```
StatSigIVs <- lm(wgpa ~ rnk + gndr + hst3 + mat + dst + hsgpa,
                 data = GEwgpawfb)
summary(StatSigIVs)   #give adjRsqd = .4345
```





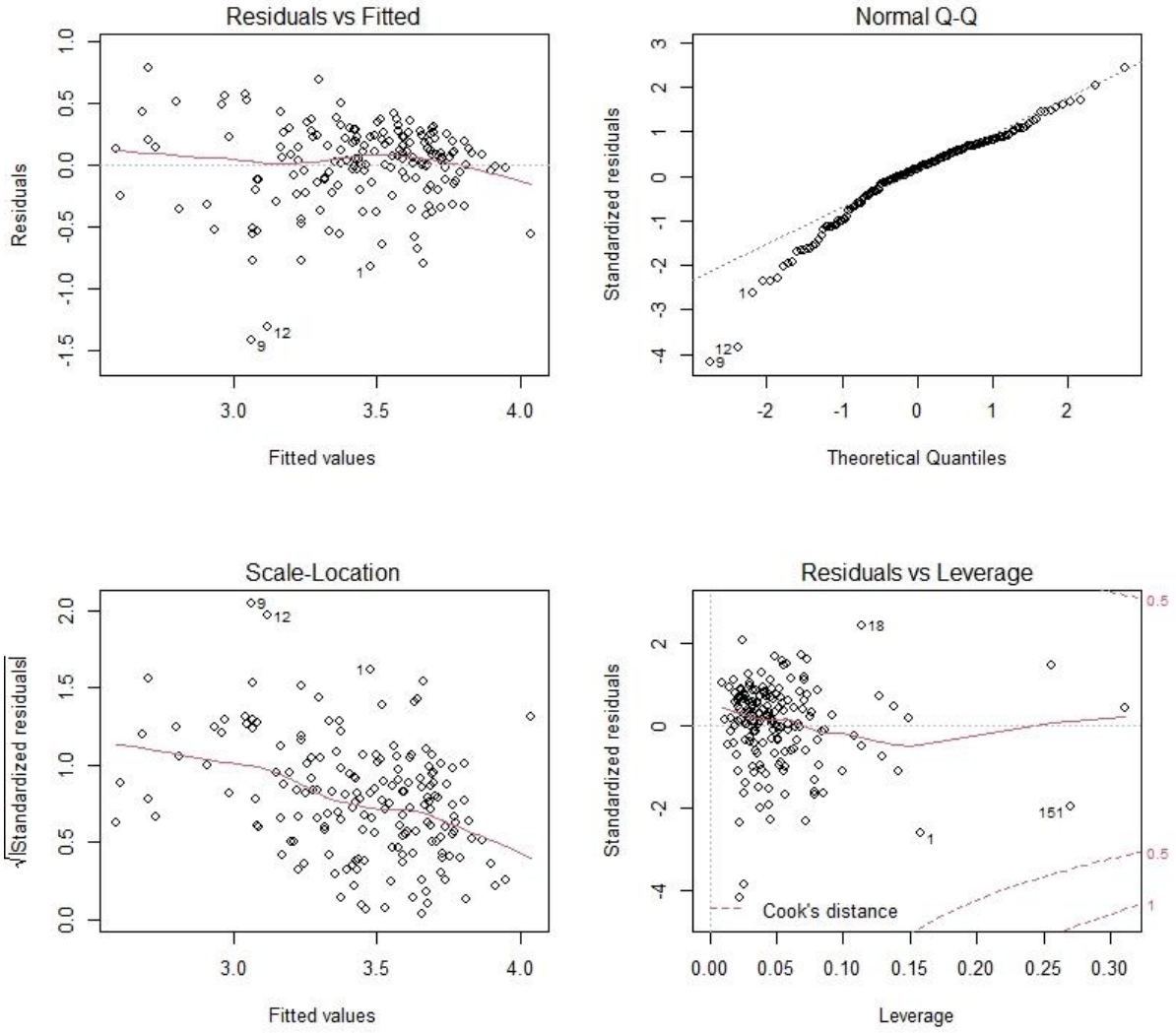




GE3-248

Diagnostic of Classic IVs , Grads and Exits

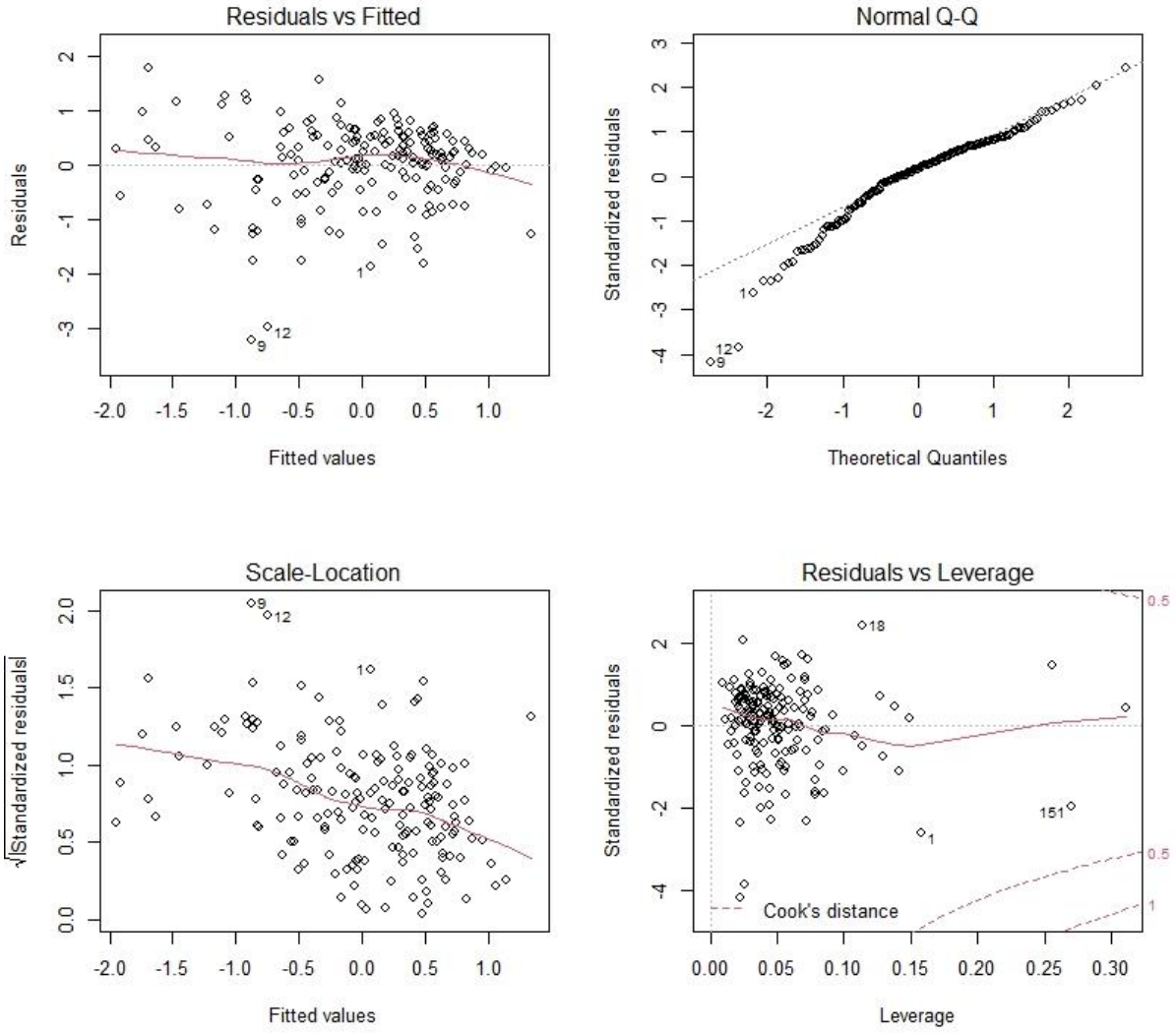
```
ClassicIVs <- lm(wgpa ~ rnk + hsgpa + mat + eng + rdg + cmp + sci + tcr,
data = GEwgpawfb)
summary(ClassicIVs)    #gives adjRsqd = .3894
```



GE3-268

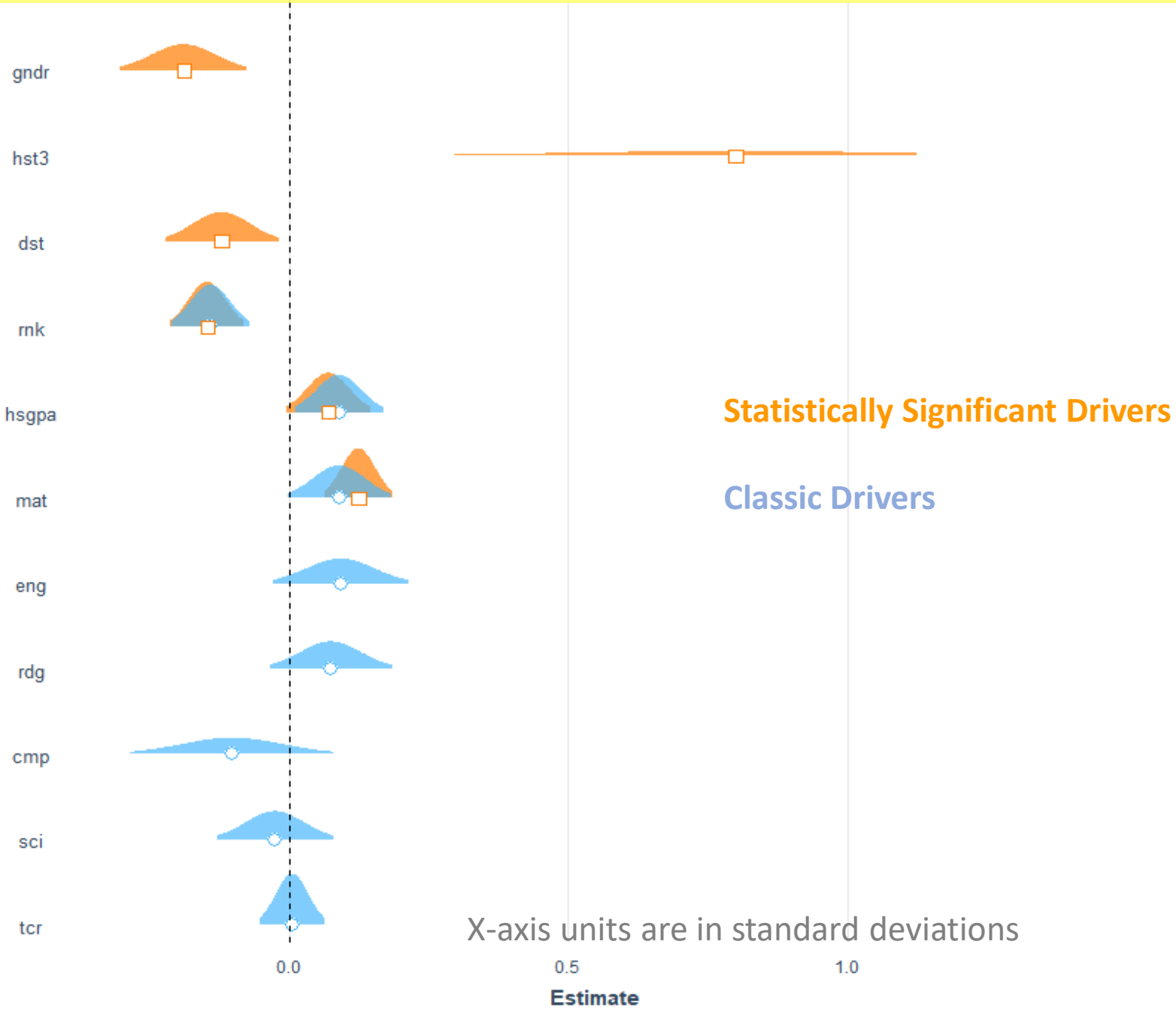
Diagnostic of Stdzd Stat Sig IVs ,

```
Std.ClassicIVs <- lm(wgpa ~ rnkneg + hsgpa + mat + eng + rdg + tcr + sci + cmp,
                     data = GEwgpawfb.std)
summary(Std.ClassicIVs)   #gives adj Rsq = .3894
```



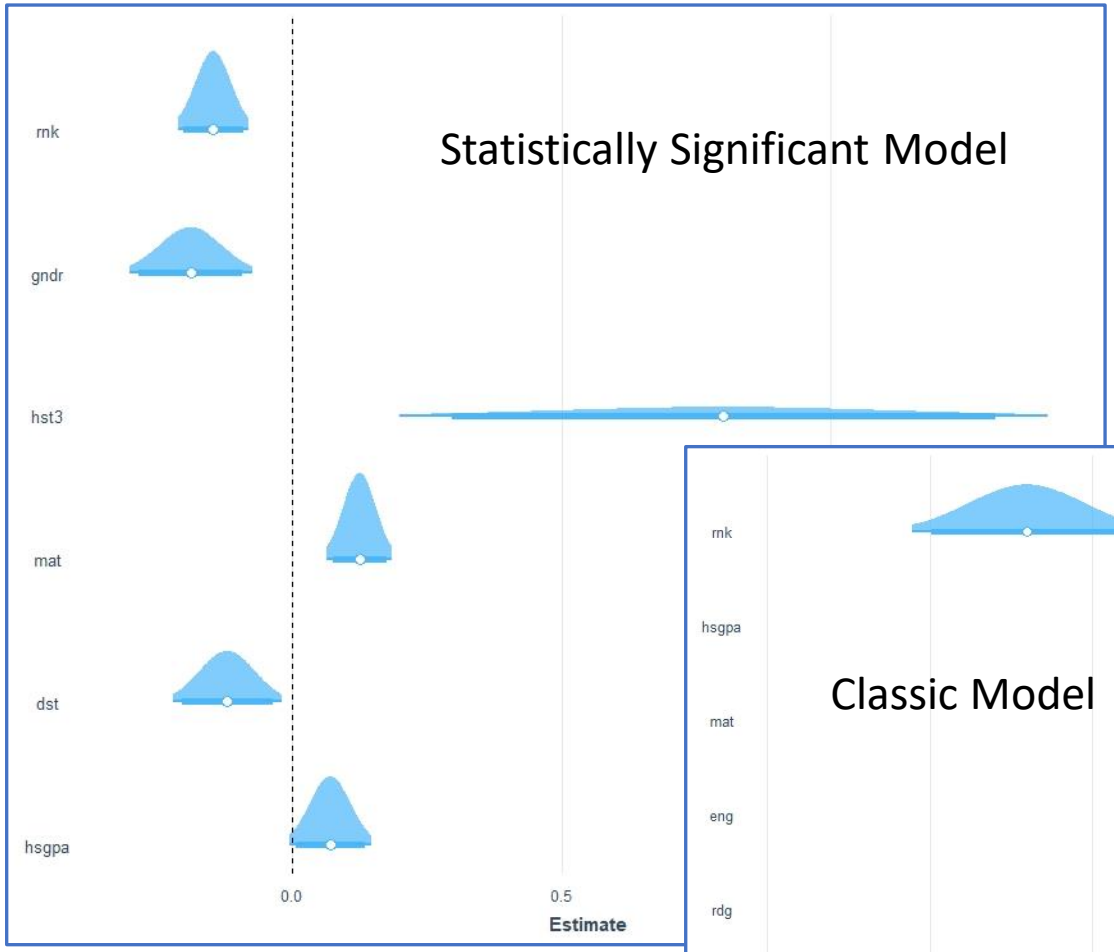
Comparing Statistically Significant vs Classic Drivers of GPAs

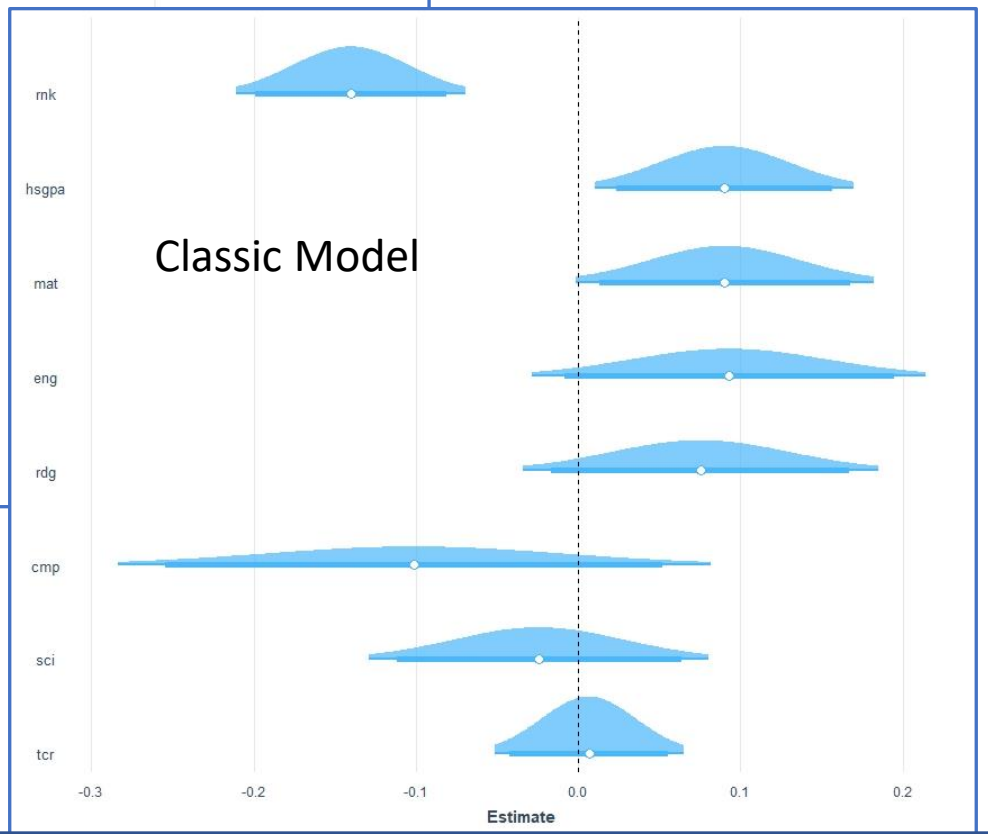
GE3-260



Comparing Statistically Significant vs Classic Drivers of GPAs

GE3-238,256



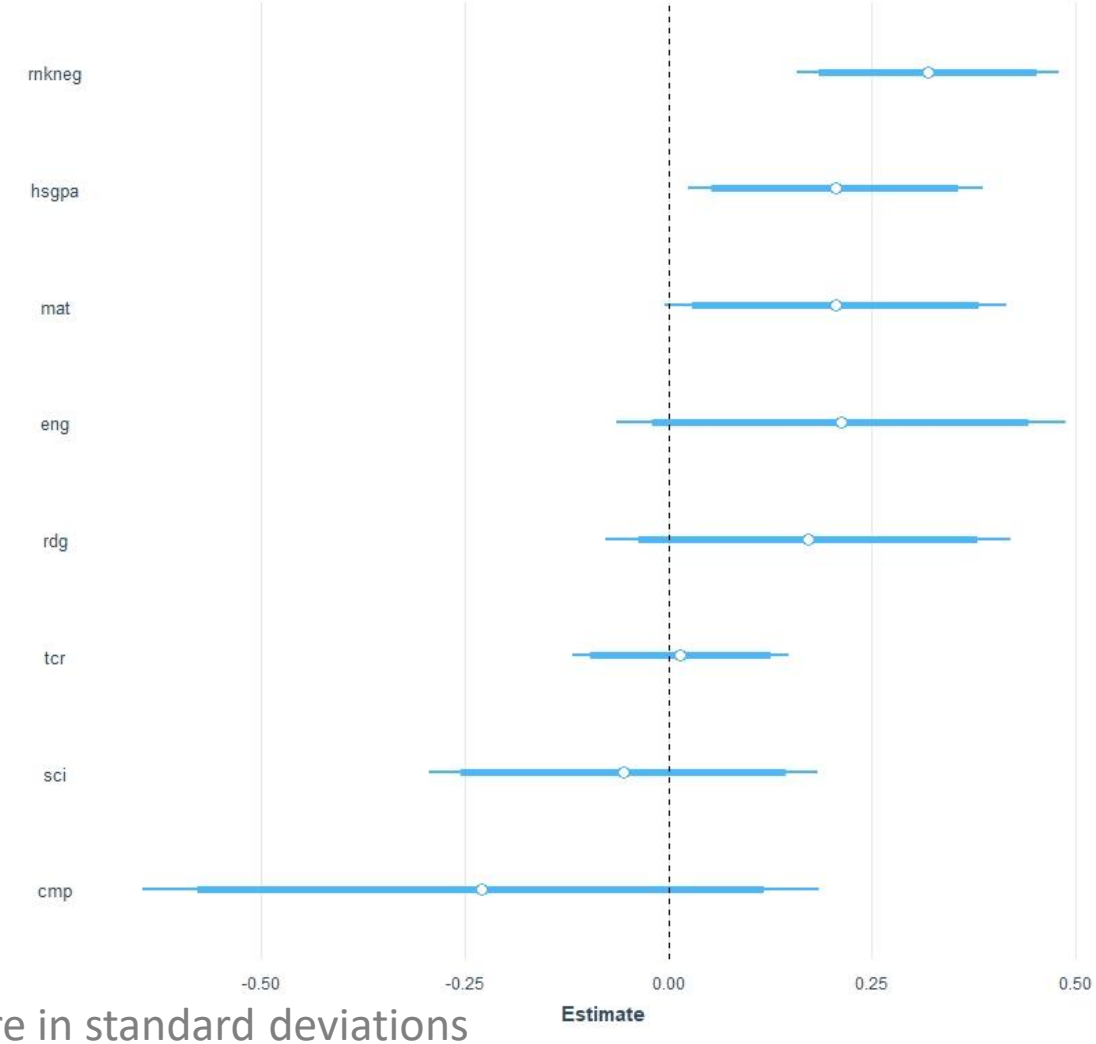


X-axis units are in standard deviations

Standardized Classic Drivers of GPAs

GE3-272

PLOTSUMM for Standardized Classic IVs , Grads and Exits , Standardized



X-axis units are in standard deviations

Instructions for transmitting slides to .rmd

- In Powerpoint: file, export, change file type, jpeg, save as.
- Assign the created-location as being in home-side repository folder where Presentation rscript resides. (E:\000 DTS 350 Data Visualization\DTS350-hollinbergert\DTS350TemplateMaster\DTS400 , All Slides , OK.
- Go to file explorer, home-side repository folder, open the transfer folder, and move the slides one level up. That is, ctrl-a all slides, cut/paste from the transfer folder up to the main repo folder. Delete the now-empty transfer folder.
- Go to Rstudio, presentation.rscript, ctrl-shift-k to knit/spin the rmd.