

Preliminary report on impact of the use of the Nelson-Denny comprehension test

This report focuses only on the impact of the Nelson-Denny comprehension test cut-offs. Given that the essay and math sections are essentially the same year-on-year, the difference in admissions numbers is likely due in part to the comprehension section. A member of the RAR committee noted that the comprehension test seemed to be a major factor contributing to non-admission.

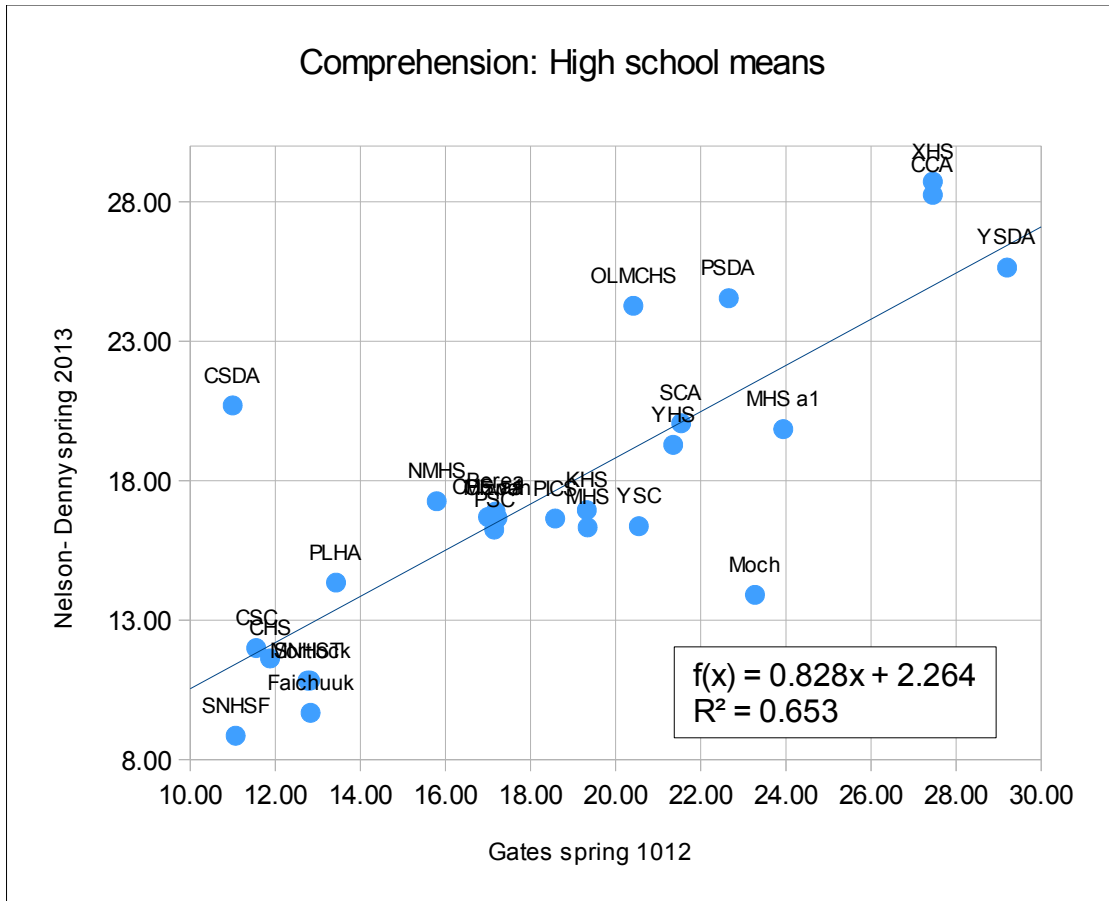
Rather than use the Nelson-Denny grade level equivalents, this report uses the performance year-on-year for each high school to generate a linear conversion between Gates AR scores 2012 and Nelson-Denny scores 2013. This procedure presumes that average performance for a given high school is relatively stable year-on-year.

The following table provides the average Gates AR comprehension score by high school for 2012 and the average Nelson-Denny score by high school for 2013.

| HS | Gates 12 | ND 13 |
|----------|----------|-------|
| Berea | 17.18 | 16.89 |
| CCA | 27.45 | 28.25 |
| CHS | 11.88 | 11.63 |
| CHS a | 17.00 | 16.70 |
| CSC | 11.55 | 12.00 |
| CSDA | 11.00 | 20.70 |
| Faichuuk | 12.83 | 9.68 |
| KHS | 19.32 | 16.95 |
| MHS | 19.34 | 16.33 |
| MHS a | 23.94 | 19.85 |
| Mizpah | 17.22 | 16.67 |
| Moch | 23.28 | 13.91 |
| Mortlock | 12.82 | 10.83 |
| NMHS | 15.79 | 17.26 |
| Ohwa | 17.14 | 16.65 |
| OLMCHS | 20.42 | 24.27 |
| PICS | 18.58 | 16.65 |
| PLHA | 13.43 | 14.35 |
| PSC | 17.15 | 16.25 |
| PSDA | 22.66 | 24.55 |
| SCA | 21.54 | 20.06 |
| SNHSF | 11.07 | 8.86 |
| SNHST | 12.76 | 10.83 |
| XHS | 27.45 | 28.73 |

| HS | Gates 12 | ND 13 |
|------|----------|-------|
| YHS | 21.35 | 19.29 |
| YSC | 20.55 | 16.37 |
| YSDA | 29.20 | 25.64 |

The data in the table above is plotted on the chart below.



The equation of the regression trend line provides a way to convert this year's Nelson-Denny comprehension scores back into Gates AR comprehension scores and grade level equivalents.

| ND | Gates eq | Grade Eq |
|----|----------|----------|
| 26 | 28.7 | 11.5 |
| 25 | 27.5 | 11 |
| 24 | 26.2 | 10.5 |
| 23 | 25.0 | 10.1 |
| 22 | 23.8 | 9.3 |
| 21 | 22.6 | 9.1 |
| 20 | 21.4 | 8.6 |

| ND | Gates eq | Grade Eq |
|----|----------|----------|
| 19 | 20.2 | 8.2 |
| 18 | 19.0 | 7.9 |
| 17 | 17.8 | 7.3 |
| 16 | 16.6 | 7 |
| 15 | 15.4 | 6.7 |
| 14 | 14.2 | 6.4 |
| 13 | 13.0 | 5.9 |
| 12 | 11.8 | 5.6 |
| 11 | 10.5 | 5.4 |
| 10 | 9.3 | 5 |
| 9 | 8.1 | 4.6 |
| 8 | 6.9 | 4 |

Using the above chart, one can determine the effective Gates AR comprehension grade level based on the performance of the high schools in the FSM.

| Nelson-Denny cut-off | Intended target grade | Gate AR equivalent grade |
|----------------------|-----------------------|--------------------------|
| 26 | 10 | 11.5 |
| 23 | 9 | 10.1 |
| 22 | 8 | 9.3 |
| 20 | 7 | 8.6 |
| 17 | 6 | 7.3 |
| 14 | 4 | 6.4 |

Note that the Nelson-Denny eighth and ninth grade cut-offs are separated by a single point. This is a difference of a single question and will not be a statistically significant difference.

Against past performance, the Nelson-Denny cut-offs raised the effective comprehension standard by an average of a grade and a half. In the range in which the candidates perform, an increase of one grade level represents a large change in the underlying number of candidates.

The following table provides Nelson-Denny cut-off scores that produce the intended grade level as measured by year-on-year performance.

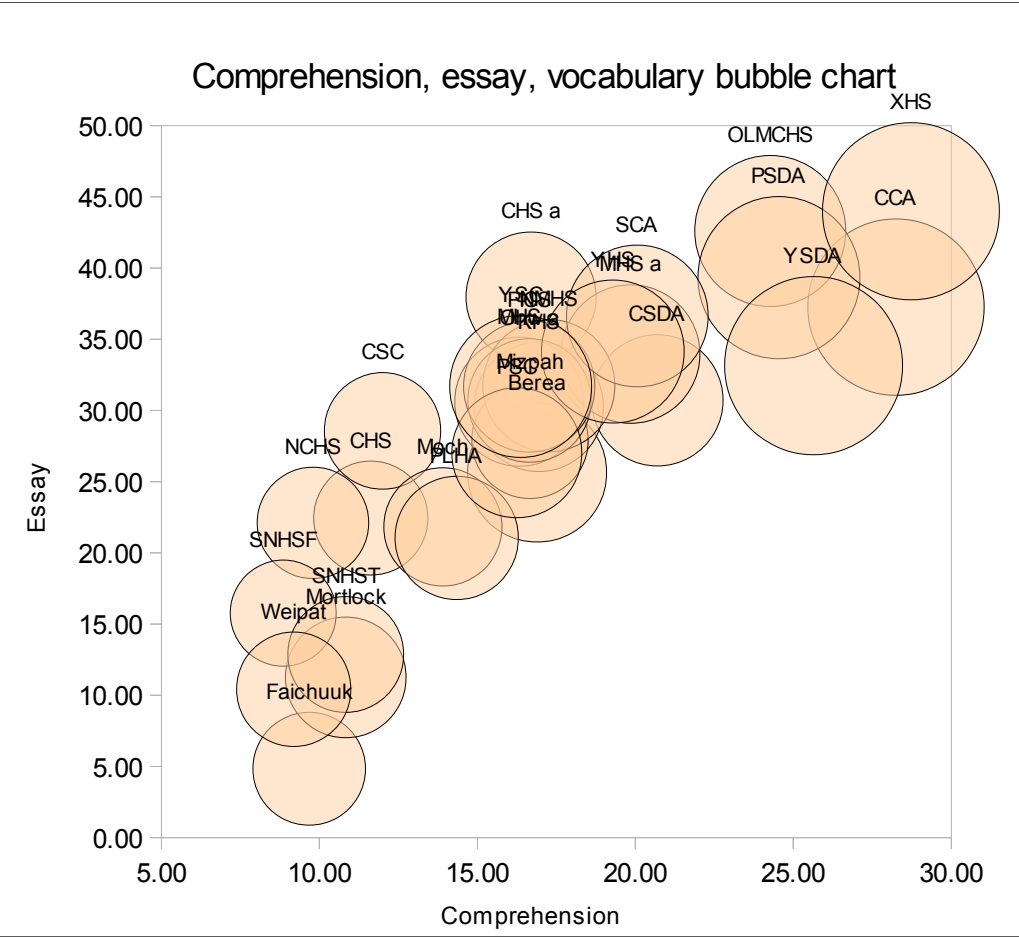
| Intended Grade Level Cut-Off | Adjusted Nelson-Denny Score |
|------------------------------|-----------------------------|
| 10 | 23 |
| 9 | 21 |
| 8 | 18 |
| 7 | 16 |

| Intended Grade Level Cut-Off | Adjusted Nelson-Denny Score |
|------------------------------|-----------------------------|
| 6 | 13 |
| 4 | 8 |

[The cut-offs used by the college were apparently obtained by using the Gates AR scores for 200 students who sat the Gates AR spring 2013 and correlating those performances to the performances of the same 200 students on the Nelson-Denny tests during fall 2013. This procedure ought to have produced a more accurate set of equivalent cut-offs than my analysis. The net effect of the cut-offs used, however, was effectively a grade and half boost in the cut-offs on a high school basis.]

One other factor might also be examined. The Nelson-Denny reading tests are designed for a 35 minute time frame. Riverside publishing's web site notes, however, that "...a unique feature of the 1993 edition is the extended-time administration of the test to meet the needs of special populations, such as students with English as a second language or as a foreign language, or returning adults." Was the extended-time administration used or was only 35 minutes allotted for the Nelson-Denny sections? If only 35 minutes was provided, then that might also have contributed to the depression in the scores. [Post-script: the author was informed that the extended-time administration was used.]

As a final graphic, the bubble chart plots the comprehension average as the x-coordinate, the essay average as the y-coordinate, with a bubble radius proportional to the vocabulary score. The chart suggests that below an essay score of 20 the comprehension score is essentially random (the test is multiple choice). Above an essay score of 20 there appears to be a relationship between the comprehension and essay average for a high school.



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