Hypogeal Achievement Dynamics: Exploring High School and College Grading Variability

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CAIR, Olympic Valley 2021

EDUCATIONAL RESULTS PARTNERSHIP

theRPgroup
Research • Planning • Professional Development for California Community Colleges

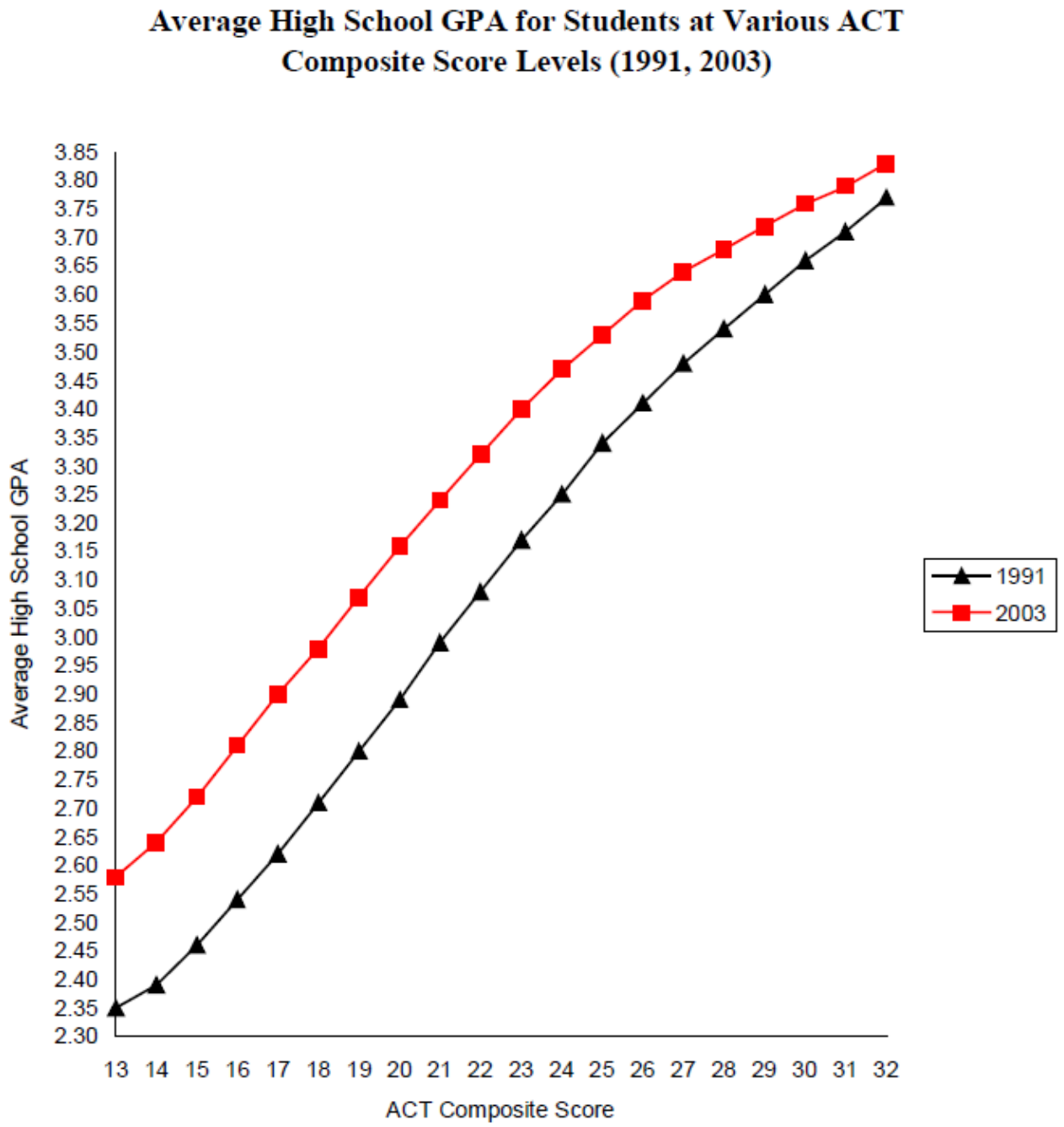
Your next 45 minutes

- This presentation contains preliminary analyses and information is subject to change in final reports.
- Grading philosophy and practice
- Examination of 11th grade grades in English
- Transition to community college and success rates in math
- Community college section level variability
- New perspectives on grading and equity pedagogy
- Future research (hint: more!)

What is Grade Inflation v. Improvement v. Variability?

- The term '***grade inflation'*** denotes an increase in grade point average (GPA) without a concomitant increase in achievement (Potter & Nyman, 2001)
- How can one distinguish between grade inflation v. grade improvement due to increased student proficiency or pedagogy?
- Studies tend to focus on central tendencies but typically don't directly examine the influence of variability between faculty and institutions over time.

- HS GPA was higher in 2003 than in 1991 for every ACT score.
- If you assume the ACT is an absolute and immutable measure of ability, this is evidence of grade inflation.
- Note the strong association between grade and score within year.



ACT. (2005). Are high school grades inflated? Issues in college readiness. https://files.eric.ed.gov/fulltext/ED510537.pdf

What does a grade measure?

- Mastery of course material and also perhaps…
  - Attendance
  - Compliance with assignment deadlines and test dates
  - Test taking skills
  - Participation
  - Extra credit
  - Nondisruptive behavior
  - Other?
- Most classroom assessments are not validated or normed

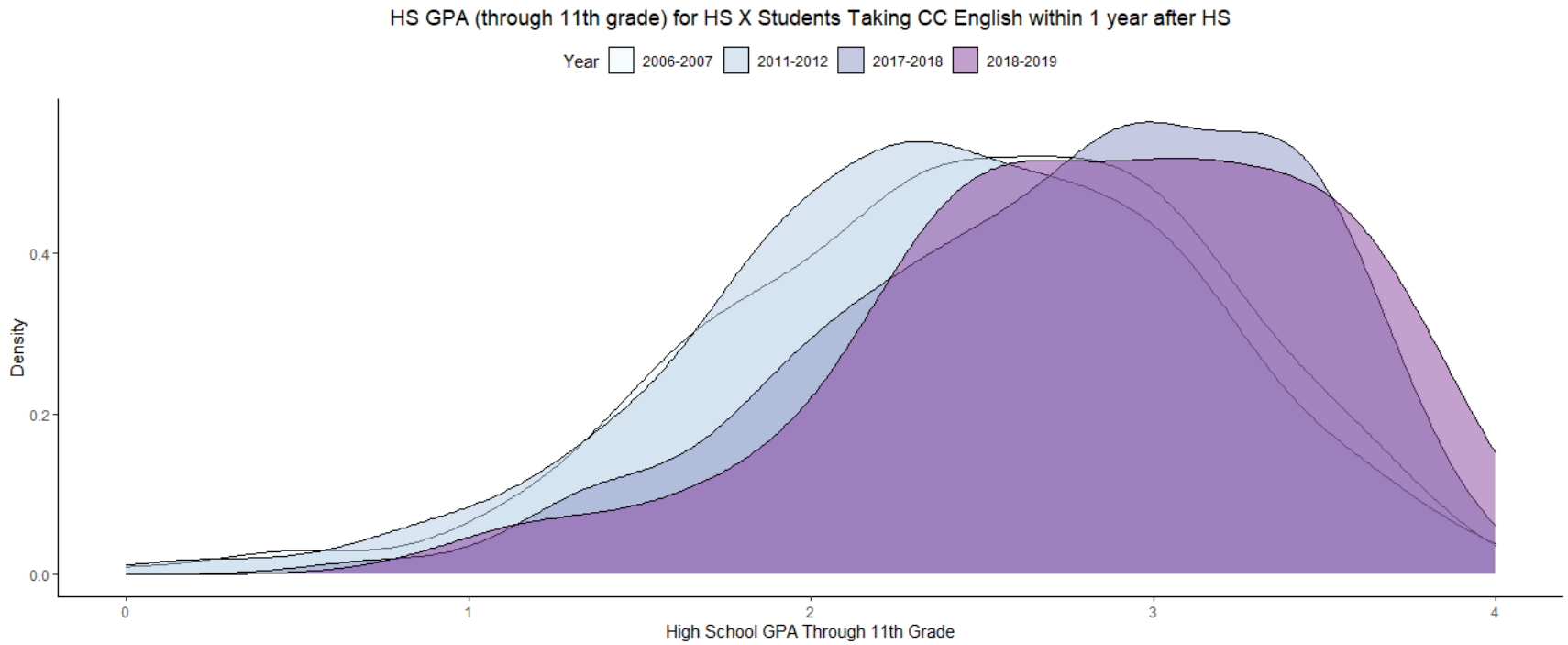
Factors Influencing Grading

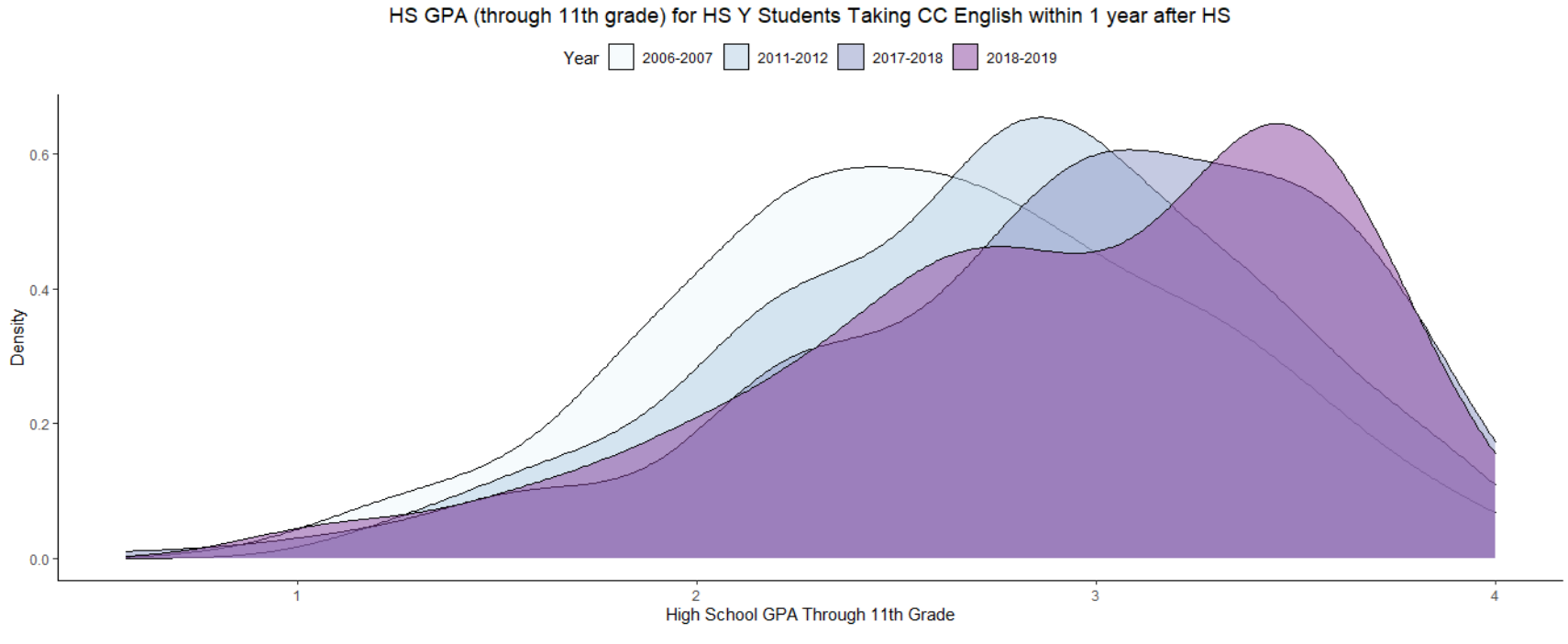
- Incentives to grade “easy”
  - Faculty wanting positive student evaluations
  - Departments with declining enrollment
  - Students and their families exert implied or direct pressure on faculty/admin
  - Provide evidence that a new intervention improves student outcomes
  - Others?
- Incentives to grade “hard”
  - Perception that a lower grade distribution signifies “rigor”
  - Departments with impacted enrollments
  - Provide evidence that a new intervention hurts student outcomes
  - Others?

11th Grade High School

Data Source

- MMAP Retrospective English file from CalPASS/ERP
- Students taking community College English with matching high school records
- Primary variables:
  - 11th grade overall GPA (unweighted, unofficial)
  - 11^{th} Grade English grades


HS GPA (through 11th grade) for HS X Students Taking CC English within 1 year after HS
Year
2006-2007
2011-2012
2017-2018
2018-2019
Density
0.0
0.2
0.4
0
1
2
3
4
High School GPA Through 11th Grade

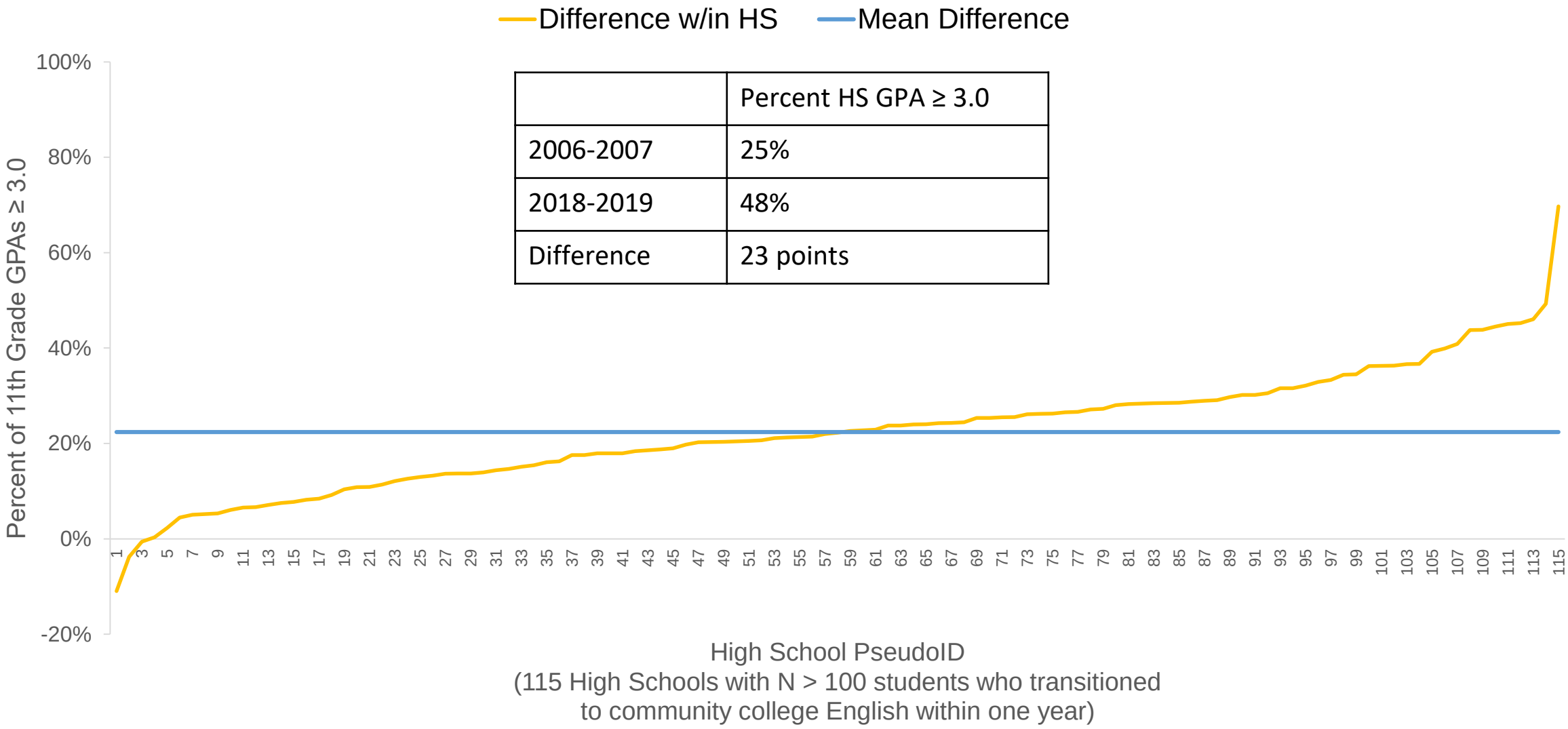

HS GPA (through 11th grade) for HS Y Students Taking CC English within 1 year after HS
Year
2006-2007
2011-2012
2017-2018
2018-2019
Density
0.0
0.2
0.4
0.6
1
2
3
4
High School GPA Through 11th Grade

R code example for ggplot histograms

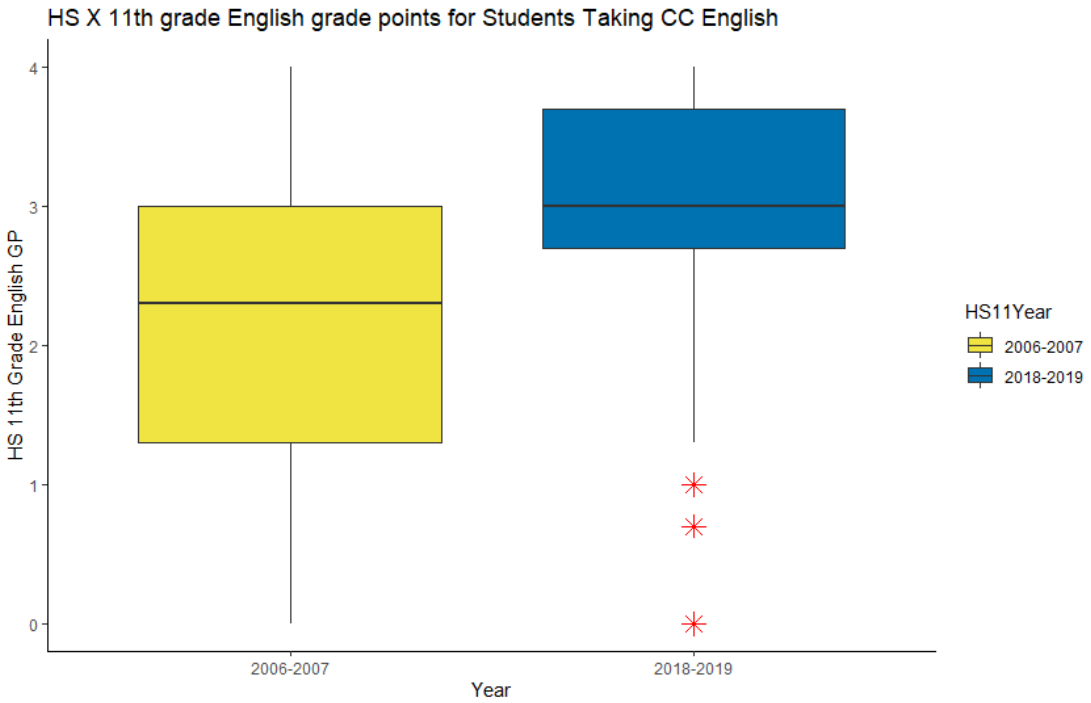
```
library(tidyverse)

hsx <- ggplot(engl2[engl2$HS11SchoolCode=='01612420134668'
& engl2$HS11OverallCumulativeGradePointAverage > 0
& (engl2$HS11Year=='2006-2007'
| engl2$HS11Year=='2011-2012'
| engl2$HS11Year=='2017-2018‘
| engl2$HS11Year=='2018-2019')
& engl2$timediff <= 20,],
 aes(x=HS11OverallGradePointAverage, fill = HS11Year)) +
  geom_density(alpha = 0.5) +
  labs(title="HS GPA (through 11th grade) for HS X Students Taking CC English within 1 year after HS") +
  labs(x="High School GPA Through 11th Grade", y="Density") +
  theme_classic() +
  theme(plot.title = element_text(hjust = 0.5),legend.position = "top") +
  scale_fill_brewer(name = "Year",palette="BuPu")#,labels=c("20073"="Spring 2007","20123"="Spring 2012","20183"="Spring
2018","20193"="Spring 2019"))
```

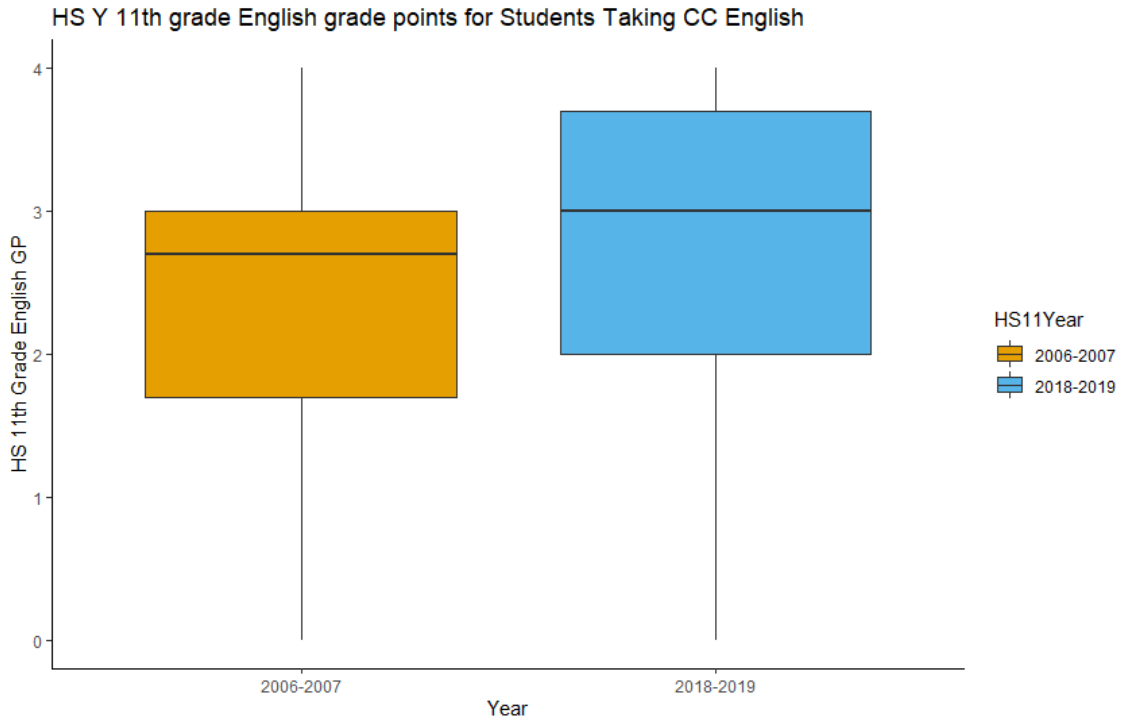
Difference in Percent of High School Students with an 11th Grade GPA ≥ 3.0 by Institution for 2006-2007 and 2018-2019

	Percent HS GPA ≥ 3.0
2006-2007	25%
2018-2019	48%
Difference	23 points

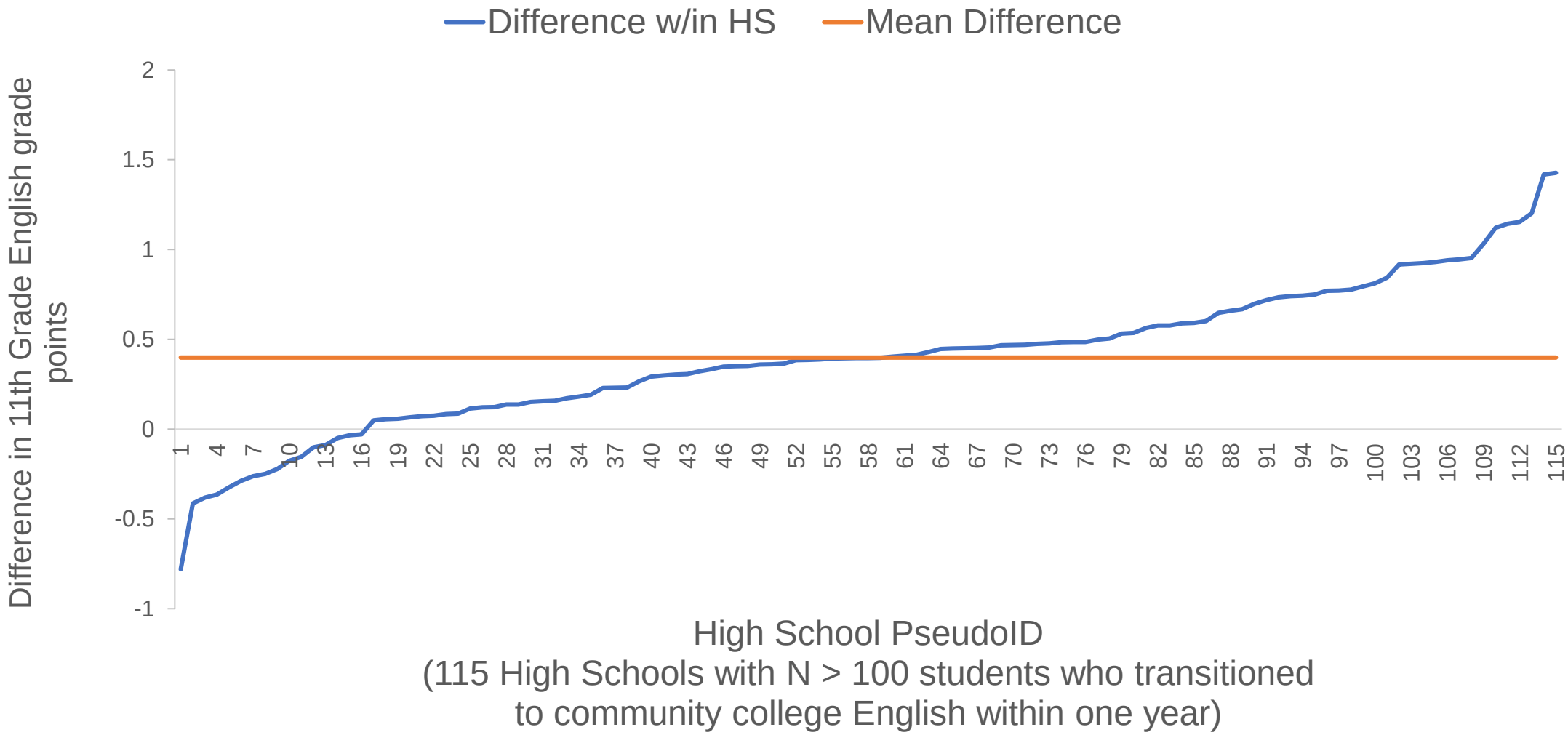


Boxplots of variation in high school grade points over time for two different high schools

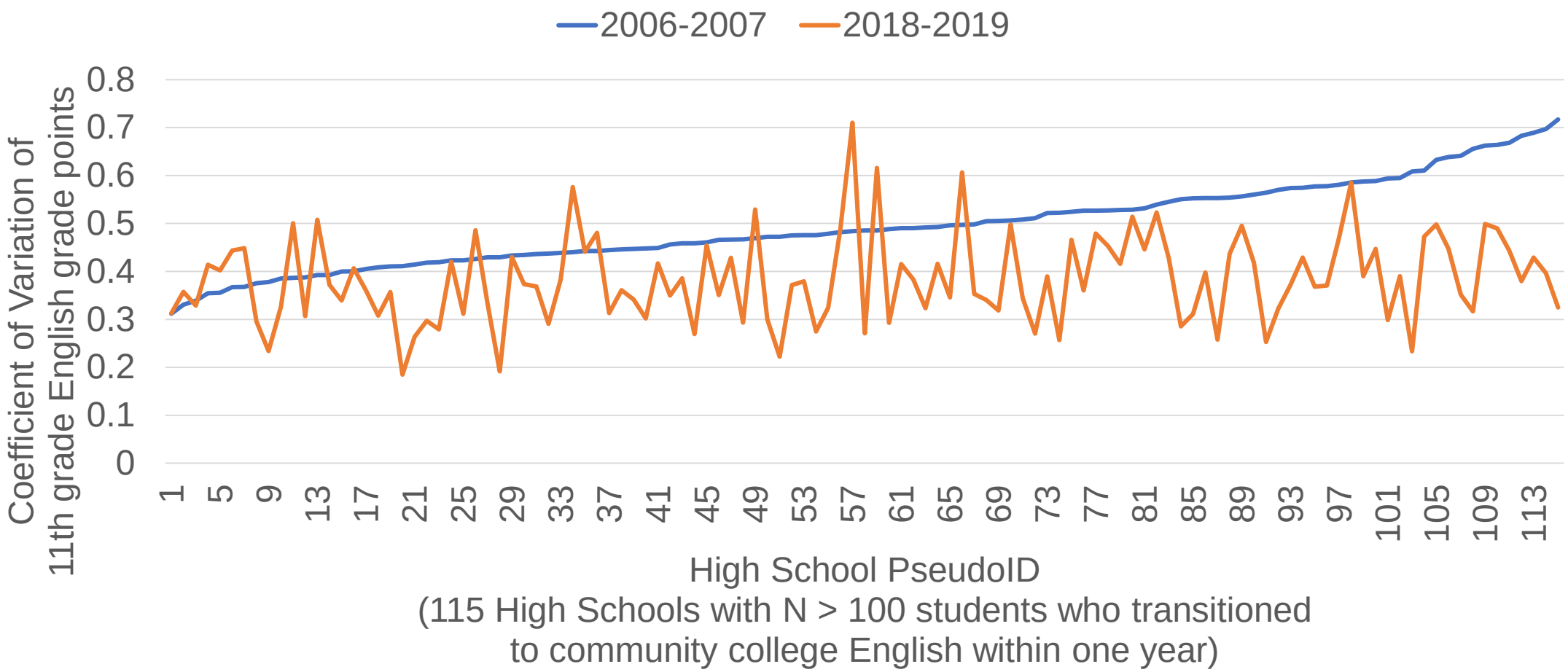




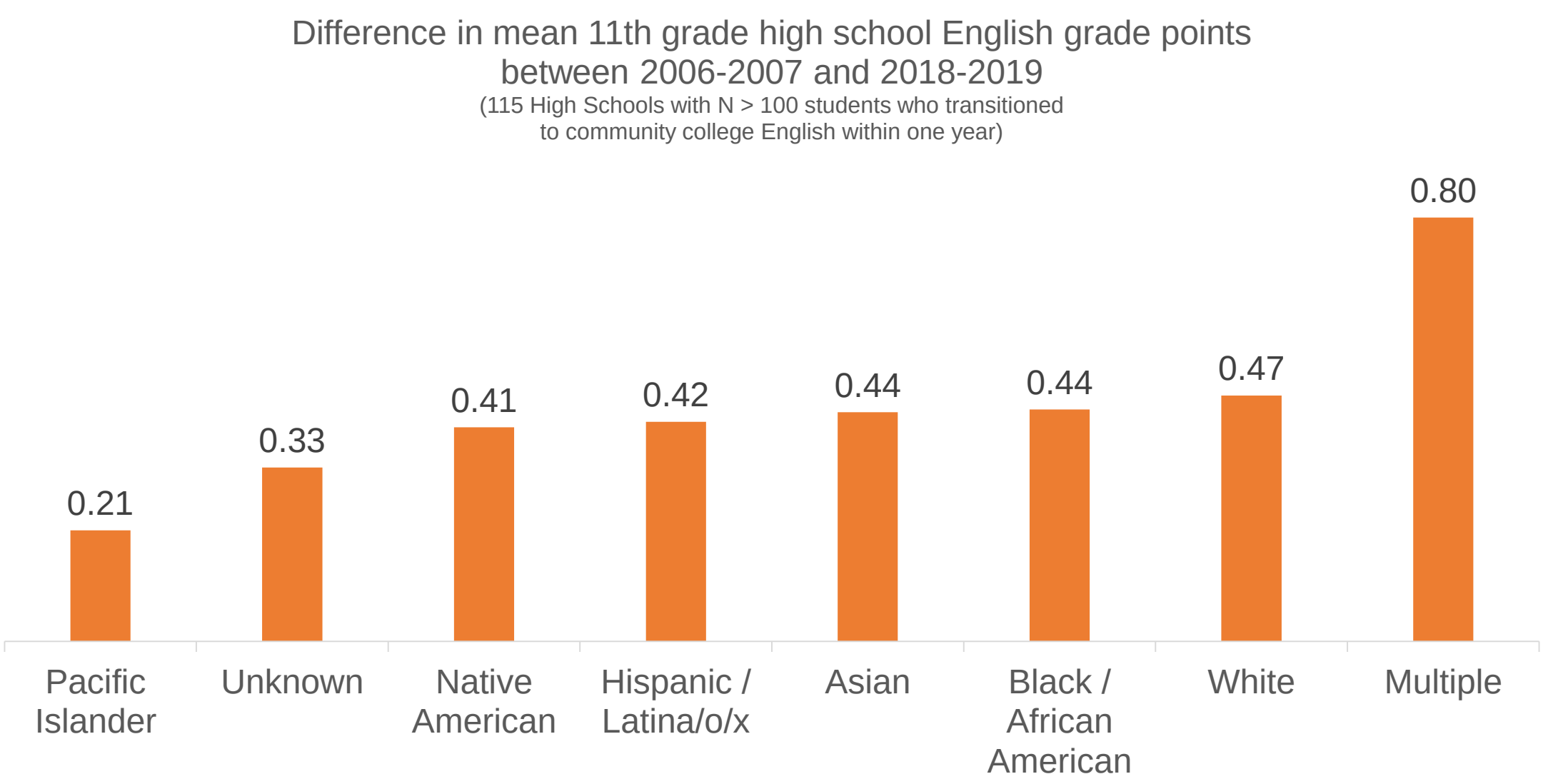
Difference in mean 11th grade high school English grade points for 2006-2007 and 2018-2019



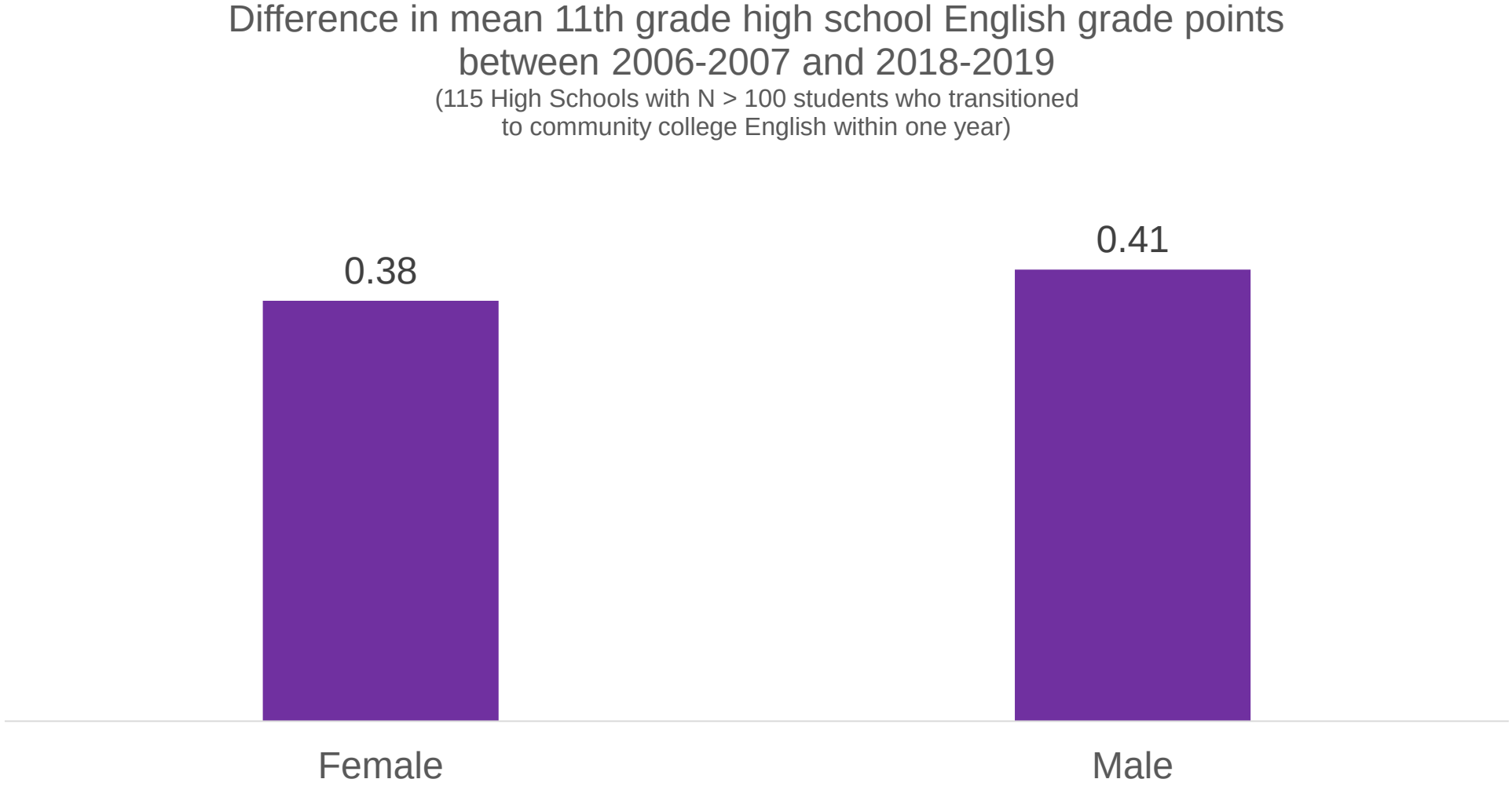
Coefficient of Variation (sd / mean) for 11th grade high school English grade points for 2006-2007 and 2018-2019



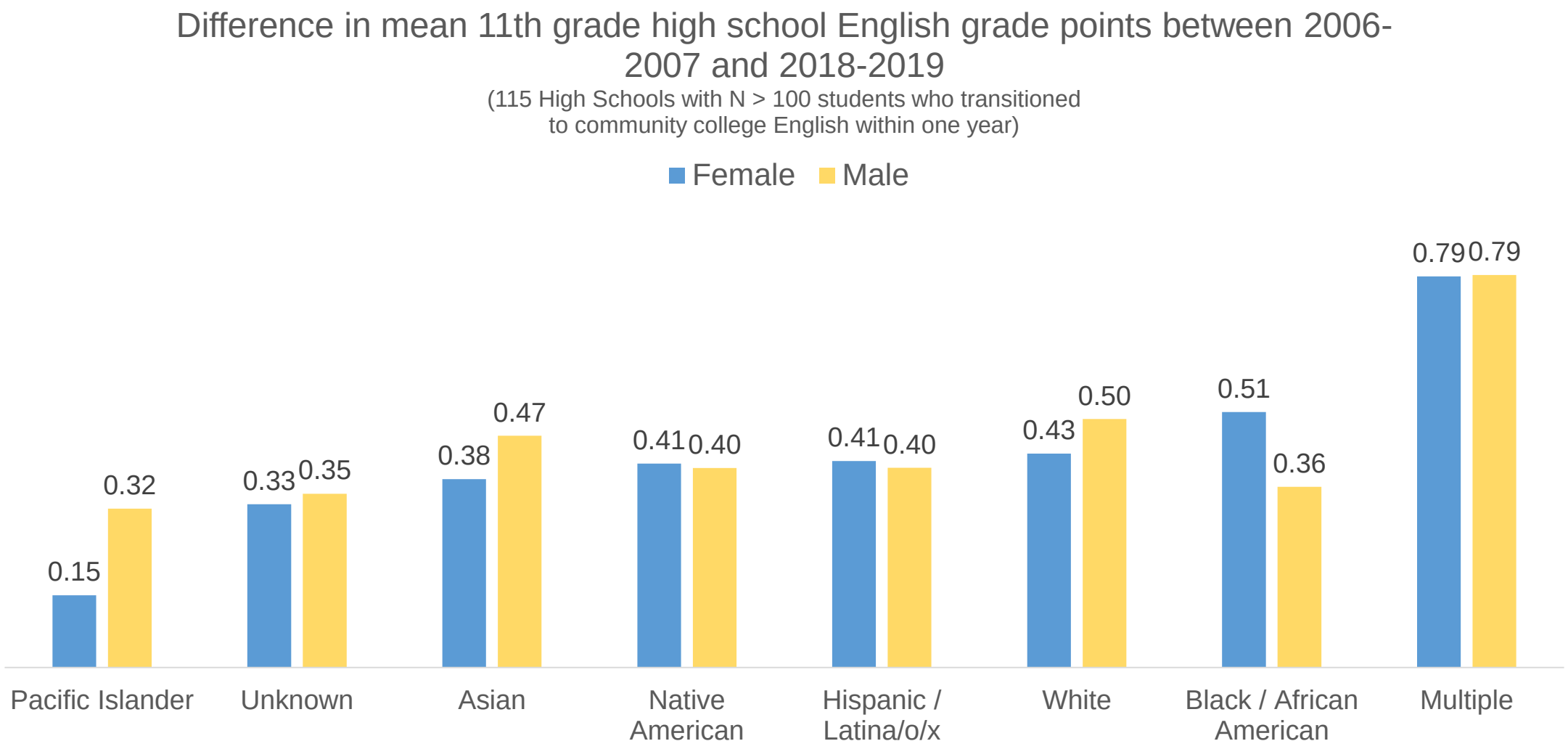
Grade Changes by Ethnicity



Grade Changes by Gender



Grade changes by ethnicity and gender



Transition from High School to Community College in Math and ESL

Data Source

- MMAP Joint English and Math file from CalPASS/ERP
- Students taking community College English or Math with matching high school records
- High school level ranks based on course coding (formerly CBEDS, now CALPADS state code) in addition to course title
- Community college level ranks based on levels below transfer (CB21) and examination of course titles and college catalogs
- High school traditional and integrated sequences combined (e.g., Algebra 2 = Integrated Math 3)

Transition from High School to Community College with Row Percentages

	CC Arith	CC PreAlg	CC El Alg	CC Geom	CC Int Alg	CC TL SLAM	CC PreCalc	CC Calc+	Total N
HS Arith	12%	29%	34%	*	21%	2%	1%	*	1,674
HS PreAlg	17%	40%	18%	*	23%	*	*	*	109
HS Alg 1	11%	32%	32%	*	22%	2%	1%	*	1,905
HS Geom	8%	23%	32%	*	31%	3%	2%	0%	4,296
HS Alg 2	4%	13%	24%	0.1%	40%	11%	8%	1%	8,044
HS Stats	2%	10%	17%	*	34%	19%	13%	5%	3,697
HS PreCalc	2%	6%	12%	*	37%	18%	19%	6%	4,745
HS Calc+	1%	1%	3%	*	20%	16%	20%	39%	1,776
F2016 Total Row %	5%	14%	22%	0.05%	33%	11%	10%	5%	100%
F2016 Total N	1,261	3,800	5,749	13	8,661	2,937	2,563	1,262	26,246
HS Arith	*	2%	4%	*	28%	50%	16%	1%	1,521
HS PreAlg	*	3%	*	*	45%	44%	5%	*	149
HS Alg 1	0.4%	2%	4%	*	32%	47%	14%	1%	2,048
HS Geom	0.2%	1%	3%	*	24%	53%	18%	1%	4,203
HS Alg 2	0.1%	0.4%	1%	*	13%	55%	28%	2%	9,528
HS Stats	*	0.1%	0.5%	*	9%	56%	27%	7%	6,335
HS PreCalc	*	0.2%	0.3%	*	7%	47%	33%	13%	5,843
HS Calc+	*	*	*	*	2%	31%	15%	51%	2,273
F2019 Total Row %	0.1%	1%	1%	*	14%	51%	25%	8%	100%
F2019 Total N	32	171	382	*	4,430	16,248	7,965	2,670	31,900

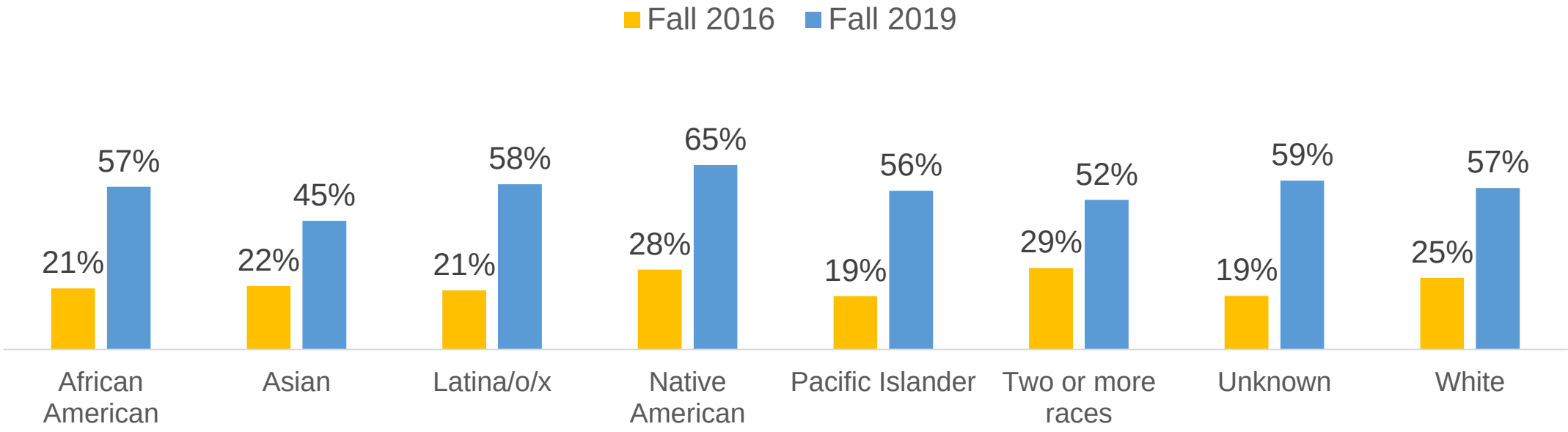
Notes: * indicates cell had fewer than 10 students. Bluer shades are higher within row values.
Orange cell borders indicate repeating already completed HS courses.

Success in First Community College Math Attempt After High School Transition

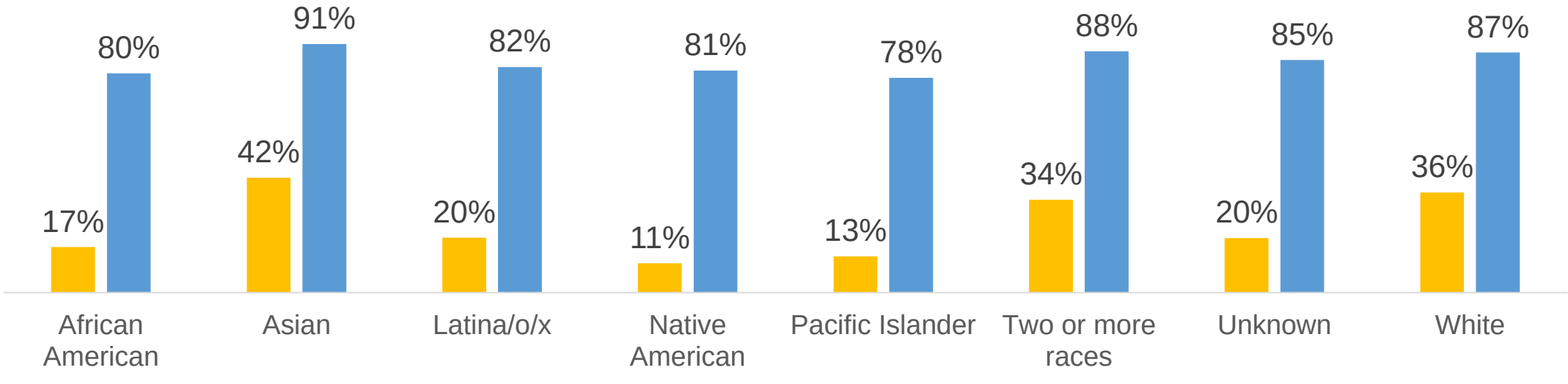
	CC Arith	CC PreAlg	CC El Alg	CC Geom	CC Int Alg	CC TL SLAM	CC PreCalc	CC Calc+	Total N
HS Arith	52%	46%	39%	*	37%	51%	43%	*	1,674
HS PreAlg	50%	41%	35%	*	36%	*	*	*	109
HS Alg 1	48%	43%	40%	*	29%	42%	40%	*	1,905
HS Geom	50%	55%	46%	*	41%	39%	34%	59%	4,296
HS Alg 2	64%	66%	58%		55%	54%	46%	39%	8,044
HS Stats	64%	65%	65%	*	65%	72%	69%	68%	3,697
HS PreCalc	66%	72%	69%	*	66%	68%	59%	58%	4,745
HS Calc+	50%	86%	79%	*	76%	81%	69%	74%	1,776
F2016 Total Row %	55%	57%	53%	54%	55%	64%	57%	67%	57%
F2016 Total N	1,261	3,800	5,749	13	8,661	2,937	2,563	1,262	26,246
HS Arith	*	27%	35%	*	27%	42%	31%	29%	149
HS PreAlg	*	40%	*	*	18%	15%	38%	*	2,048
HS Alg 1	50%	56%	33%	*	28%	33%	23%	41%	4,203
HS Geom	50%	49%	47%	*	30%	36%	23%	35%	9,528
HS Alg 2	57%	65%	49%	*	41%	48%	34%	32%	6,335
HS Stats	*	78%	55%	*	40%	59%	45%	65%	5,843
HS PreCalc	*	71%	60%	*	57%	65%	54%	44%	2,273
HS Calc+	*	*	*	*	69%	80%	66%	70%	1
F2019 Total Row %	53%	53%	44%	*	36%	52%	41%	58%	47%
F2019 Total N	32	171	382	*	4,430	16,248	7,965	2,670	31,900

Note: * indicates cell had fewer than 10 students. Darker shades are higher values.
Orange cell borders indicate repeating already completed HS courses.

Percent of Students Transitioning up One or More Levels from High School to Community College Math by Ethnicity



Percent of Students Transitioning to Transfer Level Community College Math by Ethnicity



Intra-Class Correlations (ICC) Between Grade Points in First Community College ESL Course and High School Origin and College Destination by Highest Level of ESL Offered

Highest Level of ESL at Community College	Level of First ESL Course	High School Count	College Count	Student Count	Source of Variance	Intra-class Correlation Coefficient	p-value
Transfer-Level	Transfer-level	252	31	773	High School	0.03	0.18
					College	**0.05****	0.00
	1 level below transfer	211	25	1,751	High School	**0.03****	0.01
					College	0.01	0.10
	2 levels below transfer	210	32	838	High School	**0.05***	0.05
					College	**0.03****	0.00
One Level Below Transfer-Level	1 level below transfer	117	23	872	High School	0.01	0.27
					College	0.00	0.47
	2 levels below transfer	143	24	795	High School	0.00	0.60
					College	0.01	0.25
	3 levels below transfer	130	25	649	High School	0.04	0.11
					College	**0.05****	0.00
Two Levels Below Transfer-Level	2 levels below transfer	253	18	324	High School	0.05	0.18
					College	**0.07****	0.00
	3 levels below transfer	156	22	402	High School	0.07	0.09
					College	0.02	0.10
	4 levels below transfer	60	19	129	High School	**0.27****	0.01
					College	0.09	0.06

** significant at 0.05 level*

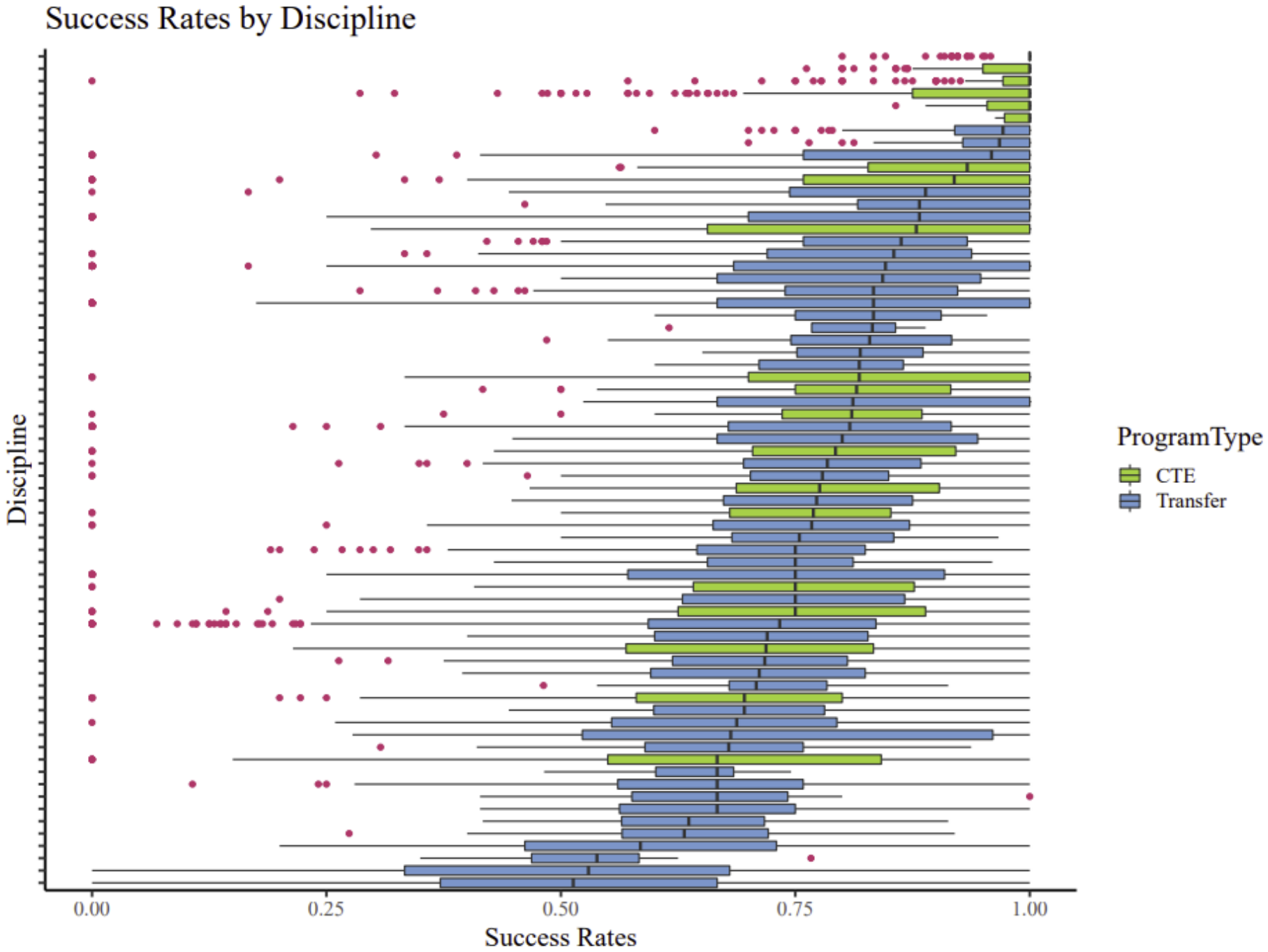
*** significant at 0.01 level*

Community College Grading Variability

Data Source

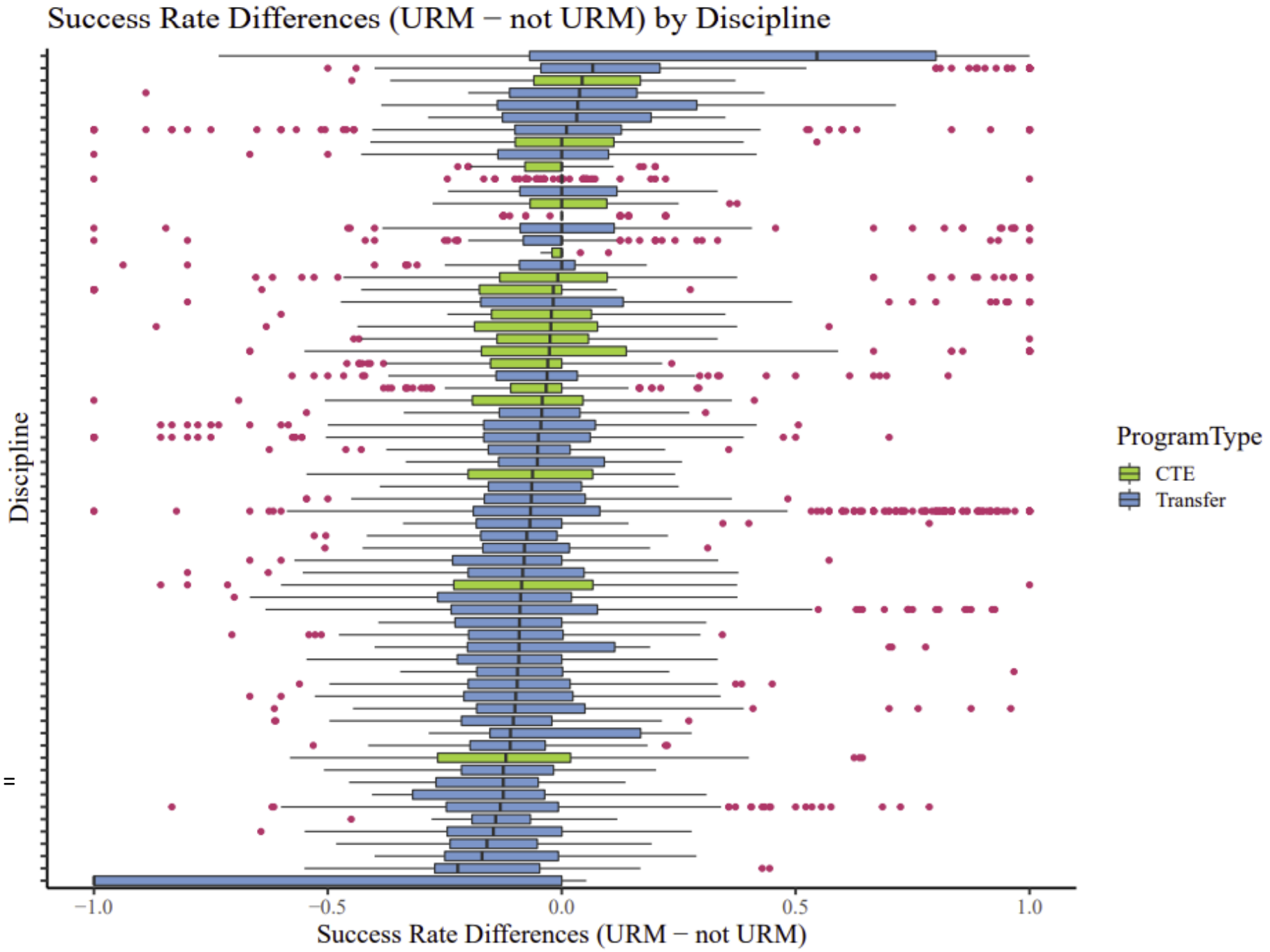
- Single college district
- Last “normal” year of success rates

Boxplots of Success Rates by Section by Discipline (masked for discretion). Red points indicate outliers. Report created using Rmarkdown.

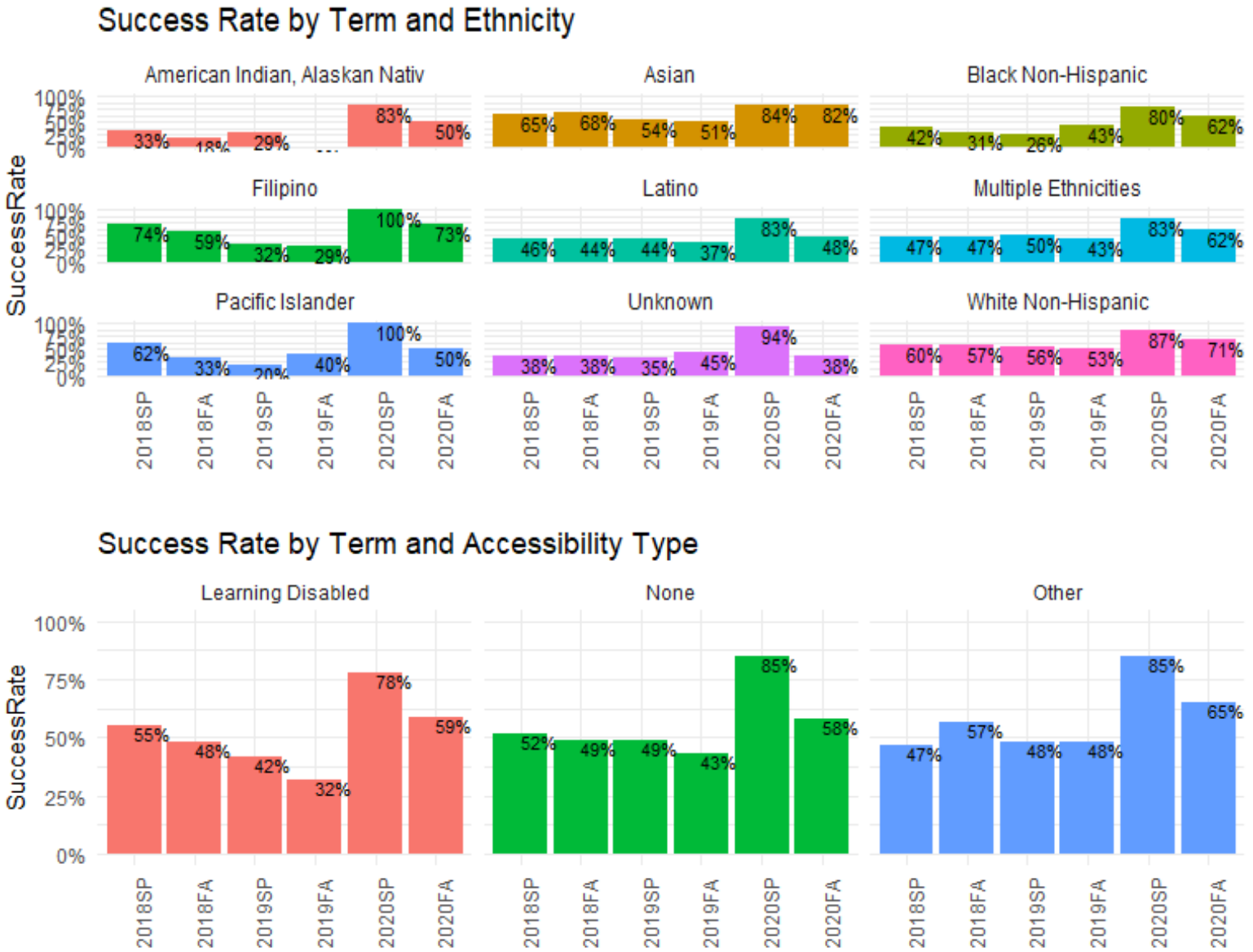


Boxplots of Success Rate differences between URM and not URM by Section by Discipline (masked for discretion). Red points indicate outliers. Report created using Rmarkdown.

URM = Underrepresented Minority = Black / African American, Filipino, Hispanic / Latina/o/x, Native American, Pacific Islander



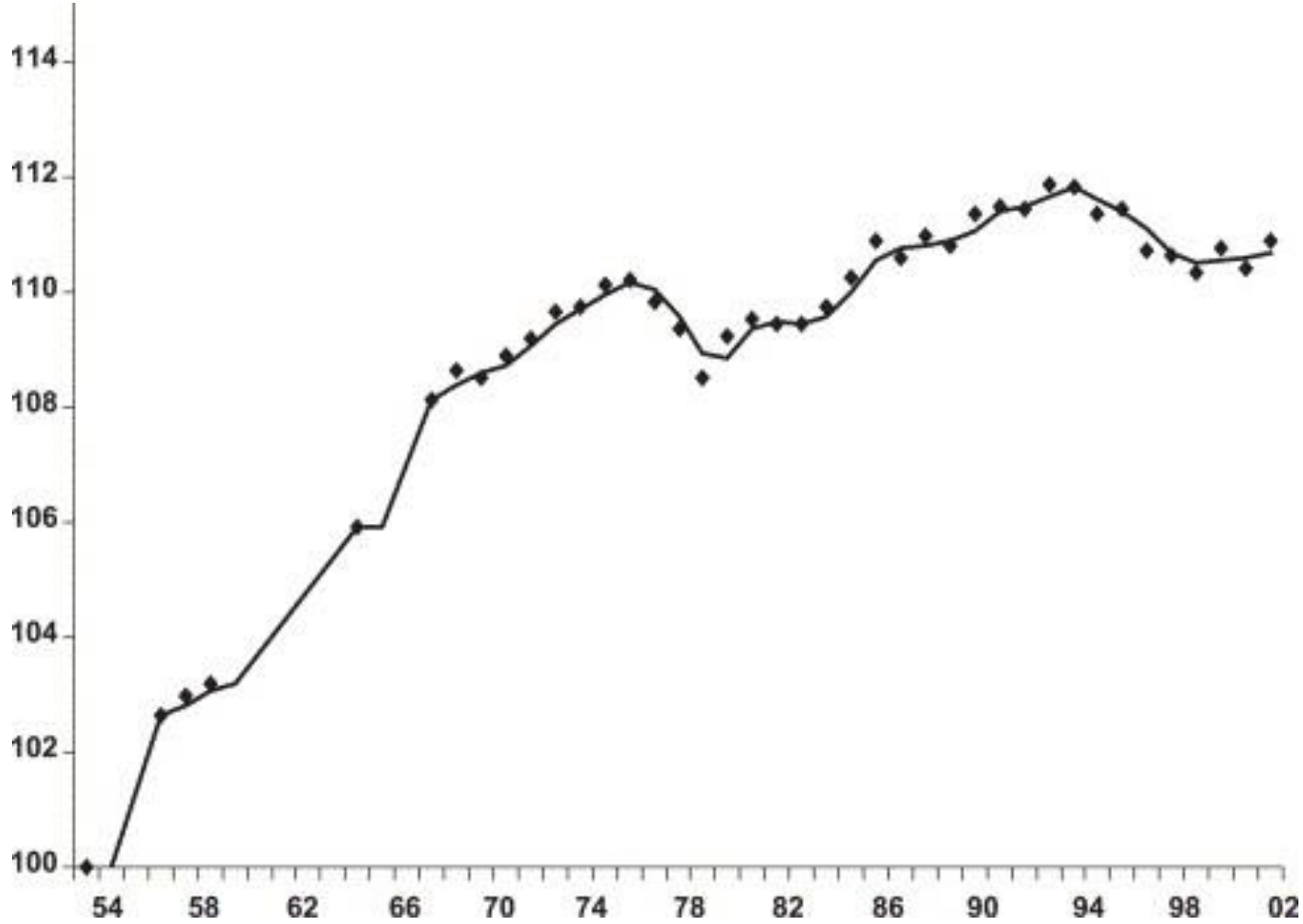
Instructor Level Success Rate By Demographic Report



Is there a standard candle for skill?

- Standardized tests / IQ and the Flynn Effect (or the Flynn Effect)
- GPA
- Course grades
- Persistence
- Unit accumulation
- Credentials (e.g., certificate, degrees, badges)
- Employment, wages

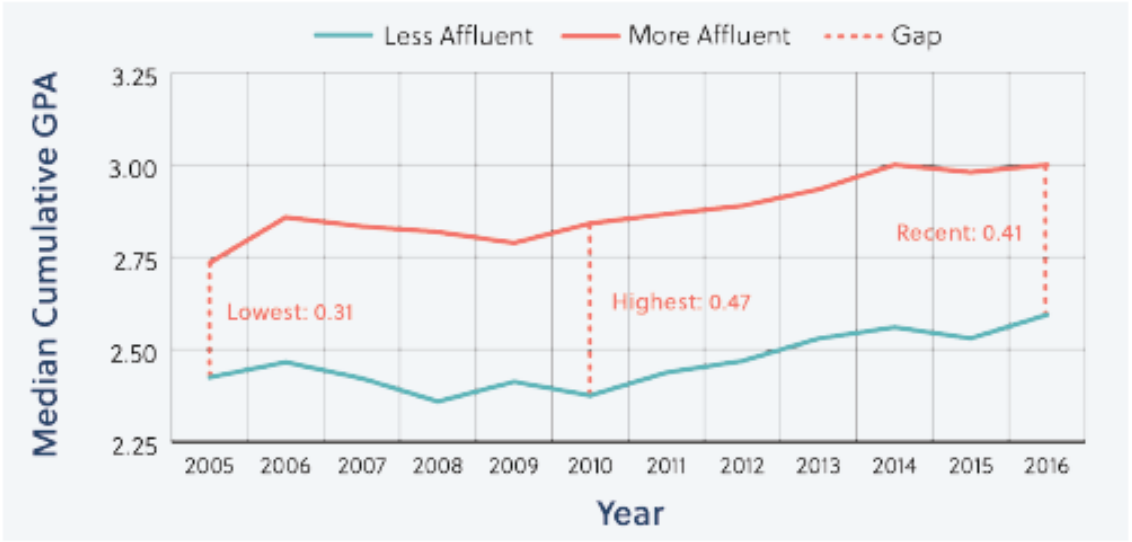
Example of Secular Trend in IQ



Sundet, J.M.; Barlaug, D.G.; Torjussen, T.M. (2004). The end of the Flynn effect?: A study of secular trends in mean intelligence test scores of Norwegian conscripts during half a century. *Intelligence*, vol. 32 no. 4: pp. 349-362. https://doi.org/10.1016/j.intell.2004.06.004.

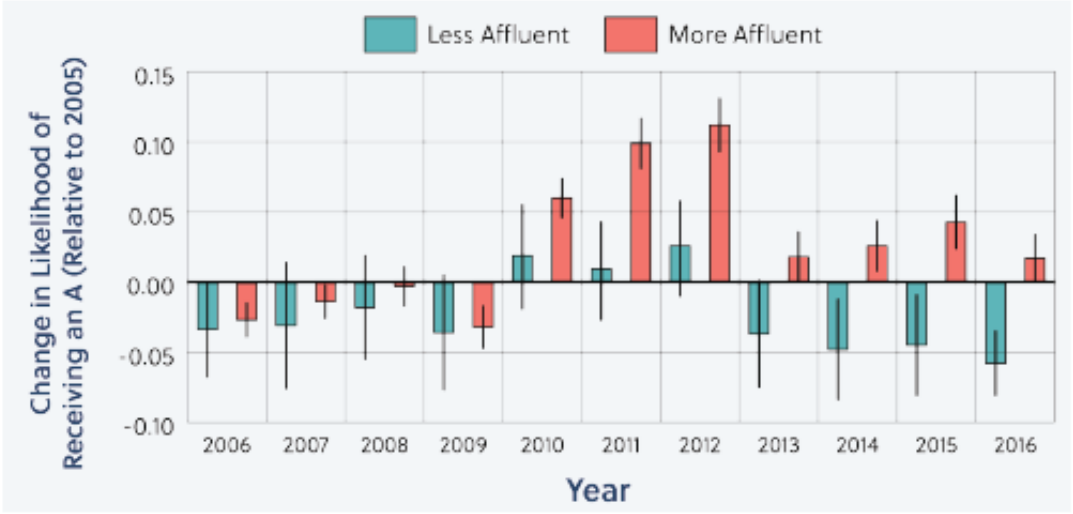
Socioeconomics as a factor

Figure 5. GPAs rose in all schools, but rose faster in more affluent schools.



Note: Less affluent schools are defined as those with more than 50 percent of students eligible for free or reduced-priced lunch; more affluent schools have less than 50 percent.

Figure 7. It has become easier for students in more affluent schools to get As while getting harder for students in less affluent schools, controlling for EOC scores.



Note: Each set of bars represents the regression-adjusted change, relative to 2005, in the likelihood of receiving an A in Algebra 1, for students in the same school who earned the same EOC score. Error bars are 95 percent confidence intervals. See Figure B.1 in Appendix B for the difference in likelihood of receiving an A over time between the less affluent and more affluent schools.

Gershenson, S., & Thomas B. Fordham Institute. (2018). Grade Inflation in High Schools (2005-2016). In Thomas B. Fordham Institute. Thomas B. Fordham Institute. ED598893

Further Research

- More disaggregation by demographic
- Effect of changes in HS standards
- Pedagogy
- Grading practices
- Charter and home schools

We’ve seen lots of charts and tables…

…so what?

References

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Thank you!

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