Appendix

Standardized Test Composite Score

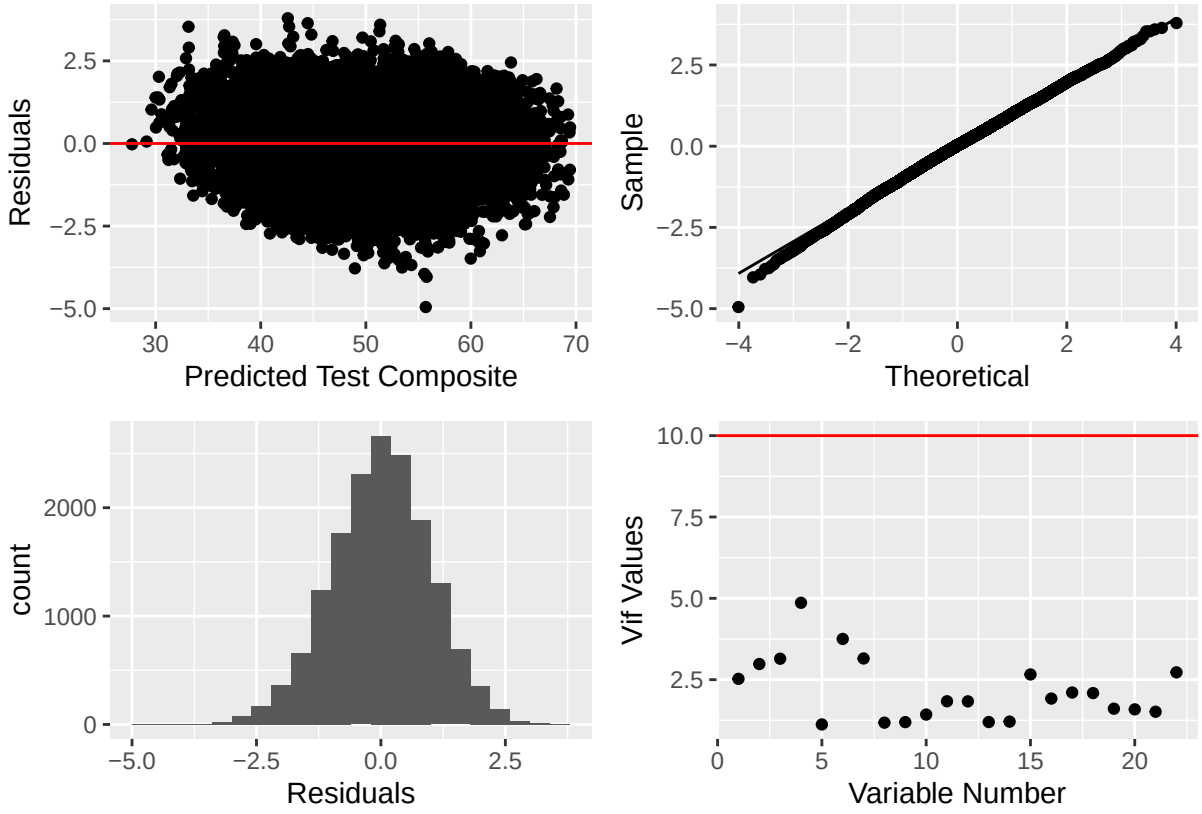
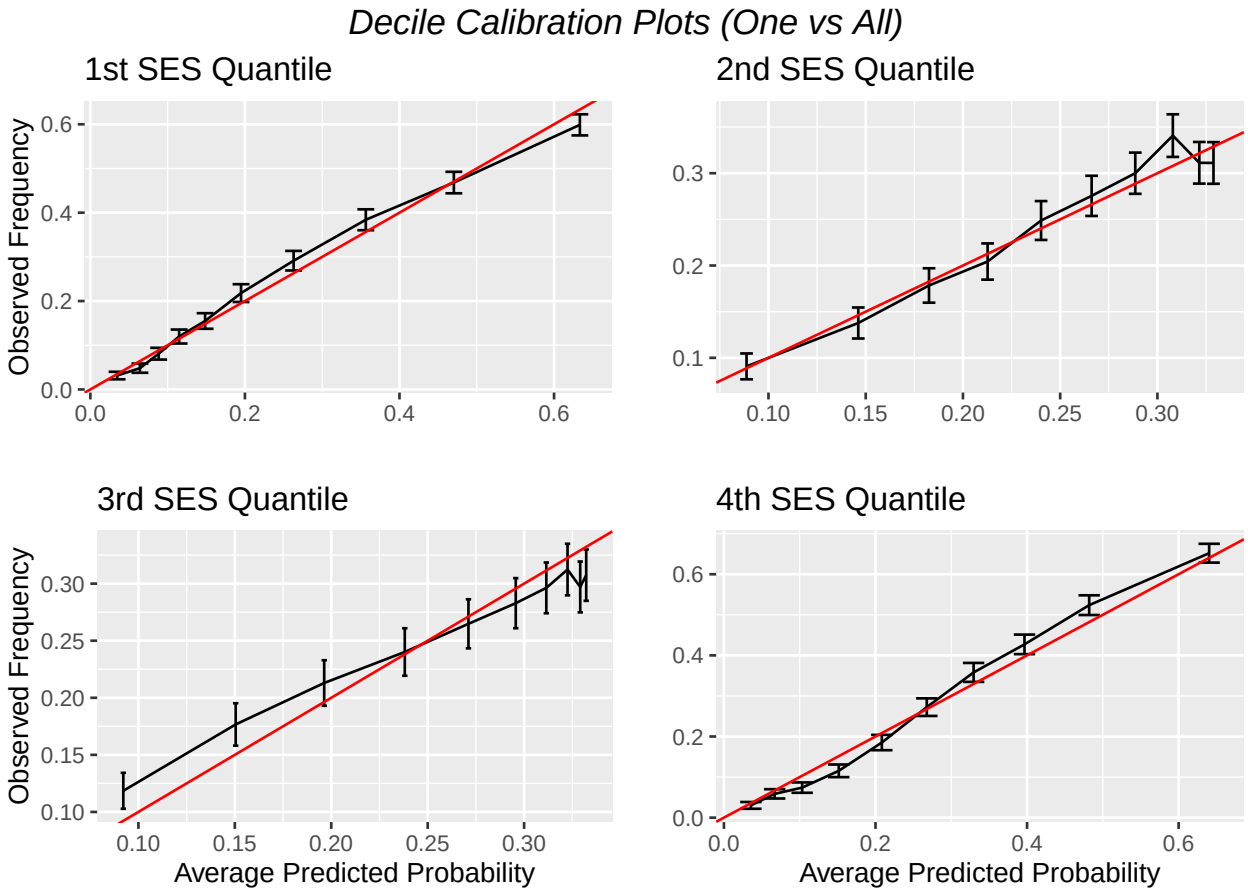


Figure 1: Model Diagnostic Plots: Residual vs. Predicted (Upper Left), QQ Plot (Upper Right), Distribution of Residuals (Lower Left), Vif Values (Lower Right)

There is no pattern in the residual plot, and they are normally distributed around 0. In addition, the QQ-plot shows a very close line to the ideal diagonal. The VIF are also all under 10, so there is no extreme multicollinearity. Therefore, we conclude that the assumptions for our OLS model are met.

SES Status



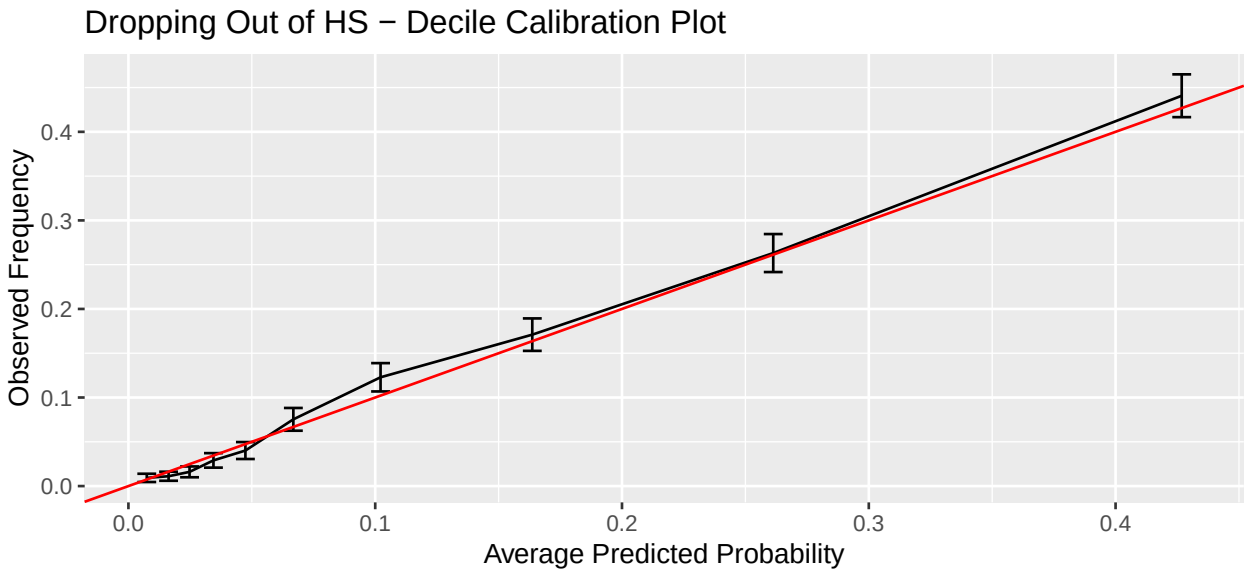
Since ordinal logistic regression has a categorical dependent variable, we first fit a linear model with the numeric version of the dependent variable of SES quantile. Then, after performing VIF, we find that there is no multicollinearity, as all of the VIF are under 10.

The proportional odds assumption is violated for 5 variables in the model. However, since we are performing only inference and since the calibration plots are relatively reasonable in comparison to the ideal line, this should not be a large concern.

As seen above, we created calibration plots for all four SES quantiles using a One vs All classification, and it seems that the models generally perform well, which gives us more confidence in our results.

Education Attainment

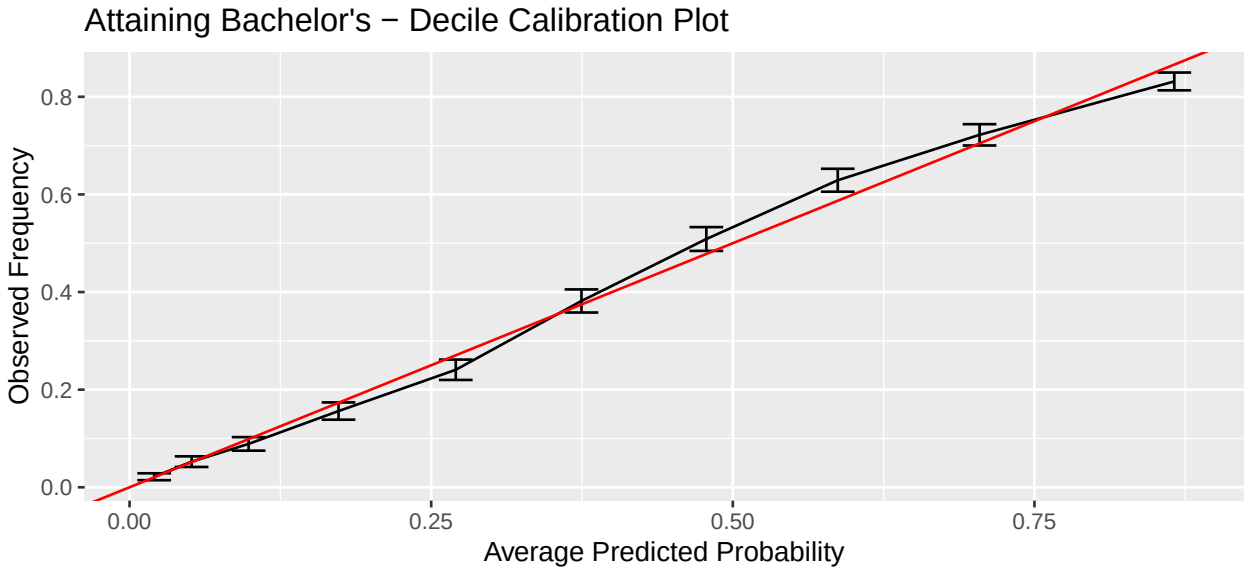
Odds of Dropping Out of High School



The calibration plot shows that the observed frequencies are pretty similar to the average predicted probabilities, with a small blip around an average predicted probability of 0.16. However, the overall trend is very similar to the ideal line.

All VIF of the variables are less than 10, so there are no issues with multicollinearity in our model.

Odds of Attaining a Bachelor's Degree



Although there are some deviances from the ideal line for the predicted probabilities greater than around 0.5, the line observed frequencies are still relatively close to the average predicted probabilities.

All VIF of the variables are less than 10, so there are no issues with multicollinearity in our model.

Sensitivity Analysis Without Imputed Data

Table 1: Sensitivity Results: OLS Model for Test Composite Score

	Coef	Std. Error	P-value
Intercept	27.734	0.937	<0.001
Race=API	-0.469	0.498	0.346
Race=Black	-3.616	0.481	<0.001
Race=Hispanic	-1.715	0.473	<0.001
Race=White	1.692	0.404	<0.001
Has Two Parents	-0.001	0.221	0.997
SES	1.640	0.23	<0.001
# Years Parents Education	-0.041	0.058	0.477
# Years Education Parents Push	0.455	0.046	<0.001
Has Computer and Internet	0.710	0.244	0.004
Is Public School	0.480	0.249	0.054
# Years Education Math Teacher Pushes	1.405	0.055	<0.001
# Years Education English Teacher Pushes	1.204	0.054	<0.001
% Sophomores in College Prep	0.013	0.003	<0.001
Lowest Teacher Salary (thousands)	-0.008	0.019	0.694
Majority Students Have Free Lunch	-0.614	0.39	0.116
LH by Lack of Space	0.272	0.224	0.225
LH by Poor Building Conditions	-1.125	0.257	<0.001
LH by Poor Heating/Air/Light	0.514	0.241	0.033
LH by Lack of Text/Supplies	-0.363	0.221	0.101
LH by Poor Facilities	-0.518	0.226	0.022
LH by Poor Technology	0.216	0.226	0.341
Majority Free Lunch:LH by Lack of Space	-1.231	0.526	0.019

Table 2: Sensitivity Results: Logistic Regression for Odds of Dropping Out of HS

	Coef	Exp(Coef)	Std. Error	P-value
Intercept	2.880	17.807	0.531	<0.001
Race=API	0.259	1.296	0.285	0.363
Race=Black	-0.145	0.865	0.245	0.553
Race=Hispanic	-0.034	0.967	0.241	0.889
Race=White	-0.337	0.714	0.212	0.112
Has Two Parents	-0.269	0.764	0.115	0.019
SES	-0.155	0.857	0.13	0.235
# Years Parents Education	-0.035	0.966	0.032	0.282
# Years Education Parents Push	-0.016	0.984	0.024	0.5
Has Computer and Internet	-0.115	0.892	0.115	0.319
Is Public School	0.334	1.397	0.196	0.089
# Years Education Math Teacher Pushes	-0.337	0.714	0.033	<0.001
# Years Education English Teacher Pushes	-0.345	0.709	0.032	<0.001
% Sophomores in College Prep	0.002	1.002	0.002	0.168
Lowest Teacher Salary (thousands)	-0.017	0.983	0.012	0.151
Majority Students Have Free Lunch	-0.523	0.593	0.23	0.023
LH by Lack of Space	-0.049	0.952	0.132	0.711
LH by Poor Building Conditions	0.015	1.015	0.151	0.92
LH by Poor Heating/Air/Light	0.028	1.028	0.142	0.843
LH by Lack of Text/Supplies	0.013	1.013	0.123	0.917
LH by Poor Facilities	-0.091	0.913	0.133	0.495
LH by Poor Technology	0.034	1.035	0.133	0.796
Majority Free Lunch:LH by Lack of Space	0.470	1.600	0.293	0.108

Table 3: Sensitivity Results: Logistic Regression for Odds of Attaining Bachelor's

	Coef	Exp(Coef)	Std. Error	P-value
Intercept	-7.598	0.001	0.422	<0.001
Race=API	0.682	1.978	0.205	0.001
Race=Black	0.275	1.316	0.203	0.176
Race=Hispanic	-0.032	0.968	0.201	0.872
Race=White	0.456	1.578	0.167	0.006
Has Two Parents	0.008	1.008	0.093	0.927
SES	0.491	1.633	0.093	<0.001
# Years Parents Education	-0.000	1.000	0.024	0.998
# Years Education Parents Push	0.070	1.073	0.019	<0.001
Has Computer and Internet	0.389	1.476	0.111	<0.001
Is Public School	-0.294	0.745	0.095	0.002
# Years Education Math Teacher Pushes	0.421	1.524	0.026	<0.001
# Years Education English Teacher Pushes	0.347	1.415	0.024	<0.001
% Sophomores in College Prep	0.001	1.001	0.001	0.319
Lowest Teacher Salary (thousands)	0.007	1.007	0.008	0.369
Majority Students Have Free Lunch	-0.006	0.994	0.168	0.97
LH by Lack of Space	-0.029	0.971	0.088	0.739
LH by Poor Building Conditions	-0.119	0.888	0.102	0.243
LH by Poor Heating/Air/Light	0.117	1.124	0.096	0.224
LH by Lack of Text/Supplies	-0.033	0.967	0.09	0.709
LH by Poor Facilities	0.025	1.026	0.091	0.779
LH by Poor Technology	-0.085	0.919	0.091	0.35
Majority Free Lunch:LH by Lack of Space	0.116	1.123	0.226	0.608

Table 4: Sensitivity Results: Ordinal Logistic Regression for SES Status

	Coef	Exp(-Coef)	Std. Error	P-value
Race=API	0.304	0.738	0.157	0.053
Race=Black	0.174	0.841	0.150	0.247
Race=Hispanic	-0.117	1.124	0.148	0.427
Race=White	0.301	0.740	0.126	0.017
Has Two Parents	0.094	0.911	0.068	0.168
SES	0.381	0.683	0.070	<0.001
# Years Parents Education	-0.027	1.027	0.018	0.130
# Years Education Parents Push	0.045	0.956	0.014	0.001
Has Computer and Internet	0.325	0.723	0.075	<0.001
Is Public School	-0.130	1.139	0.075	0.080
# Years Education Math Teacher Pushes	0.271	0.762	0.017	<0.001
# Years Education English Teacher Pushes	0.211	0.810	0.017	<0.001
% Sophomores in College Prep	0.002	0.998	0.001	0.033
Lowest Teacher Salary (thousands)	0.006	0.994	0.006	0.330
Majority Students Have Free Lunch	-0.261	1.298	0.120	0.030
LH by Lack of Space	-0.139	1.149	0.067	0.037
LH by Poor Building Conditions	-0.104	1.110	0.077	0.176
LH by Poor Heating/Air/Light	0.143	0.867	0.072	0.049
LH by Lack of Text/Supplies	-0.089	1.093	0.067	0.181
LH by Poor Facilities	-0.085	1.088	0.068	0.212
LH by Poor Technology	0.011	0.989	0.068	0.874
Majority Free Lunch:LH by Lack of Space	0.214	0.808	0.161	0.184
Intercept (SES Quartile <= 1)	2.657	0.070	0.286	<0.001
Intercept (SES Quartile <= 2)	4.045	0.018	0.289	<0.001
Intercept (SES Quartile <= 3)	5.402	0.005	0.292	<0.001