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Examining the Linearity of the PSAT/NMSQT®–FYGPA Relationship¹

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Introduction

Tests, and their intended uses, have at times been misunderstood by the general public. For example, one misunderstanding is that tests do not predict above a minimum threshold.² That is, test scores may be useful for identifying students with very low levels of ability; however, higher scores are considered unrelated to higher performance for those above a certain threshold. If true, this reality would have critical ramifications for the National Merit Scholarship Program and its selection process — the truth, however, is quite the opposite.

To be eligible to win a National Merit Scholarship, students must take the PSAT/NMSQT^{®3} during their junior year of high school. Only juniors who attain a very high total score on the PSAT/NMSQT will advance to Semifinalist. It should be pointed out that PSAT/NMSQT scores are not the sole factor in determining scholarship winners, but rather are used for only the initial screening of students. The entire selection process is quite rigorous and multiple factors, including leadership experiences, essays, and student grades, are used to make final decisions.

Winning a National Merit Scholarship is a prestigious achievement and helps alleviate the monetary burden associated with attending an institution of higher education. With that in mind, the appropriateness of using PSAT/NMSQT scores to select Semifinalists has been a controversial topic; specifically, the ability of PSAT/NMSQT scores to meaningfully discriminate between top scorers has been questioned. Therefore, it is crucial to provide evidence supporting the use of PSAT/NMSQT scores to designate National Merit Semifinalists.

The purpose of the current study was to test whether the previous research finding of a linear (straight line) relationship

between cognitive tests (e.g., the SAT) and performance is also true for PSAT/NMSQT scores and college grades. In other words, do students who earn higher PSAT/NMSQT scores also earn higher college grades? If higher PSAT/NMSQT scores are associated with higher college grades, this would provide evidence supporting the use of the PSAT/NMSQT to select National Merit Semifinalists.

About the Research

This study evaluated whether performance on the PSAT/NMSQT is related to first-year college grades, particularly among students with very high scores. Specifically, whether the relationship between PSAT/NMSQT scores and first-year grade point average (FYGPA) was linear (i.e., as PSAT/NMSQT scores increase, FYGPA also increases) was evaluated. If students with different PSAT/NMSQT scores (e.g., 200 versus 240) earned the same FYGPA (e.g., 3.50), then alternative measures/methods for selecting students may need to be explored.

Data and Methodology

The data used for this study were based on three cohorts of first-time, first-year students from 177 colleges and universities, and consisted of 444,193 students with valid PSAT/NMSQT scores (from junior year, official College Board records) and FYGPAs (provided by participating institutions). The sample was fairly representative of the national population of students enrolled in four-year institutions in terms of both gender and race/ethnicity.⁴ The relationship between PSAT/NMSQT and FYGPA was explored and analyzed for the full scale of PSAT/NMSQT scores as well as for students scoring 200 and above. Different grading procedures at various colleges were accounted for in the data analysis.

Results and Conclusions

To graphically display the relationship, the mean FYGPA earned by each PSAT/NMSQT total score (i.e., 60–240) was computed and plotted, revealing a linear trend (see Figure 1). In other words, as the PSAT/NMSQT score increased, mean FYGPA also increased in a uniform linear fashion — FYGPA increased relatively constantly as the PSAT/NMSQT scores increased. This trend is especially evident from a total score of 100 and above, which includes 99.5 percent of the data. When examining only the top end of the PSAT/NMSQT score scale (≥ 200), the relationship between PSAT/NMSQT scores and FYGPA did not deviate from linearity, which is where merit-based decisions are made.

In sum, the current study showed that the relationship between PSAT/NMSQT scores and FYGPA was linear, particularly among very high-scoring students, suggesting that the PSAT/NMSQT can meaningfully identify and

distinguish among very high-ability students, thereby supporting its use in the scholarship decision-making process.

1. J. P. Marini, K. D. Mattern, and E. J. Shaw, *Examining the Linearity of the PSAT/NMSQT–FYGPA Relationship* (College Board Research Report No. 2011-7) (New York: The College Board, in press). Click here for the full report: <http://professionals.collegeboard.com/profdownload/pdf/RR2011-7.pdf>
2. P. R. Sackett, M. J. Borneman, and B. S. Connelly, "High-Stakes Testing in Higher Education and Employment," *American Psychologist* 63, no. 4 (2008): 215-27.
3. Preliminary SAT/National Merit Scholarship Qualifying Test.
4. T. D. Snyder and S. A. Dillow, *Digest of Education Statistics 2009*, NCES 2010-013 (National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, 2008).

Figure 1
Mean FYGPA by PSAT/NMSQT Selection Index Score

