Vocabulary.com

# The Impact of Vocabulary.com Usage on PSAT/SAT Reading and Writing

January, 2025 | Huan Liu, Ph.D.

Vocabulary.com is an award-winning vocabulary acquisition platform that is built on learning science principles and a powerful adaptive engine to deliver the fastest and most effective way for students to master new words (Zimmer, n.d.). Using a "big data" approach and item response theory to analyze response patterns from billions of questions, Vocabulary.com creates personalized vocabulary instruction for each learner that is truly tailored to his or her needs. As of this writing, Vocabulary.com has served more than 8 billion questions to 4 million students in 46,000 schools across the world.

## How Vocabulary.com works

The goal of Vocabulary.com is to enable word mastery, not memorization of a single, simplified definition. The platform achieves this by identifying gaps in students' vocabulary and then systematically exposing students to words they need to learn in a variety of contexts, using various question types, multiple meanings, and adaptive activities. The software adapts to each learner based on his or her responses and reintroduces words from the past until each word is fully mastered. Vocabulary.com's gamification features keep learners engaged and motivated through interactive learning at their own pace, and badges and points track and celebrate their progress. The site can be used for independent and collaborative learning, at home or in the classroom, allowing learners to practice and master new words anytime, anywhere.

## Prior research

Prior research has consistently shown the positive effects of Vocabulary.com usage on student learning. For example, a number of studies found that Vocabulary.com usage was associated with improved FCAT and FSA reading exam performance among middle school students in Florida (Bruening et al., 2015; Project Tomorrow, 2019). A recent study found that Vocabulary.com usage helped boost Missouri standard proficiency rates among high school students, and increased Vocabulary.com usage was associated with greater learning gains (Vocabulary.com, 2023). Furthermore, a qualitative study has demonstrated the benefits of Vocabulary.com's gamification approach to word learning among high school students in New York (Abrams & Walsh, 2014).

## Study purpose

The goal of the present study was to examine the effect of increased Vocabulary.com usage on reading and writing achievement among high school students in 10th through 12th grade, as measured by the PSAT/SAT Evidence-Based Reading and Writing (EBRW). Specifically, we investigated the following research question:

> **Usage effects of Vocabulary.com:** Controlling for baseline performance and demographic characteristics, how did the amount of Vocabulary.com usage relate to students' reading and writing performance, as measured by the PSAT/SAT EBRW?

## Data sources

**Assessment and Demographic Data.** We obtained students' PSAT/SAT EBRW performance data between Spring 2023 and Fall 2024 from a high school in New Jersey. Each student from 10th through 12th Grade had a pretest score on the PSAT or SAT, which served as the baseline, and a posttest score on the PSAT or SAT, which was used to examine the impact of Vocabulary.com usage. Table A1 (Appendix A) shows details of students' pretest and posttest measures. In addition, the school provided student-level demographic data, including students' gender, race/ethnicity, English language learner (ELL) status, special education status, and economically disadvantaged status.

**Vocabulary.com Usage Data.** We obtained Vocabulary.com usage data from Vocabulary.com's internal database. When students practice on Vocabulary.com, they answer questions covering various definitions of a word. When students answer enough questions correctly, the word becomes "mastered" and students are rewarded with a 1,000-point bonus. The amount of time it takes to master a word depends on several factors such as the number of meanings a word has, the number of questions students answer correctly or incorrectly, and the number of words students are learning at the same time. Descriptive statistics of students' weekly Vocabulary.com usage for the analyzed sample are presented in Table 1.

**Table 1. Descriptive Statistics of Students' Weekly Vocabulary.com Usage**

| Weekly usage | *M* | *SD* | Min | Max |
|---|---|---|---|---|
| Words mastered | 3.95 | 2.34 | 0.42 | 13.43 |
| Questions answered | 58.00 | 28.62 | 11.84 | 167.71 |
| Time spent (in minutes) | 19.85 | 10.14 | 1.88 | 58.55 |

*Note.* *M* = mean, *SD* = standard deviation

## Participants

We included data from students with any amount of Vocabulary.com usage during the study period as well as non-missing demographic and assessment data. Prior to analysis, we removed outliers ($n$ = 12) that had Vocabulary.com usage further than ±3 standard deviations from the mean. The final sample size comprised a total of 255 students in 10th through 12th grade. In the sample analyzed, 7% of the students were female[1], 93% were racial minorities, 59% were economically disadvantaged, and 13% were receiving special education support. See Table A2 (Appendix A) for means and standard deviations of students' PSAT/SAT EBRW achievement.

## Analysis

We specified a multiple regression model to test the effect of Vocabulary.com usage on reading and writing achievement. The model regressed posttest PSAT/SAT EBRW on the number of words mastered per week and the following covariates: pretest PSAT/SAT EBRW (i.e., baseline performance), gender, race, special education status, and economically disadvantaged status.

Each effect is accompanied by a test of statistical significance (i.e., a $p$-value). The $p$-value is the probability of observing the current or more extreme data, assuming the effect is zero (Cohen, 1994). The smaller the $p$-value, the less likely it is that the result occurred at random; $p$-values less than .05 are considered statistically significant. We also report a standardized regression coefficient (β) for each analysis to gauge the practical significance of Vocabulary.com usage relative to the effects of the covariates.

## Results

We found a statistically significant positive association between the number of words mastered per week and posttest PSAT/SAT EBRW performance. Figure 1 shows the expected score improvement in PSAT/SAT EBRW with additional words mastered. Specifically, with each additional word mastered on Vocabulary.com per week, students' PSAT/SAT EBRW scores would be expected to increase by 3.44 points ($b$ = 3.44, $p$ < 0.5). If students mastered five more words per week on Vocabulary.com, their PSAT/SAT EBRW score would increase by 17.2 points. Full model results are presented in Appendix B.

[1] *The school from which the student sample was collected serves primarily male students.*

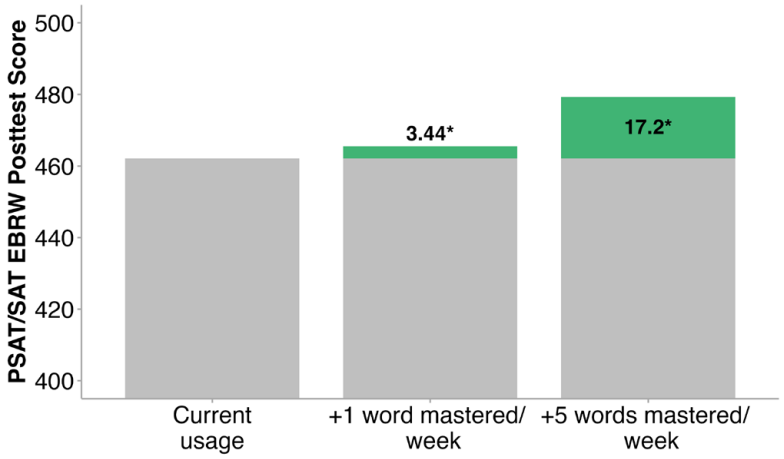


*Figure 1. Predicted usage effect of Vocabulary.com*

## Conclusion

In this study, we examined the effect of Vocabulary.com usage on high school reading and writing achievement, as measured by the PSAT/SAT EBRW. Controlling for baseline performance and student demographics, we found that the more words students mastered on Vocabulary.com, the better their PSAT/SAT EBRW performance. These results add to the body of research showing that Vocabulary.com is an effective platform that helps students systematically improve their vocabulary (e.g., Abrams & Walsh, 2014; Bruening et al., 2015; Project Tomorrow, 2019; Zimmer, n.d.).

Based on the current study and prior research, using Vocabulary.com can help boost high school students' reading and writing skills and empower students to unlock their full academic potential. Regardless of their current levels, Vocabulary.com provides students with opportunities to further expand their vocabulary and increase their test scores. With Vocabulary.com's test prep programs, students can study smarter and focus on the words they need to know for test day and beyond. Vocabulary.com's adaptive, targeted learning activities can help students achieve their best score on standardized tests such as the SAT/PSAT, ACT, GRE, and TOEFL.

## References


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# Appendix A: Achievement Measures and Descriptive Statistics

**Table A1.** **Pretest and Posttest Measures**

| SY 2023-24 | Grade 10 | Grade 11 | Grade 12 |
|---|---|---|---|
| **Pretest** | Fall 23 PSAT | Fall 23 PSAT | Spring 23 SAT |
| **Posttest** | Fall 24 PSAT | Spring 24 SAT | Fall 23 SAT |

*Note.* SY = school year. The SAT Suite uses a common score scale for the total and section scores. The ranges for PSAT and SAT reflect grade-level appropriateness within the common score scale. See this College Board guide for details.

**Table A2.** **Means (Standard Deviations) of Students' PSAT/SAT EBRW Achievement**

| SY 2023-24 | Grade 10 (*n* = 124) | Grade 11 (*n* = 69) | Grade 12 (*n* = 62) |
|---|---|---|---|
| **Pretest** | 444.35 (84.67) | 442.32 (70.92) | 500.97 (79.69) |
| **Posttest** | 472.58 (86.38) | 481.01 (74.64) | 503.87 (82.83) |

*Note.* SY = school year.

## Appendix B: Full Multiple Regression Model Results

| Predictor | *b* | *SE* | 95% CI | β | *t* | *p* |
|---|---|---|---|---|---|---|
| (Intercept) | 465.81 | 11.93 | 442.31 – 489.31 | -0.20 | 39.03 | < .001 |
| Pretest PSAT/SAT EBRW[1] | 0.81 | 0.04 | 0.74 – 0.89 | 0.82 | 21.27 | < .001 |
| Gender: male[2] | 12.68 | 11.71 | -10.38 – 35.7 | 0.15 | 1.08 | 0.280 |
| Race: White[3] | 19.99 | 11.92 | -3.48 – 43.46 | 0.24 | 1.68 | 0.095 |
| Economically disadvantaged[4] | 3.50 | 6.30 | -8.91 – 15.91 | 0.04 | 0.56 | 0.579 |
| Special education support[5] | 10.84 | 9.40 | -7.66 – 29.35 | 0.13 | 1.15 | 0.250 |
| **Words mastered per week[1]** | **3.44** | **1.34** | **0.81 – 6.07** | **0.10** | **2.57** | **0.011** |

*Note.* Dependent variable: posttest PSAT/SAT EBRW score. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.

[1] Grand-mean centered

[2] Dummy coded; female students as reference group.

[3] Dummy coded; racial minority students as reference group.

[4] Dummy coded; students who are not economically disadvantaged as reference group.

[5] Dummy coded; students who are not receiving special education support as reference group.