



COLLEGE of
CHARLESTON
OFFICE FOR INSTITUTIONAL
EFFECTIVENESS

ETS PROFICIENCY
PROFILE LONGITUDINAL
ANALYTICAL REPORT-
HONORS COLLEGE



**ETS Proficiency Profile Longitudinal Analytical
Report-Honors College**

Prepared By:

The Office of Institutional Effectiveness

July 2020

Introduction

The ETS Proficiency Profile (EPP) test is designed by the Educational Testing Service (ETS) as a measure of college-level reading, mathematics, writing, and critical thinking in the context of the humanities, social sciences, and natural sciences. Postsecondary institutions across the United States have utilized the ETS Proficiency Profile because the ETS test provides invaluable data for accreditation, strategic planning, curriculum improvement, benchmarking, and for assessing general education outcomes. For the same purpose, The College of Charleston has conducted ETS Proficiency Profile test in 2009 (N=199), 2012 (N=403), 2015(N=778) and 2018 (N=399), respectively.

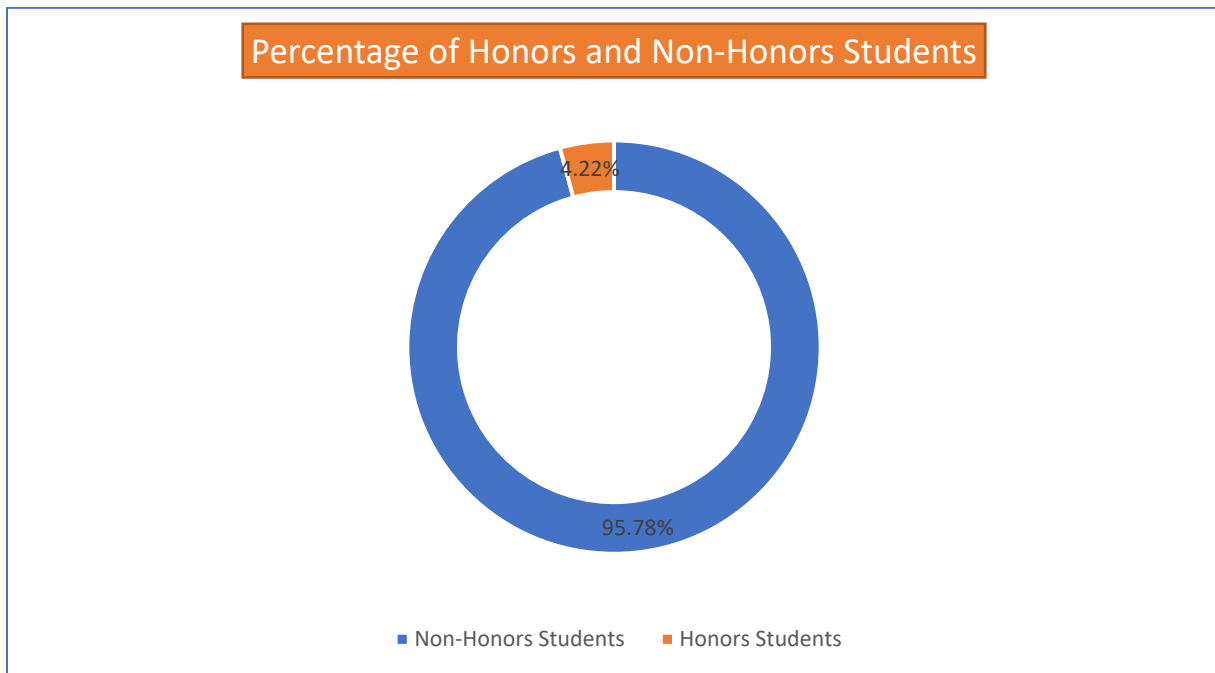
For Honors College at the College, the total of 75 students have taken the EPP test in 2012, 2015 and 2018. The goal of this report is to understand how Honors students performed over the years as compared to their Non-Honors peers as well as the national average EPP score. More importantly, this research was trying to find out the effect of being Honors students on the performance of EPP scale scores, all else being equal. Multiple regression strategy (see Appendix A, C and D for details) was utilized to achieve this goal. Appendix A provides detailed information about the introduction, research questions, and methodology for the longitudinal analysis.

Findings

Table 1. Percentage and the Total Number of Honors Students by Years

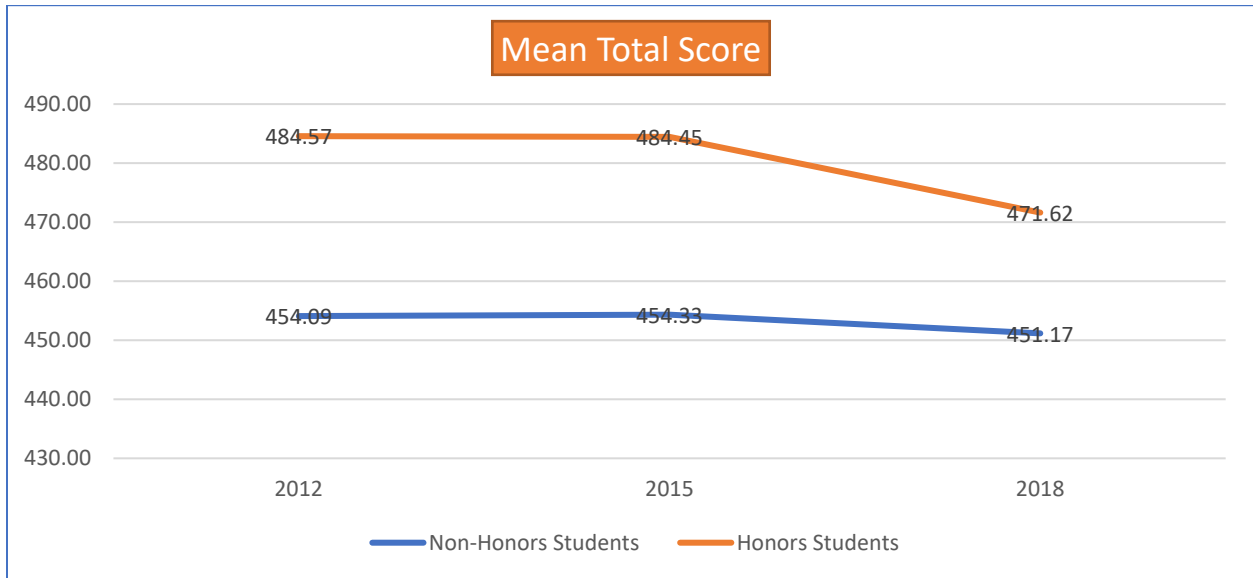
Year	N	Percentage
2012	7	9.33%
2015	31	41.33%
2018	37	49.33%
Total	75	100.00%

Figure 1. Percentage of Students Who Took EPP by Honors Student Status



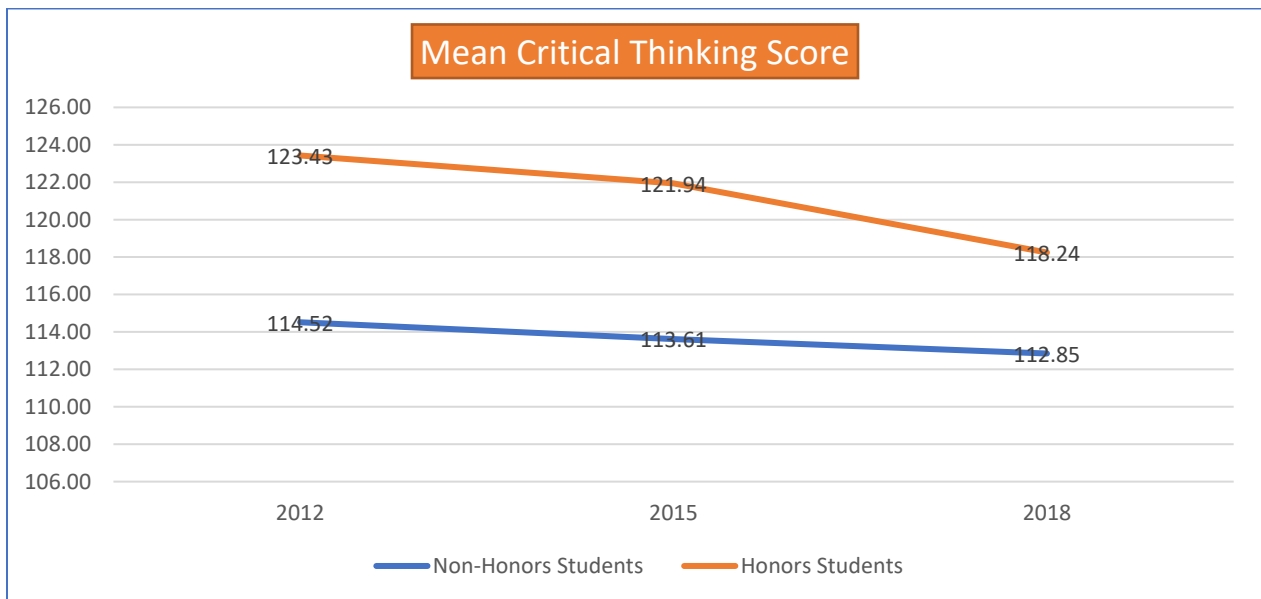
EPP Scale Score by Honor Student Status and by Year

Figure 2. Mean Total Score by Honors Students and Non-Honors and by Year



- Honors students held a considerable advantage in the mean total score over the years.
- The gap between Honors students and Non-Honors students was between 20 to 30 points.
- The difference in the total score between Honors and Non-Honors students decreased from 2015 to 2018.

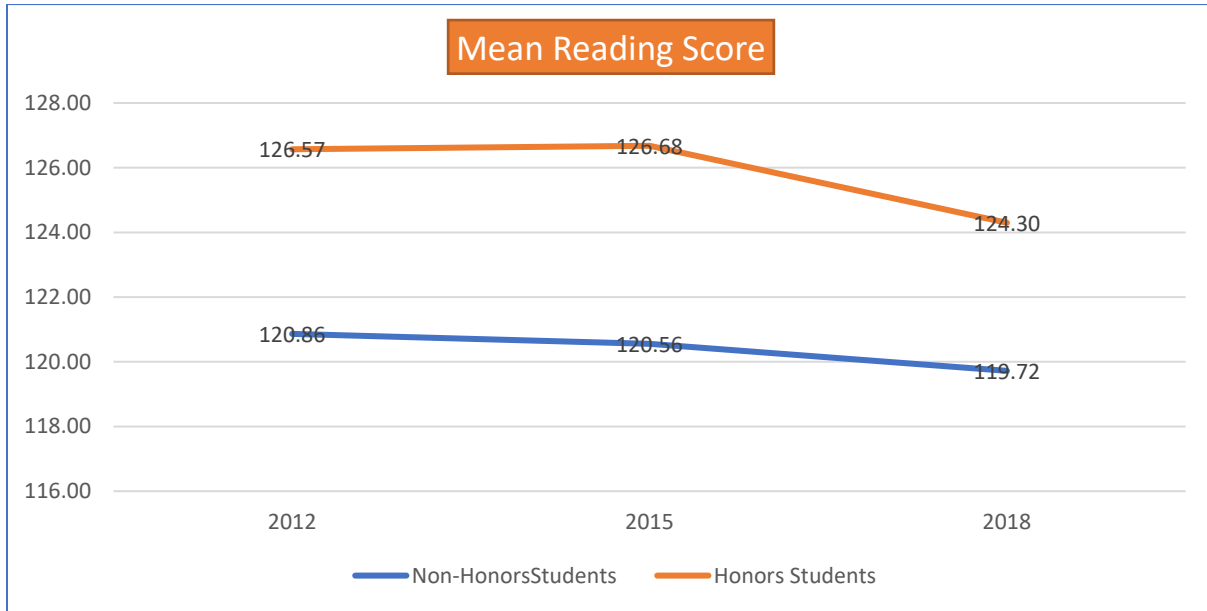
Figure 3. Mean Critical Thinking Score by Honors Students and Non-Honors and by Year



- Honors students held a considerable advantage in the critical thinking score over the years.
- The gap between Honors students and Non-Honors students was about 8 points in 2015.

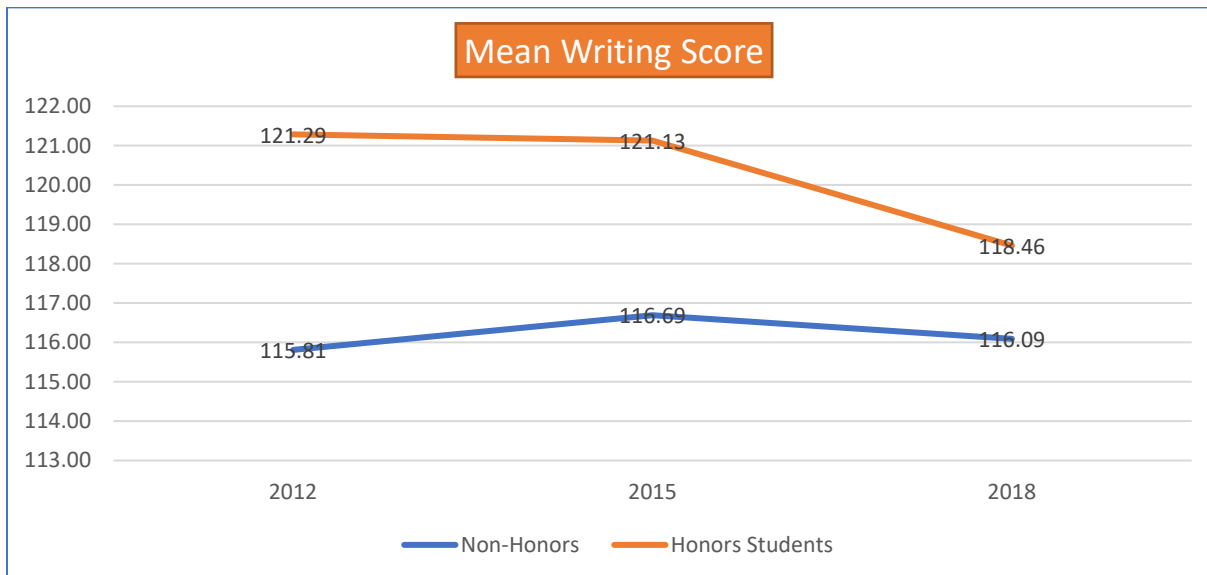
- The difference in the critical thinking score between Honors and Non-Honors students decreased from 2015 to 2018.

Figure 4. Mean Reading Score by Honors Students and Non-Honors and by Year



- Honors students performed better in the reading score over the years.
- The gap between Honors students and Non-Honors students was about 6 points in 2015.
- The difference in the reading score between Honors and Non-Honors students decreased from 2015 to 2018.

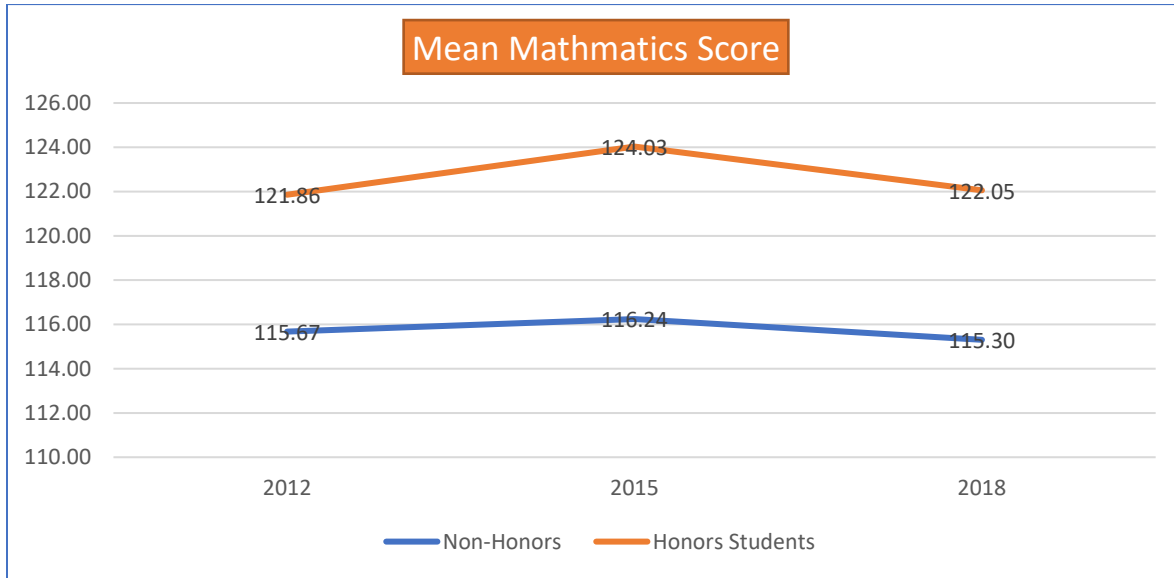
Figure 5. Mean Writing Score by Honors Students and Non-Honors and by Year



- Honors students performed better in the writing score over the years.

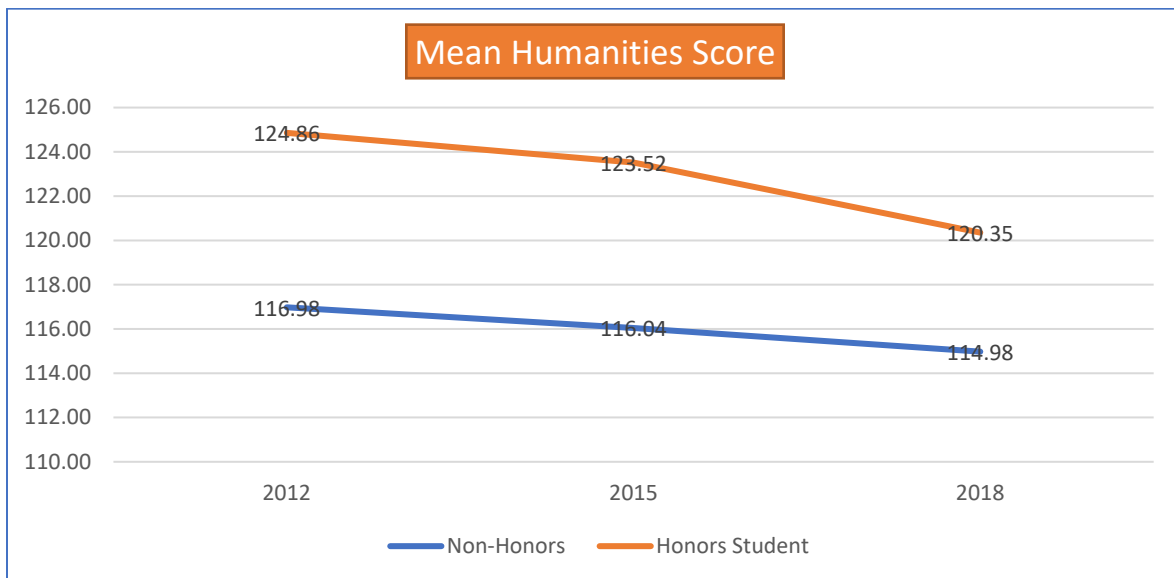
- The gap between Honors students and Non-Honors students was about 5 points in 2015.
- The difference in the writing score between Honors and Non-Honors students decreased from 2015 to 2018.

Figure 6. Mean Mathematics Score by Honors Students and Non-Honors and by Year



- Honors students performed better in the math score over the years.
- The gap between Honors students and Non-Honors students was about 8 points in 2015.

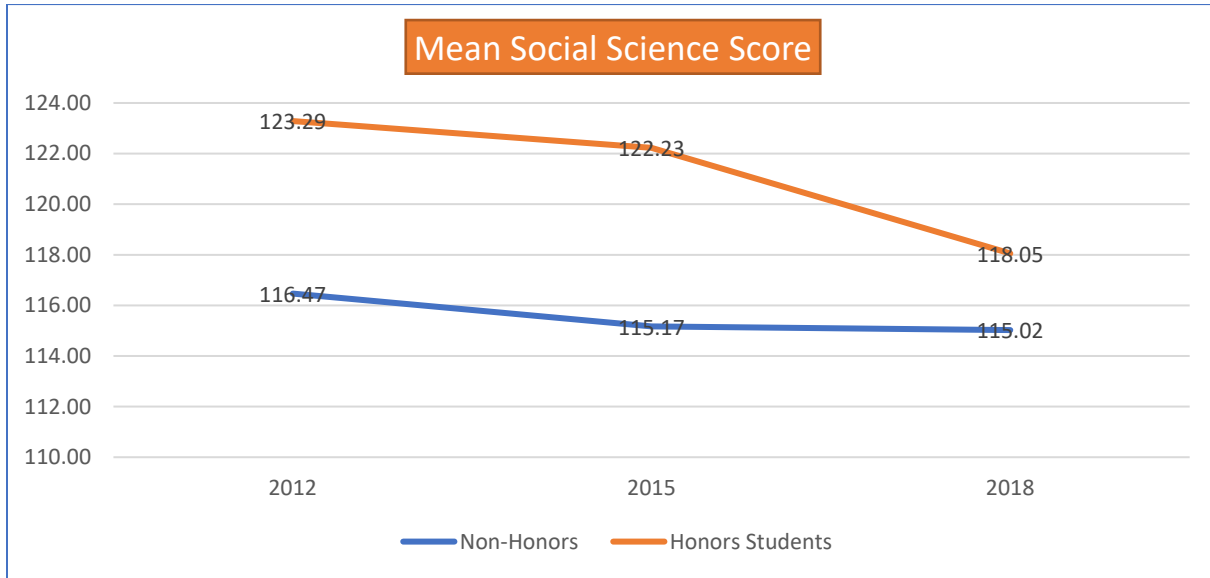
Figure 7. Mean Humanities Score by Honors Students and Non-Honors and by Year



- Honors students performed better in the humanities score over the years.
- The gap between Honors students and Non-Honors students was about 7 points.

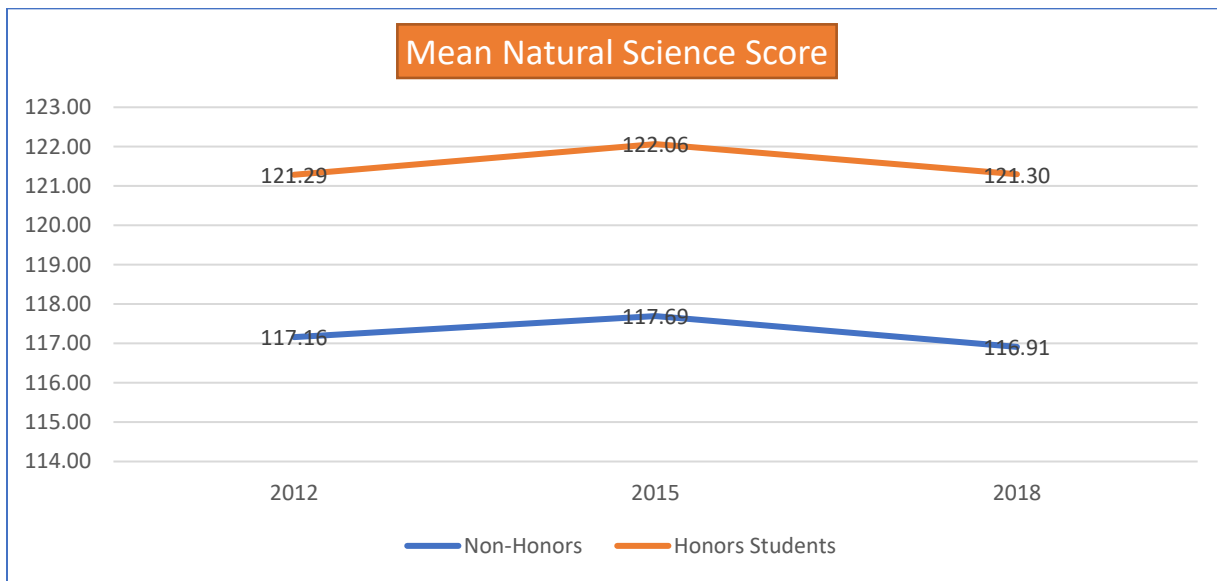
- The difference in the humanities score between Honors and Non-Honors students decreased from 2015 to 2018.

Figure 8. Mean Social Science Score by Honors Students and Non-Honors and by Year



- Honors students performed better in the social science score over the years.
- The gap between Honors students and Non-Honors students was about 7 points.
- The difference in the social science score between Honors and Non-Honors students significantly decreased from 2015 to 2018.

Figure 9. Mean Natural Science Score by Honors students and Non-Honors and by Year



- Honors students performed better in the natural science score over the years.
- The gap between Honors students and Non-Honors students was about 5 points.

Results of the Multiple Regression-Effects of Demographic and Educational Background Variables on ETS Proficiency Total Score

Table 2. Results of the Multiple Regression-Effects of Demographic and Educational Background Variables on ETS Proficiency Total Score

Variables	Model 1 Coef (Std.err)	Model 2 Coef (Std.err)	Model 3 Coef (Std.err)
Age	0.38* (0.16)	-0.4 (0.19)	-0.1 (0.2)
Male (female as the reference group)	3.66*** (0.99)	4.38*** (0.91)	2.86*** (0.95)
White (non-White as the reference group)	6.2*** (1.28)	4.63*** (1.21)	5.31*** (1.23)
Non-transfer students (transfer students as the reference group)		1.75 (1.12)	1.46 (1.13)
Honors (Non-Honors students as the reference group)		21.8*** (1.89)	18.6*** (2.1)
Freshmen (seniors as the reference group)		-8.78*** (1.13)	-8.7*** (1.32)
English not as the primary language (English as the primary language as the reference group)		-1.39 (1.03)	-1.36 (1.03)
Speaking English and other languages equally well (English as the primary language as the reference group)		-1.12 (3.43)	-1.65 (3.54)
Enrolled Part-time (Enrolled full-time as the reference group)		1.08 (1.9)	1.23 (1.98)
GPA>3.5(GPA<3.5 as the reference group)		11.9*** (0.93)	10.9*** (0.94)
1-15 hours worked (0 hours worked as the reference group)		1.12 (1.04)	1.47 (1.04)

>15 hours worked (0 hour worked as the reference group)		1.73 (1.14)	2.47* (1.16)
Major			x
Year			x
R-Squared	0.027	0.216	0.271

*** p<0.001, ** p<0.01, * p<0.5; Coef represents coefficients.
Std.err represents standard error.

Table 2 presents the results of model 1, model 2 and model 3. Model 1 included demographic variables, including age, gender and race. The effects of age, gender, and race on the EPP total score are presented in the second column. Model 2 included both demographic and educational background factors, including age, gender, race, transfer student status, Honors student status, undergraduate student status, if English as the primary language, enrolled part-time or full-time, GPA, and hours worked per week. The effects of demographic and educational background factors in Model 3 are presented in the third column. In addition to the variables in the Model 1 and Model 2, majors and year when students took the EPP test were also included. The final results of the Model 3 are presented in the fourth column (marked in yellow).

Only interpreting the final model, table 2 suggests that demographic factors matter in predicting students' EPP test performance. Age does not have a significant effect on students' performance in the EPP total score, all other things being equal. After taking into account the effects of demographic and educational background factors, male students on average performed significantly better than

their female counterparts, with an advantage of 2.86 points. Similarly, white students on average held a 5.31 points advantage than non-white students.

Several educational background variables had significant effects on students' EPP total score. Being a transfer student does not affect students' performance in the EPP total score, all things being equal. ***Being an Honors student, however, performs much better than a Non-Honors student in the EPP total score. Specifically, after controlling for demographic and educational background factors, Honors students on average gained 18.6 points more than the Non-Honors students.*** It is not surprising that all else being equal, freshmen were 8.7 points lower than seniors, which is expected and understandable. All else being equal, students who had a GPA 3.5 or higher demonstrated a 10.9 points advantage as compared to the group with a GPA 3.5 lower than 3.5. The more interesting finding is that all else being equal, students who worked more than 15 hours per week were 2.5 points higher in the EPP total score than their peers who did not work at all, while this significant difference was not found between the group who worked between 1 to 15 and the group who worked 0 hour.

Table 3. Comparing Mean EPP Scale Score of Honors Students at the College to the Average National EPP Score

	Average National EPP	Honors Students(N=75)	Mean Difference
Total score	441.1	478.13	37.03***
Critical Thinking	110.7	120.2	9.5***
Reading	116.8	125.5	8.7***
Writing	113.6	119.8	6.2***
Mathematics	112.9	122.8	9.9***
Humanities	113.7	122.1	8.4***
Social Science	112.3	120.3	8***
Natural Science	114.5	121.6	7.1***

*** p<0.001, ** p<0.01, * p<0.5.

In order to compare the mean EPP scale score of Honors students to the average national EPP score, it is important to decide which group of Honors students is used to do the comparison. Given that the low sample size of Honors students in 2018(N=37), it makes sense to use the total number of Honors students in the past three years (N=75).

One-sample t test was used to determine if the average EPP scale score of Honors students at the College in these eight categories is significantly higher than the average national EPP score. Eight one-sample t tests were conducted. As shown in Table 3, all p values are statistically significant, which suggests that Honors students at the College performed significantly better than the average national EPP score.

Appendixes

Appendix A: Introduction, Research questions and methodology

Introduction

Although annual ETS Proficiency Profile analytical reports have been present to the College, there have been no reports available to get the College informed from the perspective of longitudinal analysis, a study that can showcase the trends of how students performed over the years in the EPP test as well as how different demographic and educational background factors impacted students' performance in the EPP test. Given the small sample size every year (less than 450 except in 2015) and the limitation of providing a snapshot of how students at the College performed in the annual analytical report, the past EPP reports lack the in-depth understanding of how students performed over the years as well as what factors significantly and consistently affected students' EPP performance. To bridge this gap, the Office of Institutional Effectiveness acquired the original four year's datasets from ETS and conducted this longitudinal data analysis.

Knowing the structure of EPP test plays a crucial role in better understanding this longitudinal analysis. The EPP test (abbreviated version) is a standardized test composed of 36 multiple choice questions designed to assess students' competencies in critical thinking, reading, writing, and mathematics. Questions in the EPP test are multiple choices and are arranged in blocks of three to eight. Each section tests the same types of skills. The total score on the test is reported on a scale of 400-500. There are seven sub-scores that are reported on a scale of 100-130 for each skill area (Critical Thinking, Reading, Writing, Mathematics, Humanities, Social Sciences, and Natural Sciences). In addition to a total score, institutions receive proficiency classifications (i.e. proficient, marginal or not proficient) for each skill level identified simply as Level 1, Level 2 and Level 3 based on students' performance taken as a group in each skill dimension.

Appendix B provides a comprehensive overview of each proficiency level, which is defined in terms of competencies expected of students. Proficiency classifications capture how well students have mastered each skill area.

Research Questions

This longitudinal analytical report was guided by the following research questions:

1. What are the frequency and percentage of Honors students who took the EPP test over time?
2. How have Honors students at the College performed in the EPP scale scores and the EPP proficiency classifications over the years?
3. What is the effect of being an Honors students on the EPP total score performance, all else being equal?
4. How did Honors Students perform over years compared to the National average?

Methodology

Basic descriptive analysis was conducted to illustrate the percentage of students who took the EPP test over the years to answer research question 1. To answer question 2 and 3, cross-tabulation trend analysis was used to yield the trend of students' EPP performance over the years by gender, race, transfer students, Honors student status, undergraduate student status, hours worked per week and school.

With the descriptive analysis and cross-tabulation analysis as the foundation for further analysis, multiple regress strategy was utilized to reveal the factors that significantly impacted students' EPP performance over the years, all else being equal. We grouped independent variables into three models (see Table 2 for details), run these three models successively and checked the R-squared value in every model to decide if a specific variable should or should be not included in the next model. The R-squared in the final model is 27.17%, meaning that 27.17% of variance in

the EPP total scores are explained by the variables included in the present analysis. Detailed regression results of the three models were presented in **Appendix C**. Given the exploratory nature of this analysis, the purpose of revealing the relationships among demographic and educational background factors and the EPP total scale scores has been achieved, although the R-squared might be relatively low. Future research could carry on by adding more variables related to students' EPP performance into this proposed equation to increase the explaining power of this model.

The multiple regression equation is listed below:

$$ETS \text{ Total Score} = \beta_0 + \beta * DEM + \alpha * EDU + \gamma * YEA + \delta * MAJ + \mu$$

DEM represents a vector of demographic variables, including age, race/ethnicity and gender.

EDU denotes a vector of educational background variables, including transfer student status,

Honors student status, enrolled part-time/full-time, hours worked per week, GPA, if English as

the primary language and freshmen vs. seniors. YEA represents the controlled year variable

(2009, 2012, 2015 and 2018 with 2009 being the reference group), and MAJ represents 32

majors (32 majors are provided in **Appendix D**) in this analysis. β_0 is the constant of the

regression equation and μ is the error term.

Appendix B: Proficiency Classifications and Proficiency Level Statistics

Proficiency Levels

The skills measured by the ETS Proficiency Profile test are grouped into three skill areas:

- Reading and critical thinking
- Writing
- Mathematics

Within each of these three skill areas, the specific skills tested by the ETS Proficiency Profile test are classified into three proficiency levels, identified simply as Level 1, Level 2, and Level 3. Each proficiency level is defined in terms of a set of specific competencies expected of students.

Skills Tested at Each Level

Reading and Critical Thinking

To be considered proficient at Level 1, a student should be able to:

- recognize factual material explicitly presented in a reading passage
- understand the meaning of particular words or phrases in the context of a reading passage

To be considered proficient at Level 2, a student should be able to:

- synthesize material from different sections of a passage
- recognize valid inferences derived from material in the passage
- identify accurate summaries of a passage or of significant sections of the passage
- understand and interpret figurative language
- discern the main idea, purpose, or focus of a passage or a significant portion of the passage

To be considered proficient at Level 3, a student should be able to:

- evaluate competing casual explanations
- evaluate hypothesis for consistency with known facts
- determine the relevance of information for evaluating an argument or conclusion
- determine whether an artistic interpretation is supported by evidence contained in a work
- recognize the salient features or themes in a work of art
- evaluate the appropriateness of procedures for investigating a question of causation
- evaluate data for consistency with known facts, hypotheses or methods

Writing

To be considered proficient at Level 1, a student should be able to:

- recognize agreement among basic grammatical elements (e.g., nouns, verbs, pronouns and conjunctions)
- recognize appropriate transition words
- recognize incorrect word choice
- order sentences in a paragraph
- order elements in an outline

To be considered proficient at Level 2, a student should be able to:

- incorporate new material into a passage
- recognize agreement among basic grammatical elements (e.g., nouns, verbs, pronouns and conjunctions) when these elements are complicated by intervening words or phrases
- combines simple clauses into single, more complex combinations
- recast existing sentences into new syntactic combinations

To be considered proficient at Level 3, a student should be able to:

- discriminate between appropriate and inappropriate use of parallelism
- discriminate between appropriate and inappropriate use of idiomatic language
- recognize redundancy
- discriminate between correct and incorrect constructions
- recognize the most effective revision of a sentence

Mathematics

To be considered proficient at Level 1, a student should be able to:

- solve word problems that would most likely be solved by arithmetic and do not involve conversion of units or proportionality (These problems can be multi-step if the steps are repeated rather than embedded.)
- solve problems involving the informal properties of numbers and operations, often involving the Number Line, including positive and negative numbers, whole numbers and fractions (including conversions of common fractions to percent, such as converting $\frac{1}{4}$ to 25%)
- solve problems requiring a general understanding of square roots and the squares of numbers
- solve a simple equation or substitute numbers into an algebraic expression

- find information from a graph (This task may involve finding a specified piece of information in a graph that also contains other information.)

To be considered proficient at Level 2, a student should be able to:

- solve arithmetic problems with some complications, such as complex wording, maximizing or minimizing and embedded ratios (these problems include algebra problems that can be solved by arithmetic [the answer choices are numeric])
- simplify algebraic expressions, perform basic translations and draw conclusions from algebraic equations and inequalities (these tasks are more complicated than solving a simple equation, though they may be approached arithmetically by substituting numbers.)
- interpret a trend represented in a graph, or choose a graph that reflects a trend
- solve problems involving sets (the problems would have numeric answer choices.)

To be considered proficient at Level 3, student should be able to:

- solve word problems that would be unlikely to be solved by arithmetic; the answer choices are either algebraic expressions or are numbers that do not lend themselves to back-solving
- solve problems involving difficult arithmetic concepts such as exponents and roots other than squares and square roots and percent of increase or decrease
- generalize about numbers, e.g., identify the values of (x) for which an expression increases as (x) increases
- solve problems requiring an understanding of the properties of integers, rational numbers, etc.
- interpret a graph in which the trends are to be expressed algebraically or in which one of the following is involved: exponents and roots other than squares and square roots, percent of increase or decrease
- solve problems requiring insight or logical reasoning

Appendix C. Detailed Model 3 Results

Table 4. Regression Results of Model 3

totalscore	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
age	-0.109	0.177	-0.62	0.537	-0.457	0.238	
0b.gender	0.000	.	.	.	.	.
1.gender	2.870	0.931	3.08	0.002	1.044	4.696	***
0b.race re	0.000	.	.	.	.	.
1.race re	5.319	1.235	4.31	0.000	2.896	7.742	***
0b.transfer re	0.000	.	.	.	.	.
1.transfer re	1.463	1.107	1.32	0.187	-0.709	3.634	
1b.major	0.000	.	.	.	.	.
2.major	-7.166	5.025	-1.43	0.154	-17.022	2.691	
3.major	0.217	8.432	0.03	0.980	-16.324	16.757	
4.major	22.263	11.799	1.89	0.059	-0.882	45.409	*
5.major	-9.327	4.054	-2.30	0.022	-17.279	-1.376	**
6.major	1.424	3.501	0.41	0.684	-5.444	8.293	
7.major	1.632	2.320	0.70	0.482	-2.918	6.183	
8.major	-3.192	1.973	-1.62	0.106	-7.061	0.678	
9.major	11.676	3.077	3.79	0.000	5.641	17.711	***
10.major	-6.428	2.195	-2.93	0.003	-10.733	-2.123	***
11.major	0.661	6.986	0.10	0.925	-13.043	14.364	
12.major	7.148	3.524	2.03	0.043	0.236	14.059	**
13.major	-5.932	2.207	-2.69	0.007	-10.262	-1.602	***
14.major	-8.460	16.539	-0.51	0.609	-40.902	23.983	
15.major	7.052	4.883	1.44	0.149	-2.527	16.631	
16.major	-16.497	11.850	-1.39	0.164	-39.740	6.747	
17.major	0.608	4.076	0.15	0.881	-7.387	8.604	
18.major	4.654	4.745	0.98	0.327	-4.653	13.962	
19.major	-4.975	2.488	-2.00	0.046	-9.856	-0.093	**
20.major	-0.799	4.450	-0.18	0.857	-9.528	7.929	
21.major	0.413	16.595	0.03	0.980	-32.139	32.965	
22.major	-3.274	3.602	-0.91	0.363	-10.339	3.790	
23.major	11.529	6.491	1.78	0.076	-1.203	24.261	*
24.major	-3.947	6.103	-0.65	0.518	-15.918	8.023	
25.major	10.460	7.552	1.39	0.166	-4.353	25.274	
26.major	0.153	8.491	0.02	0.986	-16.503	16.810	
27.major	5.411	2.915	1.86	0.064	-0.306	11.129	*
28.major	0.336	3.257	0.10	0.918	-6.052	6.725	
29.major	17.223	16.549	1.04	0.298	-15.238	49.684	
30.major	-2.237	3.829	-0.58	0.559	-9.748	5.274	
31.major	-5.529	2.609	-2.12	0.034	-10.647	-0.410	**
32.major	-2.314	1.966	-1.18	0.239	-6.170	1.542	
0b.honor_recd	0.000	.	.	.	.	.

1.honor_recd	18.690	2.445	7.64	0.000	13.894	23.487	***
1b.year	0.000	.	.	.	.	.
2.year	2.735	1.792	1.53	0.127	-0.780	6.250	
3.year	1.044	1.585	0.66	0.511	-2.066	4.153	
4.year	0.493	1.794	0.28	0.784	-3.026	4.012	
1b.workhour_re	0.000	.	.	.	.	.
2.workhour_re	1.479	1.050	1.41	0.159	-0.580	3.539	
3.workhour_re	2.471	1.142	2.16	0.031	0.230	4.711	**
0b.studstat	0.000	.	.	.	.	.
1.studstat	-8.701	1.274	-6.83	0.000	-11.200	-6.202	***
1b.english	0.000	.	.	.	.	.
2.english	-1.370	1.025	-1.34	0.182	-3.381	0.641	
3.english	-1.658	3.150	-0.53	0.599	-7.837	4.521	
0b.enroll	0.000	.	.	.	.	.
1.enroll	1.230	2.066	0.59	0.552	-2.822	5.283	
0b.gpa_re	0.000	.	.	.	.	.
1.gpa_re	10.957	0.982	11.16	0.000	9.031	12.883	***
Constant	447.892	5.473	81.83	0.000	437.156	458.628	***
Mean dependent var							
	455.068	SD dependent var			18.921		
R-squared		0.272	Number of obs		1539.000		
F-test		12.099	Prob > F		0.000		
Akaike crit. (AIC)		13022.697	Bayesian crit. (BIC)		13273.624		
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.5$.							

Appendix D. Majors

Table 5. Majors included in the analysis and codes

Accounting	1
Allied Health	2
Anthropology & Archeology	3
Architecture & Environmental Design	4
Art & Art History	5
Banking & Finance	6
Biological Sciences	7
Business Administration	8
Chemistry	9
Communications	10
Computer & Information Sciences	11
Economics	12
Education	13
Engineering & Engineering Technologies	14
English	15
Environmental Sciences	16
Foreign Languages & Literature	17
Geological Sciences	18
Health & Medical Sciences	19
History	20
Liberal Studies	21
Marketing	22
Mathematical Sciences	23
Music	24
Philosophy	25
Physics & Astronomy	26
Political Science	27
Psychology	28
Religion & Theology	29
Sociology	30
Undecided	31
Other	32