

# Student Level Analysis: SI on One Year Retention

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## Initial Model

```
fit1<-glm(One.Year.Retention ~ SLC.Attended.Flag + Cohort.Term.Year + Student.Orientation.Flag + URM +  
summary(fit1)
```

```
##  
## Call:  
## glm(formula = One.Year.Retention ~ SLC.Attended.Flag + Cohort.Term.Year +  
##       Student.Orientation.Flag + URM + First.Generation.Flag +  
##       Gender.Code + HS.GPA + Major.1.College + Major.1.STEM.Flag,  
##       family = binomial(link = "logit"), data = d)  
##  
## Deviance Residuals:  
##      Min       1Q   Median       3Q      Max  
## -3.0610   0.1792   0.2021   0.2338   3.1737  
##  
## Coefficients:  
##                                     Estimate Std. Error z value  
## (Intercept)                        0.198738   0.481478   0.413  
## SLC.Attended.Flag1                  1.300307   0.024794  52.444  
## Cohort.Term.Year2017                 0.025475   0.055747   0.457  
## Cohort.Term.Year2018                -0.049953   0.058163  -0.859  
## Cohort.Term.Year2019                -0.732988   0.057281 -12.796  
## Cohort.Term.Year2020                -0.804735   0.039029 -20.619  
## Cohort.Term.Year2021               -7.261881   0.192476 -37.729  
## Student.Orientation.FlagY            0.078715   0.052371   1.503  
## URMURM                              0.037088   0.021113   1.757  
## First.Generation.FlagY               0.002542   0.021760   0.117  
## Gender.CodeM                       -0.197223   0.023037  -8.561  
## Gender.CodeN                       -0.225708   0.733931  -0.308  
## HS.GPA                             0.268004   0.024192  11.078  
## Major.1.CollegeAgriculture           2.249752   0.771219   2.917  
## Major.1.CollegeBehavioral and Social Sciences 1.987945   0.769928   2.582  
## Major.1.CollegeBusiness              2.222422   0.770327   2.885  
## Major.1.CollegeCol Engr, Csci, & Cmgmt      2.033011   0.770561   2.638  
## Major.1.CollegeCommunication and Education  2.459737   0.770226   3.194  
## Major.1.CollegeHumanities and Fine Arts     2.000165   0.768050   2.604  
## Major.1.CollegeNatural Sciences           1.783924   0.770055   2.317  
## Major.1.CollegeUndergraduate Education      1.419345   0.770694   1.842  
## Major.1.STEM.FlagN                   -0.429444   0.605748  -0.709  
## Major.1.STEM.FlagY                   -0.397417   0.606527  -0.655  
##                                     Pr(>|z|)
```

```
## (Intercept) 0.67978
## SLC.Attended.Flag1 < 2e-16 ***
## Cohort.Term.Year2017 0.64769
## Cohort.Term.Year2018 0.39042
## Cohort.Term.Year2019 < 2e-16 ***
## Cohort.Term.Year2020 < 2e-16 ***
## Cohort.Term.Year2021 < 2e-16 ***
## Student.Orientation.FlagY 0.13283
## URMURM 0.07897 .
## First.Generation.FlagY 0.90701
## Gender.CodeM < 2e-16 ***
## Gender.CodeN 0.75844
## HS.GPA < 2e-16 ***
## Major.1.CollegeAgriculture 0.00353 **
## Major.1.CollegeBehavioral and Social Sciences 0.00982 **
## Major.1.CollegeBusiness 0.00391 **
## Major.1.CollegeCol Engr, Csci, & Cmgt 0.00833 **
## Major.1.CollegeCommunication and Education 0.00141 **
## Major.1.CollegeHumanities and Fine Arts 0.00921 **
## Major.1.CollegeNatural Sciences 0.02052 *
## Major.1.CollegeUndergraduate Education 0.06553 .
## Major.1.STEM.FlagN 0.47836
## Major.1.STEM.FlagY 0.51232
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 113430 on 387068 degrees of freedom
## Residual deviance: 93654 on 387046 degrees of freedom
## (127 observations deleted due to missingness)
## AIC: 93700
##
## Number of Fisher Scoring iterations: 6
```

```
#stargazer(fit1)
```

Notably, - SLC positive & significant - Cohort yrs 2019 (fire), 2020 (Pandemic), (2021) negative & significant  
- First gen & URM positive & insignificant (bias?) ## With some interactions

```
fit2<-glm(One.Year.Retention ~ SLC.Attended.Flag + Cohort.Term.Year + URM*First.Generation.Flag + Gender.CodeM + Gender.CodeN + HS.GPA + Major.1.CollegeAgriculture + Major.1.CollegeBehavioral and Social Sciences + Major.1.CollegeBusiness + Major.1.CollegeCol Engr, Csci, & Cmgt + Major.1.CollegeCommunication and Education + Major.1.CollegeHumanities and Fine Arts + Major.1.CollegeNatural Sciences + Major.1.CollegeUndergraduate Education + Major.1.STEM.FlagN + Major.1.STEM.FlagY, family = binomial(link = "logit"), data = d)
summary(fit2)
```

```
##
## Call:
## glm(formula = One.Year.Retention ~ SLC.Attended.Flag + Cohort.Term.Year + URM * First.Generation.Flag + Gender.Code + HS.GPA + Major.1.CollegeAgriculture + Major.1.CollegeBehavioral and Social Sciences + Major.1.CollegeBusiness + Major.1.CollegeCol Engr, Csci, & Cmgt + Major.1.CollegeCommunication and Education + Major.1.CollegeHumanities and Fine Arts + Major.1.CollegeNatural Sciences + Major.1.CollegeUndergraduate Education + Major.1.STEM.FlagN + Major.1.STEM.FlagY, family = binomial(link = "logit"), data = d)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -3.0772   0.1771   0.2015   0.2358   3.1332
##
## Coefficients:
##                                     Estimate Std. Error z value
```

```

## (Intercept) 0.239978 0.482026 0.498
## SLC.Attended.Flag1 1.299739 0.024722 52.574
## Cohort.Term.Year2017 0.101398 0.028285 3.585
## Cohort.Term.Year2018 0.005456 0.030109 0.181
## Cohort.Term.Year2019 -0.661300 0.029191 -22.654
## Cohort.Term.Year2020 -0.830762 0.039157 -21.216
## Cohort.Term.Year2021 -7.196800 0.186008 -38.691
## URMURM -0.138505 0.026395 -5.247
## First.Generation.FlagY -0.227018 0.030041 -7.557
## Gender.CodeM -0.205811 0.023064 -8.923
## Gender.CodeN -0.299845 0.735609 -0.408
## HS.GPA 0.264955 0.024198 10.949
## Major.1.CollegeAgriculture 2.281013 0.771594 2.956
## Major.1.CollegeBehavioral and Social Sciences 2.019968 0.770304 2.622
## Major.1.CollegeBusiness 2.258088 0.770698 2.930
## Major.1.CollegeCol Engr, Csci, & Cmgmt 2.038454 0.770934 2.644
## Major.1.CollegeCommunication and Education 2.492176 0.770599 3.234
## Major.1.CollegeHumanities and Fine Arts 2.028600 0.768429 2.640
## Major.1.CollegeNatural Sciences 1.811408 0.770427 2.351
## Major.1.CollegeUndergraduate Education 1.450725 0.771070 1.881
## Major.1.STEM.FlagN -0.416390 0.605802 -0.687
## Major.1.STEM.FlagY -0.369637 0.606582 -0.609
## URMURM:First.Generation.FlagY 0.441694 0.041487 10.647
## Pr(>|z|)
## (Intercept) 0.618587
## SLC.Attended.Flag1 < 2e-16 ***
## Cohort.Term.Year2017 0.000337 ***
## Cohort.Term.Year2018 0.856214
## Cohort.Term.Year2019 < 2e-16 ***
## Cohort.Term.Year2020 < 2e-16 ***
## Cohort.Term.Year2021 < 2e-16 ***
## URMURM 1.54e-07 ***
## First.Generation.FlagY 4.13e-14 ***
## Gender.CodeM < 2e-16 ***
## Gender.CodeN 0.683557
## HS.GPA < 2e-16 ***
## Major.1.CollegeAgriculture 0.003114 **
## Major.1.CollegeBehavioral and Social Sciences 0.008734 **
## Major.1.CollegeBusiness 0.003390 **
## Major.1.CollegeCol Engr, Csci, & Cmgmt 0.008190 **
## Major.1.CollegeCommunication and Education 0.001220 **
## Major.1.CollegeHumanities and Fine Arts 0.008292 **
## Major.1.CollegeNatural Sciences 0.018714 *
## Major.1.CollegeUndergraduate Education 0.059911 .
## Major.1.STEM.FlagN 0.491871
## Major.1.STEM.FlagY 0.542274
## URMURM:First.Generation.FlagY < 2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 113430 on 387068 degrees of freedom
## Residual deviance: 93545 on 387046 degrees of freedom

```

```
## (127 observations deleted due to missingness)
## AIC: 93591
##
## Number of Fisher Scoring iterations: 7
```

```
#stargazer(fit2)
```

- with interaction URM negative & significant, First gen negative and significant, URM\*First gen positive and significant

```
fit3<-glm(One.Year.Retention ~ SLC.Attended.Flag + Cohort.Term.Year + URM + First.Generation.Flag + URM
summary(fit3)
```

```
##
## Call:
## glm(formula = One.Year.Retention ~ SLC.Attended.Flag + Cohort.Term.Year +
##      URM + First.Generation.Flag + URM:First.Generation.Flag +
##      URM:SLC.Attended.Flag + First.Generation.Flag:SLC.Attended.Flag +
##      Gender.Code + HS.GPA + Major.1.College + Major.1.STEM.Flag,
##      family = binomial(link = "logit"), data = d)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -3.0890   0.1754   0.2027   0.2356   3.1269
##
## Coefficients:
##                                     Estimate Std. Error z value
## (Intercept)                       0.33926    0.48209   0.704
## SLC.Attended.Flag1                  1.04514    0.03465  30.160
## Cohort.Term.Year2017                0.10318    0.02829   3.647
## Cohort.Term.Year2018                0.01457    0.03012   0.484
## Cohort.Term.Year2019               -0.66438    0.02920 -22.752
## Cohort.Term.Year2020               -0.80993    0.03939 -20.564
## Cohort.Term.Year2021               -7.20852    0.18603 -38.749
## URMURM                             -0.36529    0.03956  -9.234
## First.Generation.FlagY              -0.38630    0.04389  -8.802
## Gender.CodeM                       -0.20734    0.02307  -8.988
## Gender.CodeN                       -0.21099    0.73444  -0.287
## HS.GPA                             0.27657    0.02428  11.392
## Major.1.CollegeAgriculture          2.22452    0.77159   2.883
## Major.1.CollegeBehavioral and Social Sciences 1.95156    0.77032   2.533
## Major.1.CollegeBusiness             2.17134    0.77073   2.817
## Major.1.CollegeCol Engr, Csci, & Cmgt     1.97431    0.77093   2.561
## Major.1.CollegeCommunication and Education 2.42063    0.77061   3.141
## Major.1.CollegeHumanities and Fine Arts    1.94628    0.76844   2.533
## Major.1.CollegeNatural Sciences          1.76311    0.77042   2.288
## Major.1.CollegeUndergraduate Education    1.37164    0.77109   1.779
## Major.1.STEM.FlagN                  -0.33183    0.60591  -0.548
## Major.1.STEM.FlagY                  -0.29160    0.60669  -0.481
## URMURM:First.Generation.FlagY          0.39935    0.04164   9.592
## SLC.Attended.Flag1:URMURM             0.35343    0.04402   8.029
## SLC.Attended.Flag1:First.Generation.FlagY 0.25015    0.04571   5.473
##
##                                     Pr(>|z|)
## (Intercept)                       0.481604
## SLC.Attended.Flag1                  < 2e-16 ***
```

```
## Cohort.Term.Year2017          0.000265 ***
## Cohort.Term.Year2018          0.628688
## Cohort.Term.Year2019          < 2e-16 ***
## Cohort.Term.Year2020          < 2e-16 ***
## Cohort.Term.Year2021          < 2e-16 ***
## URMURM                        < 2e-16 ***
## First.Generation.FlagY         < 2e-16 ***
## Gender.CodeM                  < 2e-16 ***
## Gender.CodeN                  0.773895
## HS.GPA                        < 2e-16 ***
## Major.1.CollegeAgriculture     0.003939 **
## Major.1.CollegeBehavioral and Social Sciences 0.011295 *
## Major.1.CollegeBusiness        0.004844 **
## Major.1.CollegeCol Engr, Csci, & Cmgt 0.010439 *
## Major.1.CollegeCommunication and Education 0.001683 **
## Major.1.CollegeHumanities and Fine Arts 0.011317 *
## Major.1.CollegeNatural Sciences 0.022109 *
## Major.1.CollegeUndergraduate Education 0.075267 .
## Major.1.STEM.FlagN            0.583925
## Major.1.STEM.FlagY            0.630776
## URMURM:First.Generation.FlagY < 2e-16 ***
## SLC.Attended.Flag1:URMURM     9.81e-16 ***
## SLC.Attended.Flag1:First.Generation.FlagY 4.43e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 113430 on 387068 degrees of freedom
## Residual deviance: 93431 on 387044 degrees of freedom
## (127 observations deleted due to missingness)
## AIC: 93481
##
## Number of Fisher Scoring iterations: 7
```

```
#stargazer(fit3)
```

- SLC non URM positive significant
- SLC \* URM positive significant
- SLC \* First gen positive significant

```
#stargazer(fit1, fit2, fit3, header = FALSE)
```