Relating ACT Writing Scores to First-Year English Composition Grades

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Introduction

The optional ACT® writing test is designed to measure students' writing skills – specifically, those skills emphasized and acquired in high school English classes and important for success in entry-level college composition courses. The test was first introduced in 2005, and in fall 2015, a number of enhancements to the former version were introduced. The enhancements included redesigning the writing prompts, extending the testing time from 30 minutes to 40 minutes, and using an analytical rubric on four writing domains for scoring instead of using a holistic six-point rubric. For the latter enhancement, the two independent trained readers assigned to the essay now use a six-point scoring rubric for each of the four domains evaluated; the domains include Ideas and Analysis, Development Support, Organization, and Language Use and Conventions (ACT, 2019; pp. 3.15 – 3.22).[1] Each writing domain score is calculated as the sum of the two readers' ratings for the domain with the rounded average of the four domain scores being reported as the enhanced ACT writing score. Information from the enhanced ACT writing test aims to inform postsecondary institutions about students' ability to think critically about an issue, consider different perspectives on it, and compose an effective argumentative essay in a timed condition.

By design, one purpose of the essay is to identify students' strengths and weaknesses in writing so that they can skill up in areas in need of improvement while there is still time to do so in high school. Another purpose is to help postsecondary institutions inform college course placement decisions for writing-intensive courses and identify students placed into a standard-level English Composition course that may benefit from additional academic supports and services. Empirical evidence exists supporting the use of the former ACT writing test, as well as showing the incremental value of using ACT writing scores with ACT English scores, for these purposes (ACT, 2009). Given the recent enhancements to the ACT writing test, there is a need to revisit these topics.

With this background in mind, the objective of the current study was to examine the validity of using the enhanced ACT writing test for predicting grades in a first-year college English Composition course, alone and in combination with other measures including the ACT English score and high school grade point average (HSGPA). Two types of evidence were evaluated: (a) statistical measures of the overall strength of the relationship between the predictors and course grades and (b) decision-based statistics such as accuracy and success rates for identifying students likely to achieve a specific grade or higher in the

course. The following questions were addressed in this study:

1. Do students with higher ACT writing scores perform better in a first-year college English Composition course?
2. Does the ACT writing score enhance the prediction of grades earned in a first-year college English Composition course, above ACT English score and HSGPA?

Data and Methods

Study Sample

The study sample was comprised of 6,477 students from the 2016 freshman cohort who took the enhanced ACT writing test during the 2015-2016 academic year as a senior in high school and a first-year credit-bearing English Composition I course during their freshman year in college. Students were also required to have an ACT English score and a HSGPA.[2] Students were from 28 different postsecondary institutions that had participated in research services offered by ACT and had a minimum of 35 students meeting the study inclusion criteria. All but one of the institutions was a four-year institution. Three-fourths were public institutions, nearly two-thirds (64%) had total enrollments of 10,000 or more, 86% had selective or traditional admissions policies, and 89% were from the Midwest and Southern census regions.[3]

Female students made up more than one-half (57%) of the sample, and nearly one-fourth (23%) were racial/ethnic minority students, primarily African American (15%) and Hispanic (8%). Students from other underserved learner groups were also represented in the sample. Of those providing the corresponding information, 10% indicated that their parents had no college experience, 18% indicated that their annual family income was less than $36,000, and 5% indicated that English was not the most frequently spoken language at home.[4]

Measures

Outcomes. The course grades earned in the English Composition course were provided by institutions under a plus-minus grading system and were coded as 0.0 (for an F) through 4.0 (for an A), or as a withdrawal. In some analyses, the course grade outcome was treated as a continuous outcome. In other analyses, course grades were dichotomized to examine course success rates using three different criteria levels that included earning an A grade, a B or higher grade, or a C or higher grade. The 19 students with a withdrawal grade were treated as an unsuccessful event in the course success rate analyses, but they were not included in the analyses that examined course grades as a continuous outcome.

Predictors. The predictors included in this study were students' ACT writing scores, ACT English scores, and self-reported HSGPAs. The ACT writing score was the rounded average of the four ACT writing domain scores and ranged from 2 to 12. The ACT English score ranged from 1 to 36 and represented the score obtained from the multiple-choice ACT English test. HSGPA was based on students' self-reports of their coursework taken in up to 23 specific courses in English, mathematics, social studies, and science, and the grades earned in those courses. Prior studies have shown that students report high school coursework and grades accurately relative

to information provided in their transcripts (Sanchez & Buddin, 2016).

Analyses were also conducted using English HSGPA, as well as scores from the ACT writing test that are placed on a 1 to 36 scale, equated across test forms, and computed for the purpose of contributing to students' ACT English Language Arts (ELA) scores (ACT, 2019, pp. 9.3-9.4).[5] Results based on these alternative predictors were not provided in this report as they were found to be comparable to those reported for overall HSGPA and for the 2 to 12 ACT writing score currently provided to students and institutions on ACT score reports or in data files.

Analyses

Because students were nested within institutions, hierarchical linear regression models were used to relate the predictors (ACT scores and HSGPA) to English Composition course grades, and hierarchical logistic regression models were used for the various dichotomous success criteria. Given the variation that can exist in course content and grading standards across institutions, the intercept and slopes of the predictors were allowed to vary across institutions. The predictors included in the models were standardized to have a mean of zero and a standard deviation of one according to the overall statistics of the primary study sample. The standardized regression coefficients for each predictor are reported across the seven models estimated and provide information about the relative strength of the predictors in relation to the outcome. Model 1 included ACT writing score, model 2 included ACT English score, model 3 included HSGPA, model 4 included ACT writing and English scores, model 5 included ACT writing score and HSGPA, model 6 included ACT English score and HSGPA, and model 7 included all three predictors.

To further examine the predictive and incremental validity of using the ACT writing score to estimate students' English Composition course grade, the multiple correlation (*R*) was computed. The multiple *R* provides a measure of the strength of the relationship between the predictors and the continuous course grade outcome. It ranges between 0 and 1. A higher value indicates better prediction. Multiple R values were computed for each institution.

Because ACT scores and HSGPA are often used to help select students who are academically ready for college courses, multiple *R* values that corrected for range restriction in the variances of the predictors were also computed. The Pearson-Lawley's multivariate correction procedure described by Sackett and Yang (2000) was utilized to obtain these corrected values. Institution-specific applicant pools were approximated and utilized to estimate the unrestricted population variance-covariance matrix of the predictors. The applicant pool for an institution was comprised of enrolled students as well as non-enrolled students who sent scores to the institution during the same time period as the enrolled cohort; all students included in the applicant pools had taken the optional enhanced ACT writing test, the ACT English test, and had a HSGPA value available. The total applicant pool for this study was comprised of 96,197 students, and some students belonged to more than one applicant pool as they had sent scores to more than one institution included in this study.[6] The multivariate correction procedure was conducted using the *mv.correction* function within the R

Selection package (Birnbaum, Paulson, & Andrews, 1950).

To further examine the predictive and incremental validity of using the ACT writing score to estimate a student's chances of earning a specific grade or higher in their English Composition course, the following four validity measures were computed: logistic *R*, maximum accuracy rate (AR), the increase in maximum accuracy rate (ΔAR), and maximum success rate (SR). Logistic *R* is the standard deviation of the estimated logit function and it measures the overall predictive strength of the logistic model (Allen & Le, 2008). The higher the logistic *R*, the stronger the relationship is between the predictors and chances of earning the specific grade or higher in the course. The logistic *R* was estimated for each institution using the institution's applicant pool.

Based on the predictors for each student, a probability of earning a specific grade or higher in the course at the institution attended can be estimated from the logistic regression model. These estimated probabilities might be used to identify students who could benefit from additional academic supports to achieve a specific grade or higher in the course. For example, students with an estimated probability below 0.50 might be identified as those who could benefit from additional academic supports to achieve the specific outcome in the course (e.g., a B or higher grade).

The AR represents the percentage of correct classifications and is calculated as the sum of (a) the percentage of students who will earn the specific grade or higher and are predicted to achieve the specific outcome and (b) the percentage of students who will not obtain the specific grade and are predicted to not achieve the specific grade. It can be shown that if the probability function crosses 0.50 within the observed range of the predictor, then the AR is maximized when a 0.50 probability is used for making the classifications (referred to as the maximum AR; Sawyer, 1996), that is, when students with a 0.50 or higher probability are classified as likely to achieve the specific grade outcome, and those with a probability lower than 0.50 are classified as not likely to achieve the specific grade outcome.

The corresponding maximum ΔAR is the increase in the percentages of correct classifications when the prediction model is used as compared to expecting all students to achieve the specific outcome, and the corresponding maximum SR is an estimate of the percentage of students who achieve the specific grade criteria among those expected to achieve the outcome. The maximum AR, ΔAR, and SR were estimated for an individual institution only in cases when the institution's probability function crossed 0.50 (referred to as having a "viable" probability model for which the maximum AR can be estimated). Similar to the calculation of the corrected correlation coefficients and logistic *R* values, these statistics were estimated for the institution's applicant pool. For more details on the theoretical basis of the maximum AR, ΔAR, and SR and how they are computed, the reader is referred to pages 11.39 to 11.42 of the ACT Technical Manual (ACT, 2019).

To aggregate and summarize over the institution-specific results, the median (i.e., the 50th percentile), the 25th percentile, and the 75th percentile for each statistical measure examined in this study (e.g., multiple *R*, logistic *R*, AR) were computed to get a sense of the typical value and the range of the middle 50% of values across

institutions. Both unweighted and weighted analyses were used to summarize across institutions. In the unweighted analyses, each institution contributed equally to the results. In the weighted analyses where weights were assigned as the number of students at the institution divided by the total number of students in the analyses, institutions with a larger number of students contributed more to the results.

Results

Descriptive Statistics of Sample and Applicant Pool

Table 1 provides descriptive statistics on the predictors and the course grade outcome summarized across institutions for the course sample and for the applicant pool sample. For each predictor, the typical average value was somewhat comparable between the two samples. The typical standard deviation across institutions was slightly smaller in the course sample than in the applicant pool (1.4 vs. 1.5 for ACT writing score, 4.3 vs. 5.5 for ACT English score, and 0.45 vs. 0.50 for HSGPA). The three predictors were moderately correlated with one another in the applicant pool, ranging from .312 between ACT writing score and HSGPA to .490 between ACT writing and ACT English scores. The typical correlations between the predictors were lower in the course sample. The typical percentage of students earning a B or higher grade in the English Composition course was 75%, but this percentage did vary across institutions (from the lower quartile [Q1] of 67% to the upper quartile [Q3] of 81%). A majority of the students earned a C or higher grade in the course (median percentage = 91% across institutions).

Table 1. Descriptive Statistics on the Predictor and Course Grade Information Summarized across Institutions by Sample

	Course sample			Applicant pool sample		
Predictor and Grade Info	**Q1**	**Median**	**Q3**	**Q1**	**Median**	**Q3**
Average ACTW	6.4	6.8	7.2	6.4	6.8	7.1
Average ACTE	19.7	21.7	23.4	19.7	21.5	23.6
Average HSGPA	3.25	3.34	3.44	3.31	3.40	3.48
Correlations between predictors						
ACTW and ACTE	.271	.341	.390	.452	.490	.511
ACTW and HSGPA	.093	.160	.262	.277	.312	.337
ACTE and HSGPA	.149	.243	.365	.401	.440	.466
Average course grade	2.82	3.04	3.21			
% earning A	19	33	46			
% earning B or higher	67	75	81			
% earning C or higher	87	91	94			
Sample size	50	121	321	422	2,130	6,125

Note. Based on 28 participating institutions. Q1 = 25th percentile, and Q3 = 75th percentile. ACT writing score ranged from 2 to 12, and ACT English score ranged from 1 to 36. ACTW = ACT writing score. ACTE = ACT English score. HSGPA = high school grade point average.

Relationship with Course Grade

As illustrated in Figure 1, the ACT writing score was positively related to the grade students earned in their English Composition course. The estimated course grade for students with an ACT writing score of 4 was 2.66 (around a C+) at a typical institution. In comparison, students with an ACT writing score of 7, 9, and 12 were estimated to earn a grade of 3.09 (around a B), 3.37 (around a B+), and 3.79 (between an A- and A), respectively.

Even when one or both of the other two predictors were added to the model, the ACT writing score was found to be a significant predictor of the grade students earned in their English Composition course (see Table 2; *p* value < 0.0001).The standardized coefficient for ACT writing score from the hierarchical linear models was similar to or slightly higher than that for ACT English score and lower than that for HSGPA.

Figure 1. Estimated English Composition Course Grade as a Function of ACT Writing Score at a Typical Institution

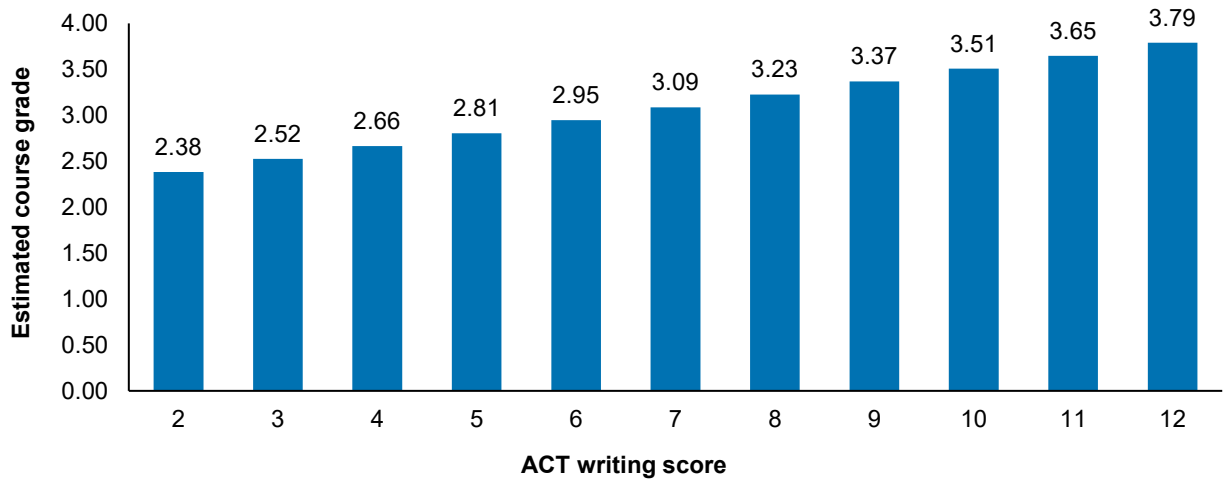


Table 2. Standardized Linear Regression Coefficients across the Models

	Estimate (standard error)			
Model	Intercept	ACT writing	ACT English	HSGPA
1	3.114 (0.048)	0.211 (0.028)		
2	3.119 (0.050)		0.193 (0.023)	
3	3.123 (0.047)			0.289 (0.026)
4	3.150 (0.046)	0.164 (0.026)	0.138 (0.021)	
5	3.165 (0.042)	0.151 (0.022)		0.261 (0.024)
6	3.162 (0.044)		0.119 (0.018)	0.260 (0.025)
7	3.182 (0.041)	0.127 (0.021)	0.080 (0.016)	0.247 (0.024)

Note. Based on 28 participating institutions. p values for the intercept and all predictors in each model were <0.0001. The predictors were grand-mean centered and standardized to have a mean of 0 and standard deviation of 1 according to the following grand means (standard deviations) from the course sample: 7.2 (1.5) for ACT writing, 23.5 (5.3) for ACT English, and 3.47 (0.44) for HSGPA. Estimated variances across institutions of standardized linear regression coefficients are provided in Table A1 of the Appendix. HSGPA = high school grade point average.

To further illustrate the incremental value of adding ACT writing scores to the prediction model, Table 3 provides the typical uncorrected and corrected multiple correlations across institutions associated with the various prediction models based on unweighted and weighted analyses. When ACT writing score was added to the model that included ACT English score and HSGPA, the typical multiple correlation across institutions in the course sample increased from .324 to .349 in unweighted analyses and from .307 to .342 in weighted analyses. When corrections for range restriction in the predictors were applied using the applicant pool sample, the corresponding typical multiple correlation across institutions increased from .412 to .433 in unweighted analyses and from .418 to .424 in weighted analyses.

Table 3. Multiple Correlations (Uncorrected and [Corrected]) across Institutions for Predicting English Composition Course Grade

Model	Predictors	Unweighted analyses			Weighted analyses		
		Q1	Median	Q3	Q1	Median	Q3
		Single-predictor models					
1	ACTW	.107 (.185)	.179 (.260)	.287 (.336)	.104 (.140)	.167 (.246)	.206 (.296)
2	ACTE	.118 (.211)	.179 (.301)	.237 (.347)	.121 (.207)	.178 (.306)	.214 (.328)
3	HSGPA	.198 (.256)	.267 (.358)	.385 (.433)	.197 (.262)	.271 (.361)	.311 (.428)
		Multiple-predictor models					
4	ACTW + ACTE	.171 (.278)	.245 (.333)	.380 (.398)	.142 (.208)	.213 (.319)	.242 (.366)
5	ACTW + HSGPA	.255 (.302)	.331 (.414)	.451 (.507)	.207 (.267)	.327 (.412)	.339 (.457)
6	ACTE + HSGPA	.219 (.289)	.324 (.412)	.417 (.470)	.214 (.284)	.307 (.418)	.341 (.451)
7	ACTW + ACTE + HSGPA	.297 (.329)	.349 (.433)	.458 (.513)	.224 (.293)	.342 (.424)	.354 (.479)

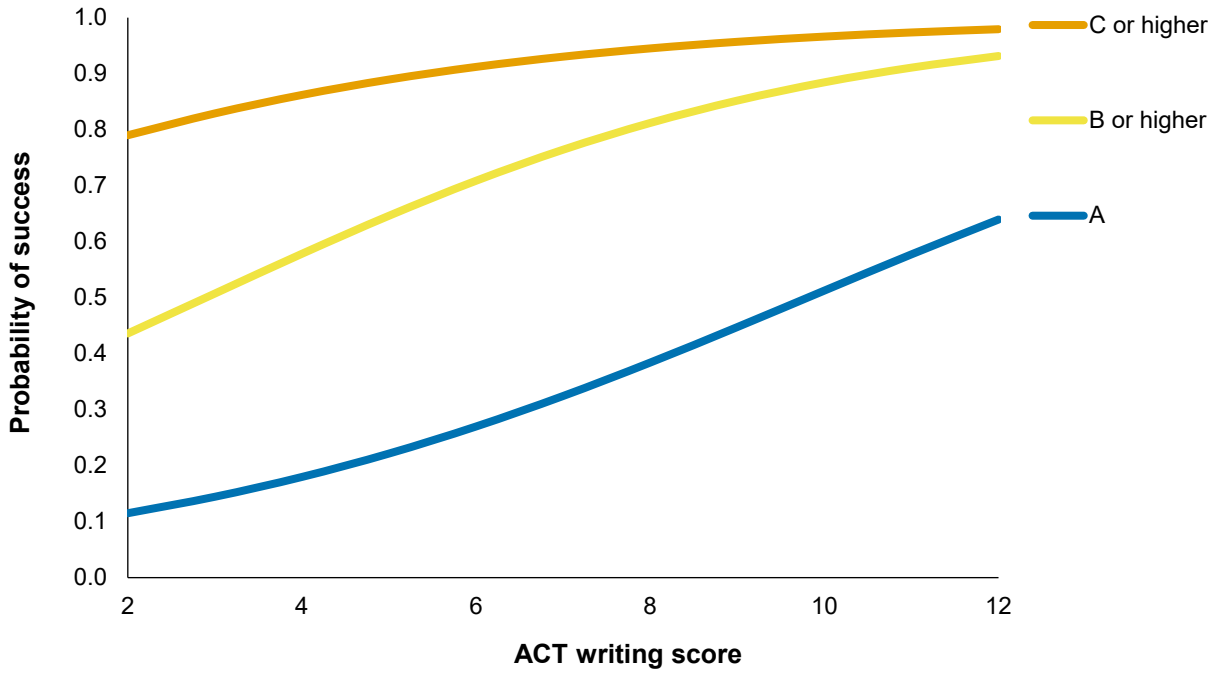
Note. Based on 28 participating institutions. Q1 = 25th percentile, and Q3 = 75th percentile. ACT writing score ranged from 2 to 12, and ACT English score ranged from 1 to 36. In the weighted analyses, institutions with larger numbers of students were assigned larger weights (i.e., number of students at institution divided by total number of students in analysis). Corrected correlations shown in parentheses were corrected for multivariate range restriction using the institution's applicant pool as the unrestricted population. ACTW = ACT writing score. ACTE = ACT English score. HSGPA = high school grade point average.

Relationship with a Student's Chances of Earning a Specific Grade or Higher

Regression models and coefficients. As illustrated in Figure 2, ACT writing score was positively related to a student's chances of earning a B or higher grade in their college English Composition course. The chances increased from 44% for those with an ACT writing score of 2 to 93% for those with a score of 12. Results for earning an A grade and for earning a C or higher grade are also provided in the figure.

When the ACT writing score was used alone or in combination with the other two predictors to estimate students' chances of earning a specific grade or higher in a college English Composition course, the standardized logistic regression coefficient for ACT writing score was significantly different from zero (see Table 4; each $p < 0.01$ across models and outcomes). Based on the model that included all three predictors (labeled Model 7), the standardized coefficient was smaller for ACT writing score than for ACT English score for the A outcome, but it was more comparable between the two predictors for the B or higher outcome and it was larger for the C or higher outcome. For this latter outcome, the ACT English score was not a significant predictor when one of the other predictors was included in the model. This result is likely due to the relatively high percentage of students earning a C or higher grade in English Composition and the predictors being moderately correlated.

Figure 2. The Probability of Success in a College English Composition Course by ACT Writing Score at a Typical Institution



Interestingly, as the criterion level increased (from a C or higher to an A) so did the predictive strength of ACT English score (as measured by the standardized logistic regression coefficient). In comparison, the predictive strength of ACT writing score and HSGPA did not change much across the criterion levels, especially for HSGPA. Having said that, the standardized coefficients for both ACT writing and ACT English scores were smaller than that for HSGPA across all models and outcomes.

Table 4. Standardized Logistic Regression Coefficients across Logistic Regression Models of Earning a Specific Grade or Higher in English Composition

Model	Estimate (standard error)			
	Intercept	ACT writing	ACT English	HSGPA
		A grade		
1	-0.681 (0.147)	0.392 (0.049)		
2	-0.603 (0.154)		0.516 (0.059)	
3	-0.665 (0.152)			0.587 (0.036)
4	-0.581 (0.158)	0.263 (0.043)	0.427 (0.061)	
5	-0.614 (0.159)	0.323 (0.046)		0.549 (0.037)
6	-0.565 (0.164)		0.393 (0.058)	0.510 (0.038)
7	-0.548 (0.168)	0.235 (0.042)	0.317 (0.060)	0.497 (0.038)
		B or higher grade		
1	1.233 (0.107)	0.430 (0.059)		
2	1.268 (0.105)		0.460 (0.055)	
3	1.306 (0.107)			0.596 (0.058)
4	1.329 (0.101)	0.324 (0.058)	0.346 (0.050)	
5	1.393 (0.102)	0.332 (0.052)		0.548 (0.056)
6	1.407 (0.102)		0.324 (0.051)	0.534 (0.058)
7	1.447 (0.103)	0.269 (0.053)	0.233 (0.049)	0.512 (0.057)
		C or higher grade		
1	2.643 (0.172)	0.380 (0.076)		
2	2.596 (0.176)		0.252 (0.085)	
3	2.769 (0.169)			0.574 (0.053)
4	2.675 (0.169)	0.334 (0.078)	0.133 (0.089)*	
5	2.853 (0.164)	0.274 (0.071)		0.536 (0.054)
6	2.793 (0.166)		0.088 (0.092)*	0.558 (0.055)
7	2.842 (0.162)	0.267 (0.073)	-0.006 (0.095)*	0.537 (0.055)

Note. Unless denoted with *, *p* values for the intercept and all predictors in each model were < 0.01. * means that *p* value > 0.05. The predictors were grand-mean centered and standardized to have a mean of 0 and standard deviation of 1 according to the following grand means (standard deviations) from the course sample: 7.2 (1.5) for ACT writing, 23.5 (5.3) for ACT English, and 3.47 (0.44) for HSGPA. Estimated variances across institutions of standardized logistic regression coefficients are provided in Table A1. HSGPA = high school grade point average.

To help assess the fit of the logistic regression models and the incremental benefit of using multiple measures to estimate a student's chances of success, Table 5 provides results on the logistic R across the models for the B or higher outcome.

The logistic R or predictive strength measure was highest when all three predictors were included in the model. This result was seen for both the unweighted and weighted analyses and for the A grade outcome (results not shown).

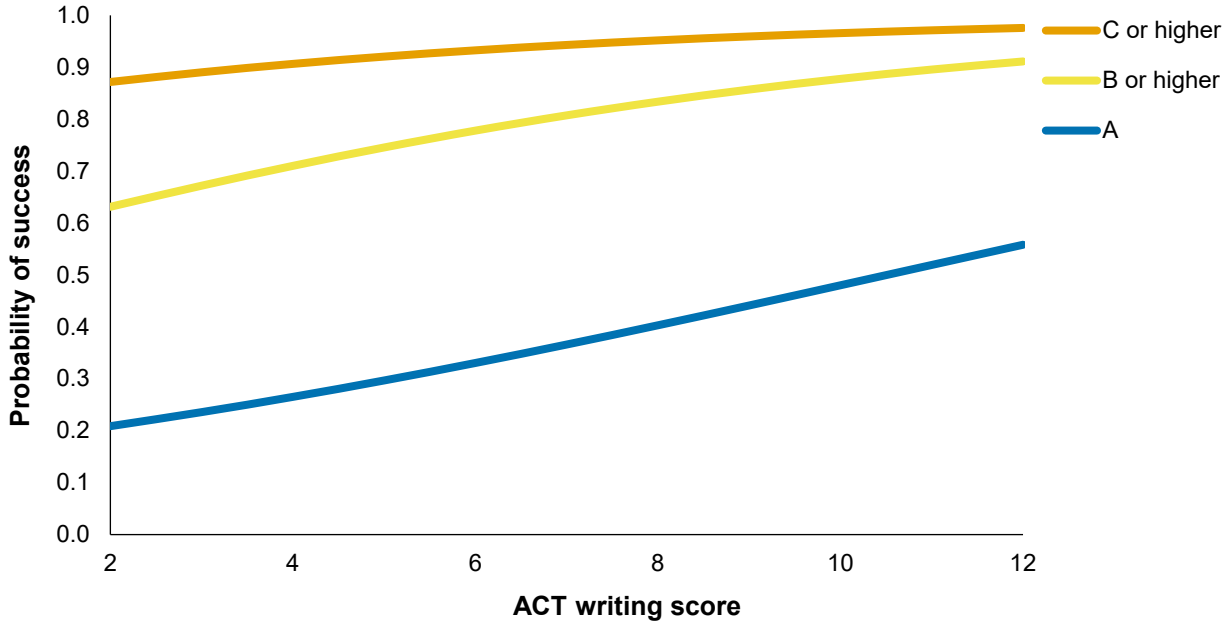
Figure 3 further illustrates that the ACT writing score helps to differentiate the chances of success among students with the same ACT English score and HSGPA. Specifically, the example provides the chances of earning a specific grade or higher in English Composition as a function of ACT writing score for students with an ACT English score of 24 and a HSGPA of 3.47 (the approximate course sample mean values). The conditional probabilities of success for earning a B or higher grade range from 0.63 to 0.91 across the Writing scale from 2 to 12.

Table 5. Overall Predictive Strength, Logistic *R* across Institutions for Logistic Regression B or Higher Course Grade Models

Model	Predictors	Unweighted analyses			Weighted analyses		
		Q1	Median	Q3	Q1	Median	Q3
	Single-predictor models						
1	ACTW	0.339	0.396	0.456	0.335	0.349	0.403
2	ACTE	0.318	0.362	0.446	0.310	0.348	0.382
3	HSGPA	0.463	0.588	0.711	0.407	0.445	0.584
	Multiple-predictor models						
4	ACTW + ACTE	0.418	0.463	0.549	0.366	0.441	0.505
5	ACTW + HSGPA	0.566	0.652	0.792	0.523	0.569	0.657
6	ACTE + HSGPA	0.527	0.635	0.774	0.487	0.511	0.641
7	ACTW + ACTE + HSGPA	0.590	0.680	0.837	0.533	0.592	0.686

Note. Based on 28 participating institutions. Q1 = 25th percentile, and Q3 = 75th percentile. ACT writing score ranged from 2 to 12, and ACT English score ranged from 1 to 36. In the weighted analyses, institutions with larger numbers of students were assigned larger weights (i.e., number of students at institution divided by total number of students in analysis). ACTW = ACT writing score. ACTE = ACT English score. HSGPA = high school grade point average. The logistic R measures the overall predictive strength of the model and is defined as the standard deviation of the estimated logit function. The higher the logistic R, the stronger the relationship is between the predictors and the chances of earning the specific grade or higher in the course.

Figure 3. The Conditional Probability of Success in a College English Composition Course by ACT Writing Score at a Typical Institution for Students with an ACT English Score of 24 and a HSGPA of 3.47



Decision-based statistics. Table 6 provides the typical maximum AR, ΔAR, and SR for the single-predictor models for the A and B or higher outcomes. The lower and upper quartiles (from Q1 to Q3) for these measures are provided in Table A2 in the Appendix. Results are provided for the 16 institutions that had viable models (i.e., the probability functions crossed 0.50) for all three predictors. Results are not reported for the C or higher outcome because of the small number of viable models.[7]

For the A outcome, the typical maximum AR and SR were lower for the ACT writing score than for the other two predictors; these measures were more comparable between ACT English score and HSGPA. In comparison, for the other outcome of earning a B or higher grade, the typical maximum AR and SR for the ACT writing score found in this study were similar to those for the ACT English score from this study and in another earlier study of 215 postsecondary institutions (ACT, 2019, Table 11.25). For this same outcome, the typical ΔAR for the ACT writing and English scores was relatively small (less than 1 percentage point) and was somewhat smaller than that reported for HSGPA in this study (about 3 percentage points) and for ACT English score from an earlier study (ACT, 2019, Table 11.25; 2 percentage points). For each predictor, the typical ΔAR associated with using the predictors was higher for the A outcome than it was for the B or higher outcome.

Table 6. Median Maximum Accuracy Rates (AR), Increase in Accuracy Rates (ΔAR), and Success Rates (SR) across Institutions for Single-Predictor Logistic Regression Course Grade Models

Model	Predictors	Unweighted analyses			Weighted analyses		
		AR	ΔAR	SR	AR	ΔAR	SR
		A grade					
1	ACTW	59.4	15.5	56.6	59.3	12.1	55.5
2	ACTE	62.3	18.0	58.4	62.1	15.1	59.5
3	HSGPA	63.2	17.4	58.6	63.3	16.8	58.3
		B or higher grade					
1	ACTW	66.9	0.5	67.6	68.5	0.1	68.7
2	ACTE	66.9	0.3	67.5	68.2	0.2	68.7
3	HSGPA	71.1	2.8	71.8	70.1	1.3	71.3

Note. Based on 16 out of the 28 participating institutions that had viable models (i.e., probability curves that crossed 0.50) for all three predictors. In the weighted analyses, institutions with larger numbers of students were assigned larger weights (i.e., number of students at institution divided by total number of students in analysis). ACTW = ACT writing score. ACTE = ACT English score. HSGPA = high school grade point average. The corresponding interquartile ranges (from Q1 to Q3) for these measures are provided in Table A2 in the Appendix.

Table 7 provides the typical decision-based statistics for two of the multiple-predictor models that allow for the examination of the incremental value associated with adding ACT writing scores to the model that includes ACT English scores and HSGPA. These two models were focused on because they were associated with the largest number of institutions with viable models (24 for the A outcome and 26 for the B or higher outcome). For both outcomes, there were small incremental increases of nearly 1 percentage point in the typical maximum AR, ΔAR, and SR.

These findings are consistent with other studies that have examined the incremental change in the typical maximum AR when a cognitive measure is added to a model that already includes another cognitive measure for predicting students' chances of earning a B or higher grade in English Composition (ACT, 2019, Table 11.26; Westrick & Allen, 2014, Tables 7-9). In general, English courses tend to have higher percentages of students earning a B or higher grade, leading to smaller increases in accuracy rates. This phenomenon occurs regardless of the predictor being used.

Table 7. Median Maximum Accuracy Rates (AR), Increase in Accuracy Rates (ΔAR), and Success Rates (SR) across Institutions for Multiple-Predictor Logistic Regression Course Grade Models

Model	Predictors	Unweighted analyses			Weighted analyses		
		AR	ΔAR	SR	AR	ΔAR	SR
		A grade					
6	ACTE + HSGPA	68.4	24.7	58.9	67.1	22.9	60.5
7	ACTW + ACTE + HSGPA	68.9	25.9	59.8	67.7	23.9	61.3
		B or higher grade					
6	ACTE + HSGPA	76.3	2.2	77.7	78.4	1.3	79.4
7	ACTW + ACTE + HSGPA	76.7	3.1	77.8	79.1	1.6	80.2

Note. Based on 24 (26) of the 28 participating institutions that had viable A (B or higher) grade models (i.e., probability curves that crossed 0.50) for the two models being compared in the table. In the weighted analyses institutions with larger numbers of students were assigned larger weights (i.e., number of students at institution divided by total number of students in analysis). ACTW = ACT writing score. ACTE = ACT English score. HSGPA = high school grade point average. The corresponding lower and upper quartiles (25th percentile - 75th percentile) for these measures are provided in Table A3 in the Appendix.

Conclusions

The current study provides validity evidence for using the enhanced ACT writing score to measure students' writing skills that are relevant for success in entry-level college English Composition courses. First, the study found that students with higher ACT writing scores earn higher grades on average than those with lower scores (Figure 1) and have greater chances of earning a specific grade (e.g., B or higher, or A grade) in the course (Figure 2). Moreover, ACT writing score was found to be moderately correlated with the grade earned in the course (Table 3) and to be reasonably accurate at classifying students likely to earn a specific grade or higher (Table 6). In comparison to the individual results for the other predictors considered in this study, the correlation coefficients and maximum ARs associated with the B or higher outcome for ACT writing score were generally similar to those for ACT English score, but the maximum ARs associated with the A outcome (excellent performance) were lower. This finding highlights how, in comparison to other predictors, the relative utility of a variable for accurately informing who is likely to succeed in the course can depend on the level of success being examined. This result was suggested by another study (Sawyer, 2013) that examined the usefulness of ACT Composite score and HSGPA for informing college admissions decisions; the study found that ACT Composite score performed better than HSGPA at greater success levels and worse at lower success levels.

In the current study, the correlation coefficients and maximum ARs associated with the A outcome or the B or higher

outcome from the single-predictor models were generally slightly higher for HSGPA than for both ACT scores. One explanation for the better HSGPA results is that HSGPA is not only affected by content mastery, as is generally the case for ACT test scores, but it is also affected by a student's academic behaviors, such as putting forth effort, participating in class, and completing homework assignments, that have also been found to be associated with students' chances of succeeding in college (Camara, O'Connor, Mattern, & Hanson, 2015).

From the multiple-predictor model results, ACT writing score was found to contribute incrementally to the prediction of the grade earned in English Composition, beyond HSGPA and ACT English score. More specifically, ACT writing score slightly improved the prediction of the grade earned above that when the other two predictors were used alone and in combination. For example, when ACT writing score was added to the models that included HSGPA and ACT English score, the typical percentage of explained variance in the grades earned in the course across institutions increased by 1 to 2 percentage points,[8] and the typical maximum AR across institutions associated with estimating a student's chances of earning a specific grade or higher in the course improved by about 1 percentage point. We acknowledge that the degree of improvement associated with ACT writing score was small, but this was expected given that: (a) the three predictors each measure academic achievement and were found to be moderately correlated with one another, and (b) a very high percentage of students earned a B or higher grade in the English Composition course (typical percentage was 75% across the institutions included in this study). But, as illustrated in Figure 3, small improvements in the multiple correlation or maximum ARs can be associated with meaningful differences in the predicted outcomes. Additionally, the logistic *R* measure suggested that the model that included all three predictors had the greatest predictive strength for estimating the likelihood of a student earning a specific grade or higher in the course. Taken together, these findings underscore the value of additional sources of information, such as ACT writing score, to gain a more holistic and personalized perspective of student readiness.

In conclusion, results from the study highlight the utility of the enhanced ACT writing score for helping to determine a student's readiness for a first-year, credit-bearing English Composition course. Postsecondary institutions and state agencies are encouraged to conduct local studies of this nature that examine the incremental benefit of using ACT writing scores to predict students' grades and their chances of earning a specific grade or higher in first-year English Composition courses offered on their campuses. Such information can provide insights on how to tailor academic services and supports in this area to best meet the needs of incoming freshmen.

Notes

1. If the readers' ratings disagree by more than one point, a third rater evaluates the essay and resolves the discrepancy.

2. Requiring students to have a HSGPA value reduced the sample size by 510 students, representing only 7% of the initial sample. This criterion did not change the number of institutions included in the study.

3. Characteristics for the postsecondary institutions were obtained from Integrated Postsecondary Education Data System (IPEDS), except for admissions selectivity. Admission selectivity was self-reported by institutions on the ACT Institutional Data Questionnaire as defined by the typical high school class ranks of their accepted freshmen: The majority of freshmen at highly selective schools are in the top 10%, selective in the top 25%, traditional in the top 50%, and liberal in the top 75% of their high school class (ACT, 2018). Institutions with open admissions policies accept all high school graduates to the limit of capacity. In terms of institutional admission policies, 25% were selective or highly selective, 61% were traditional, and 14% were liberal or open. In terms of census region, 7% were from the Northeast, 36% from the Midwest, 54% from the South, and 4% from the West.

4. Nearly all students provided their gender and race/ethnicity (seven missing for gender and two missing for race/ethnicity). Ninety percent of the students provided information about their parents' education levels and the primary language spoken at home, and 78% indicated their annual family income.

5. The comparability of the 2 to 12 writing test scores across forms is ensured by the prompt selection procedures (ACT, 2019, chapter 2), not by an equating process. Beginning in fall 2016, the 1 to 36 writing scale scores are not provided to students and institutions on ACT score reports or in data files.

6. The total number of records in the applicant pool was 106,428.

7. The results provided are based on the common set of institutions with viable models so that the comparisons are meaningful. The number of institutions with viable models varied by outcome and predictor. For the grade A outcome, 19 institutions had viable models based on ACT writing scores, 22 based on ACT English scores, and 16 based on HSGPA. For the grade B or higher outcome, 17 institutions had viable models based on ACT writing scores, 18 based on ACT English scores, and 27 based on HSGPA. For the grade C or higher outcome, 1 institution had a viable model based on ACT writing scores, 0 based on ACT English scores, and 16 based on HSGPA.

8. The percentage of variance explained by the model can be found by squaring the multiple correlation coefficient.

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Appendix

Table A1. Estimated Variances Across Institutions of Standardized Linear and Logistic Regression Coefficients

Model	Variance estimate (standard error)			
	Intercept	ACT writing	ACT English	HSGPA
Grade earned (continuous scale)				
1	0.056 (0.017)	0.015 (0.007)		
2	0.061 (0.019)		0.007 (0.004)*	
3	0.052 (0.016)			0.012 (0.005)
4	0.048 (0.015)	0.011 (0.006)*	0.004 (0.003)*	
5	0.041 (0.013)	0.007 (0.004)*		0.010 (0.005)
6	0.044 (0.014)		0.003 (0.003)*	0.012 (0.005)
7	0.039 (0.013)	0.006 (0.004)*	0.001 (0.002)*	0.010 (0.005)
A grade (dichotomized)				
1	0.544 (0.158)	0.013 (0.012)		
2	0.598 (0.174)		0.037 (0.021)	
3	0.590 (0.170)			--
4	0.625 (0.182)	0.003 (0.008)*	0.038 (0.022)	
5	0.640 (0.184)	0.010 (0.010)*		--
6	0.680 (0.197)		0.033 (0.021)*	--
7	0.713 (0.206)	0.003 (0.008)*	0.034 (0.022)*	--
B or higher grade (dichotomized)				
1	0.247 (0.081)	0.036 (0.021)		
2	0.231 (0.077)		0.023 (0.018)*	
3	0.249 (0.082)			0.043 (0.023)
4	0.204 (0.070)	0.031 (0.019)*	0.010 (0.016)*	
5	0.211 (0.072)	0.021 (0.014)*		0.038 (0.021)
6	0.209 (0.072)		0.012 (0.016)*	0.043 (0.023)
7	0.206 (0.071)	0.020 (0.014)*	0.004 (0.016)*	0.039 (0.022)
C or higher grade (dichotomized)				
1	0.643 (0.227)	0.032 (0.037)*		
2	0.688 (0.242)		0.062 (0.056)*	
3	0.622 (0.218)			--
4	0.591 (0.218)	0.027 (0.035)*	0.063 (0.057)*	
5	0.543 (0.199)	0.022 (0.031)*		--
6	0.561 (0.210)		0.078 (0.064)*	--
7	0.505 (0.196)	0.016 (0.029)*	0.079 (0.065)*	--

Note. p values < .05 unless denoted with *. The corresponding standardized linear regression coefficients for grade earned are provided in Table 2, and the standardized logistic regression coefficients for dichotomized outcomes are provided in Table 4. HSGPA = high school grade point average.

Table A2. Lower and Upper Quartiles for Accuracy Rates (AR), Increase in Accuracy Rates (ΔAR), and Success Rates (SR) across Institutions for Single-Predictor Logistic Regression Course Grade Models

Model	Predictors	Unweighted analyses			Weighted analyses		
		AR	ΔAR	SR	AR	ΔAR	SR
				A grade			
1	ACTW	57.7–63.9	10.1–21.2	54.1–58.6	57.7–61.9	9.9–17.1	54.6–58.4
2	ACTE	60.6–66.0	11.4–24.2	57.2–60.5	60.6–65.4	11.8–18.5	57.7–60.9
3	HSGPA	61.9–65.4	10.4–19.6	55.3–61.1	60.6–64.2	11.9–18.0	52.3–60.9
				B or higher grade			
1	ACTW	64.1–71.8	0.1–2.4	65.0–72.1	65.0–79.7	0.0–0.4	65.4–79.7
2	ACTE	64.1–71.4	0.1–1.7	65.0–72.4	65.2–78.9	0.0–0.6	65.7–78.9
3	HSGPA	67.5–76.1	1.2–5.3	68.6–77.6	67.1–78.2	0.7–2.9	68.4–78.7

Note. Based on 16 out of the 28 participating institutions that had viable models (i.e., probability curves that crossed 0.50) for all three predictors. In the weighted analyses, institutions with larger numbers of students were assigned larger weights (i.e., number of students at institution divided by total number of students in analysis). ACTW = ACT writing score. ACTE = ACT English score. HSGPA = high school grade point average. Numbers shown in table are Q1 (25th percentile) – Q3 (75th percentile).

Table A3. Lower and Upper Quartiles for Accuracy Rates (AR), Increase in Accuracy Rates (ΔAR), and Success Rates (SR) across Institutions for Multiple-Predictor Logistic Regression Course Grade Models

Model	Predictors	Unweighted analyses			Weighted analyses		
		AR	ΔAR	SR	AR	ΔAR	SR
				A grade			
6	ACTE + HSGPA	65.1–76.4	17.0–51.6	57.9–64.2	64.8–76.3	19.7–50.9	58.0–65.2
7	ACTW + ACTE + HSGPA	66.1–76.8	17.4–52.2	58.5–65.6	65.8–76.7	20.2–52.0	58.9–65.9
				B or higher grade			
6	ACTE + HSGPA	69.5–79.6	0.9–4.3	71.1–81.0	70.8–82.2	0.3–2.7	72.3–82.7
7	ACTW + ACTE + HSGPA	70.0–79.4	1.1–4.8	71.9–80.9	71.1–82.3	0.5–3.5	72.8–83.0

Note. Based on 24 (26) of the 28 participating institutions that had viable A (B or higher) grade models (i.e., probability curves that crossed 0.50) for the two models being compared in the table. In the weighted analyses, institutions with larger numbers of students were assigned larger weights (i.e., number of students at institution divided by total number of students in analysis). ACTW = ACT writing score. ACTE = ACT English score. HSGPA = high school grade point average. Numbers shown in table are Q1 (25th percentile) – Q3 (75th percentile).

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