STANDARDIZED TEST SCORES AND RETENTION

Daemen College
Institutional Research Office
October 2021

Executive Summary

In recent years the value of considering test scores (e.g. SAT or ACT) in admission decisions in higher education has been challenged. This research brief explores the relationship between test scores and retention at Daemen College in two separate analyses. The first analysis looks at the relationship between SAT scores and retention rates. The second analysis looks at the relationship between test-optional status and retention rates.

The cohorts for these analyses were first-time, full-time, degree-seeking students. The outcome variable was fall-to-fall retention. Separate analyses were performed for health majors (nursing, physical therapy, and physician's assistant) and non-health majors (all others).

These analyses are very preliminary and have a number of limitations, therefore results should be interpreted with caution. With that caveat, some key findings from these analyses include the following.

Relationship between SAT scores and retention:
- Non-health majors: Results of a multivariate statistical analysis showed that SAT scores dropped out of the model, leaving only high school GPA as a significant predictor of retention. These results suggest that for this cohort of students SAT scores may not be adding any predictive power to the model when high school GPA is known.
- Health majors: Results of a multivariate statistical analysis showed that both high school GPA and SAT scores remained in the model as significant predictors of retention. These results suggest that for this cohort of students SAT scores do add predictive power to the model along with high school GPA. However, high school GPA was a much stronger predictor of retention outcomes.

Relationship between test-optional status and retention:
- Non-health majors: Fall-to-fall retention rates were significantly higher for students who submitted test scores compared to those who did not, but this relationship did not hold in a multivariate analysis which controlled for other variables. It is therefore not clear, based on the results of this analysis, that submitting test scores is correlated with retention. At-risk students were less likely to submit test scores, but as a group showed comparable retention rates to non-risk students.
- Health majors: Fall-to-fall retention rates were similar for both groups, i.e. test-optional and test-submitters. A multivariate analysis reinforced this effect, i.e. the lack of a relationship between test status and retention, controlling for other variables.

Analysis 1: Relationship between SAT scores and retention

Background

This analysis provides a preliminary examination of whether and to what extent SAT scores help to predict fall-to-fall retention rates among incoming freshmen at Daemen College.

Methodology

All first-time, full-time, degree-seeking students from the fall 2017, fall 2018, fall 2019, and fall 2020 cohorts were included in this analysis (N=1484). Multiple logistic regression analysis was used to determine the relationship between SAT scores and fall-to-fall retention rates. Variables included in the analysis were: SAT score, high school GPA, under-represented minority, Pell recipient, and first-generation student. All demographic variables were dummy coded as 1 or 0. Statistical analyses were performed in SPSS.

Simple cross-tabulations in Excel were also conducted to provide a preliminary picture of the relationships among SAT scores, high school GPA, and retention outcomes.

The case file was divided into two groups: health majors (nursing, physician's assistant, and physical therapy) and all other majors. Separate analyses were conducted for each group.

Results: Non-health majors

Cross-tabulations: The table below shows the number of students in the non-health cohort in each cell defined by a range of high school GPA values and a range of total SAT scores.

Number of students in FFF cohorts by SAT and HS GPA: Non-health majors						
	SAT score					
HS GPA	<1000	1000-1099	1100-1199	1200-1299	1300+	Total
<2.00	6	1	2			9
2.00-2.49	27	7	3	1		38
2.50-2.99	57	26	12	2	1	98
3.00-3.49	69	72	30	6	1	178
3.50-3.74	30	57	70	32	7	196
3.75+	5	12	21	21	12	71
Total	194	175	138	62	21	590

SAT scores tend to be concentrated at the lower end of the range, while GPA values tend to be concentrated in the middle of the range.

The table below shows the fall-to-fall retention rates for students in each cell of the above table.

Fall-to-fall retention rates: Non-health majors						
	SAT score					
HS GPA	<1000	1000-1099	1100-1199	1200-1299	1300+	Total
<2.00	67%	0%	50%			56%
2.00-2.49	70%	43%	33%	100%		63%
2.50-2.99	72%	65%	58%	100%	100%	69%
3.00-3.49	67%	78%	73%	83%	100%	73%
3.50-3.74	83%	77%	71%	72%	86%	76%
3.75+	60%	92%	76%	90%	67%	80%
Total	71%	75%	70%	81%	76%	73%

Retention rates clearly increase with increasing high school GPA, as shown in the right-most column. However, the relationship between SAT scores and retention (bottom row) is less clear, although there is some tendency for retention to improve with high SAT scores. Students with low GPA and low SAT scores (gold shading) clearly have significantly worse retention rates.

Statistical analysis: In the multivariate logistic regression analysis (which controls for the effect of all variables in the model), only high school GPA remained in the model as a statistically significant predictor of retention. All other variables, including SAT scores, dropped out of the model. These results suggest that SAT scores may not be adding any predictive value for student retention above and beyond high school GPA for non-health majors. It is noteworthy that demographic variables are not significant predictors of retention when controlling for high school GPA and test scores.

Discussion: Results of this analysis, limited to non-health majors, indicated that SAT scores are correlated with high school GPA: on average, students with higher SAT scores had a higher GPA. Fall-to-fall retention rates increased with increasing high school GPA. However, the relationship between SAT scores and retention was less clear, although a weak positive correlation was observed. Students with low high school GPA and low SAT scores had very poor retention rates.

In the multivariate analysis, only high school GPA remained in the model as a significant predictor of retention. These results, though limited, suggest that for this cohort of students SAT scores may not be adding any predictive power to the model when high school GPA is known.

Results: Health majors

Cross-tabulations: The table below shows the number of students in the non-health cohort in each cell defined by a range of high school GPA values and a range of total SAT scores.

Number of students in FFF cohorts by SAT and HS GPA: Health majors						
	SAT score					
HS GPA	<1000	1000-1099	1100-1199	1200-1299	1300+	Total
2.50-2.99	1	3	1			5
3.00-3.49	2	40	31	8	2	83
3.50-3.74	1	63	124	76	26	290
3.75+		8	71	109	71	259
Total	4	114	227	193	99	637

SAT scores tend to be concentrated in the middle of the range, while GPA values tend to be concentrated in the upper end of the range.

The table below shows the fall-to-fall retention rates for students in each cell of the above table.

Fall-to-fall retention rates: Health majors						
	SAT score					
HS GPA	<1000	1000-1099	1100-1199	1200-1299	1300+	Total
2.50-2.99	0%	67%	100%			60%
3.00-3.49	50%	63%	68%	75%	100%	66%
3.50-3.74	0%	86%	86%	89%	96%	88%
3.75+		75%	89%	94%	94%	92%
Total	25%	76%	85%	91%	95%	86%

Retention rates clearly increase with increasing high school GPA, as shown in the right-most column. Retention rates also increase with SAT scores, as shown in bottom row. Students with lower GPA and lower SAT scores (gold shading) have significantly worse retention rates.

Statistical analysis: In the multivariate logistic regression analysis (which controls for the effect of all variables in the model), both high school GPA and SAT scores remained in the model as statistically significant predictors of retention. However, while both variable were significant, the effect was much stronger for high school GPA. All demographic variables dropped out of the model. These results suggest that SAT scores do add some degree of predictive value for student retention above and beyond high school GPA for health majors. Nevertheless, high school GPA remains the strongest predictor of student retention.

Discussion: Results of this analysis, limited to health majors, indicated that SAT scores are correlated with high school GPA: on average, students with higher SAT scores had a higher GPA. Fall-to-fall retention rates increased significantly with increasing high school GPA, and also increased significantly with higher SAT scores. Students with low to moderate high school GPA and low SAT scores had very poor retention rates.

In the multivariate analysis, both high school GPA and SAT scores remained in the model as significant predictors of retention. These results, though limited, suggest that for this cohort of students SAT scores do add predictive power to the model along with high school GPA. However, high school GPA was a much stronger predictor of retention outcomes.

Limitations

The overall strength of the statistical models was weak. Therefore, results should be interpreted with caution. Also, the number of variables included in the statistical model was limited. Inclusion of additional variables could produce a different pattern of results.

Analysis 2: Test optional policy and retention

Background

In fall 2020, partly as a result of COVID-19 restrictions, Daemen College implemented a test-optional policy for new freshmen. Basically, this policy allowed students to be admitted to Daemen without submitting SAT or ACT scores, assuming their other credentials qualified them for admission. This analysis examines whether retention outcomes were similar for students who submitted test scores compared to those who did not.

Methodology

All first-time, full-time, degree-seeking students matriculated in fall 2020 (N=345) were included in this analysis. Multiple logistic regression analysis was used to determine the relationship between test status (submitted test scores vs. did not submit test scores) and fall-to-fall retention rates. Variables included in the analysis were: test status (submitted vs. not submitted), high school GPA, under-represented minority, Pell recipient, and first-generation student. All demographic variables were dummy coded as 1 or 0. Statistical analyses were performed in SPSS.

Simple cross-tabulations in Excel were also conducted to provide a preliminary picture of the relationships among test status, high school GPA, and retention outcomes.

The case file was divided into two groups: health majors (nursing, physician's assistant, and physical therapy) and all other majors. Separate analyses were conducted for each group.

It should be noted that only a small number of students formally declared the test-optional admission status. Additionally, however, a significant number of admitted students simply did not submit test scores but are considered as test-optional for purposes of this analysis.

Results: Non-health majors

Cross-tabulations: The table below shows the number of student in each high school GPA category cross-tabulated with their test status.

Number of FFF2020 students by test status: Non-health majors							
	High school GPA						
Test status	n/a	<2.50	2.50-2.99	3.00-3.49	3.50-3.74	3.75+	Total
Tested	7	5	14	26	46	18	116
No tests	7	4	7	12	18	1	49
Total	14	9	21	38	64	19	165

Test optional students tend to be somewhat more heavily concentrated at the lower end of the GPA scale.

The table below shows the fall-to-fall retention rates for students in each cell of the above table.

Retention rates of FFF2020 students by test status: Non-health majors							
	High school GPA						
Test status	n/a	<2.50	2.50-2.99	3.00-3.49	3.50-3.74	3.75+	Total
Tested	86%	100%	71%	65%	80%	83%	78%
No tests	57%	50%	71%	83%	67%	0%	67%
Total	71%	78%	71%	71%	77%	79%	75%

Overall, retention rates are significantly higher for tested students. Generally speaking, retention rates increase with high school GPA for both groups, although the trend is somewhat non-linear. Notably, in the test optional group, students with the highest GPA (3.50 or above) had surprisingly poor retention rates.

The table below shows test status cross-tabulated with at-risk status, where at-risk students are defined as those belonging to one or more of the following groups: under-represented minority, Pell recipient, and/or first-generation.

Test status by risk status: Non-health majors				
Test status	Tested	No tests	Total	% no test
At-risk	68	31	99	31%
Not at-risk	48	18	66	27%
Total	116	49	165	30%

A slightly higher percentage (right column) of at-risk students were test-optional, but the difference is not significant.

The table below shows the retention rates for students in each cell of the above table.

Retention rates by risk status: Non-health majors			
Test status	Tested	No tests	Total
At-risk	78%	68%	75%
Not at-risk	77%	67%	74%
Total	78%	67%	75%

Retention rates for at-risk students are almost identical to retention rates for non-risk students. As noted above, retention rates are significantly higher for tested students than for test-optional students. However, there is no interaction between test status and risk status (i.e. the pattern of results is the same across both groups).

Statistical analysis: In the multivariate logistic regression analysis (which controls for the effect of all variables in the model), all variables dropped out of the model. In other words, no single variable or combination of variables used in the model was a significant predictor of retention for this population of students.

Discussion: Within the sub-population of non-health majors in the fall 2020 cohort of new freshmen, 30% of students did not submit an SAT or ACT test. Students with a higher high school GPA were somewhat more likely to submit test scores. Fall-to-fall retention rates were significantly higher for students who submitted test scores, but this relationship did not hold in a multivariate analysis which controlled for other variables. It is therefore not clear, based on the results of this analysis, that submitting test scores is correlated with retention.

At-risk students were less likely to submit test scores, but as a group showed comparable retention rates to non-risk students.

Results: Health majors

Cross-tabulations: The table below shows the number of student in each high school GPA category cross-tabulated with their test status.

	Number of FFF2020 students by test status: Health majors					
	High school GPA					
Test status	**n/a**	**2.50-2.99**	**3.00-3.49**	**3.50-3.74**	**3.75+**	**Total**
Tested	2	1	15	70	72	160
No tests	1		6	9	4	20
Total	**3**	**1**	**21**	**79**	**76**	**180**

Only about 11% of health majors in this cohort were test-optional. Most students submitting test scores were in the higher GPA range (3.50 or greater).

The table below shows the fall-to-fall retention rates for students in each cell of the above table.

	Retention rates of FFF2020 students by test status: Health majors					
	High school GPA					
Test status	**n/a**	**2.50-2.99**	**3.00-3.49**	**3.50-3.74**	**3.75+**	**Total**
Tested	100%	0%	60%	87%	93%	87%
No tests	100%		83%	89%	100%	90%
Total	**100%**	**0%**	**67%**	**87%**	**93%**	**87%**

Overall, retention rates are slightly higher for test-optional students. Retention rates increase with high school GPA for both groups.

The table below shows test status cross-tabulated with at-risk status, where at-risk students are defined as those belonging to one or more of the following groups: under-represented minority, Pell recipient, and/or first-generation.

Test status by risk status: Health majors				
Test status	**Tested**	**No tests**	**Total**	**% no test**
At-risk	49	10	59	17%
Not at-risk	111	10	121	8%
Total	**160**	**20**	**180**	**11%**

A somewhat higher percentage (right column) of at-risk students were test-optional, although the percentage of test-optional students in both groups is small.

The table below shows the retention rates for students in each cell of the above table.

Retention rates by risk status: Health majors			
Test status	**Tested**	**No tests**	**Total**
At-risk	73%	90%	76%
Not at-risk	93%	90%	93%
Total	**87%**	**90%**	**87%**

Retention rates for at-risk students are significantly lower than retention rates for non-risk students. However, at-risk students who were test optional had higher than average retention rates.

Statistical analysis: In the multivariate logistic regression analysis (which controls for the effect of all variables in the model), both high school GPA and first-generation status remained in the model as significant predictors of retention. High school GPA was positively correlated with retention, while first-

generation status was negatively correlated. Test status (i.e. submitted test scores or test-optional) was not a significant predictor of retention, controlling for other variables.

Discussion: Within the sub-population of health majors in the fall 2020 cohort of new freshmen, only 11% of students did not submit an SAT or ACT test. Fall-to-fall retention rates were similar for both groups, i.e. test-optional and test-submitters. The multivariate analysis reinforced this effect, i.e. the lack of a relationship between test status and retention, controlling for other variables. Results of this analysis, which is quite limited, do not support the hypothesis of a correlation between test status and retention rates. More data is needed to produce more conclusive evidence.

Limitations

Only a single cohort of students was used for this analysis, therefore the sample size is small and may limit the generalizability of results. Determining test status was problematic. In principle, students could declare that they were seeking admission under the test-optional policy. However, very few students formally selected this option. It is possible that some of the students who did not submit test scores failed to do so because of challenges related to the COVID-19 pandemic. For example, some of these students may have wanted to take the SAT test (and might have done very well), but did not have the option to do so. Furthermore, it is possible that certain demographic populations may have had less access to testing availability. However, it must be noted that most of the students in the fall 2020 cohort would have submitted test scores prior to the pandemic (i.e. in fall 2019).

In summary, we cannot draw clear conclusions from this analysis on the actual impact of a test-optional policy on student retention. Future studies may shed more light on this topic.