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Predictive roles of personal traits and entrance examination categories in academic performance

Shigeru Ono *

Abstract

This paper aims to examine whether a student's choice of an entrance examination category is pertinent to academic achievement and personality traits. The subjects were 649 students enrolled in Faculty of Social Information Studies at Otsuma Women's University. They were admitted to one of the three academic specialties of the faculty. The academic achievement is measured by cumulative total GPA and GPA per course group calculated at the end of the third year of university education. The course groups are categorised as follows: English courses, general education courses, discipline specific core courses, and discipline specific optional courses. As to the entrance examination category this paper focusses on the difference between examinations imposing written academic tests and those not imposing them. In the analysis, high-school GPA and high-school rank are also adopted as control variables. The results show that students with high problem-solving competency and admitted through written examination-based admission earned significantly higher GPA than those admitted through interview-based admission, especially of discipline specific courses, after controlling for academic specialties as well as high-school GPA and high-school rank. The implication of the results is also argued from the viewpoint of university admissions.

Key Words : academic performance, academic specialties, admissions decision, entrance examination categories, non-cognitive skills, personality traits

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Introduction

Personality has been widely acknowledged to be important in predicting academic achievement. In the literature on psychology and education research, the five-factor model of personality has been extensively used to investigate the impact of personality traits on academic performance, and grade point average (GPA) has been a typical criterion measure of academic achievement (e.g. McAbee & Oswald, 2013; Nofle & Robins, 2007; Vedel, 2014). However, the details of their relationship still remain unknown. Recent studies have shown that incorporation of mediating variables such as academic motivation (Burbidge, Horton & Murray, 2018; Hazari-Viari, Rad & Torabi, 2012; Sunbul, 2019), informant ratings (McCredie & Kurtz, 2020) and academic major (Vedel, 2016) lead to more fine-grained description of the prediction performances underlying personal traits.

Whereas personality traits have provided an important research perspective for exploring college student performance, little attention has been paid to the association of college admissions with them (e.g., Albanese et al, 2003; Mackenzie, Dowell, Ayansina & Cleland, 2017). Japanese universities offer mainly four types of entrance examinations: general examinations, recommendation-based examinations, Admissions Office examinations and special selection examinations (Kuramoto & Koizumi, 2018). The latter three types are holistic examinations; they are interview-based and do not impose written tests on applicants. General examinations acceptance, by contrast, are judged only by scores of written academic tests. Students admitted through different examination categories are considered to vary both in personality traits and academic

performance in university. It would be therefore worthwhile investigating the relationship between academic performance, admissions categories, and personality traits, especially from the viewpoint of university admissions. Furthermore, as Hecker (2017) and Kreiter (2016) indicate, establishing methods to assess non-academic attributes including personality traits for admissions purpose is challenging and needs further evidence-based research.

This paper aims to examine whether a student's choice of an entrance examination category is pertinent to personality traits and academic achievement after admission. The subjects were students enrolled in Faculty of Social Information Studies at Otsuna Women's University. They were admitted to one of the three academic specialties of the faculty by applying for one of the four examination categories written above; the admissions decisions are independently made by the admissions committees of the three specialties. Personality traits are assessed by the Competency scores of the Progress Report on Generic Skills (Ito, 2014; Matsumura & Tanabe, 2019), which are composed of multi-tiers of evaluation elements: three realms and three components for each realm. The Competency test attempts to assess non-cognitive skills, which are personal traits partially correlated with measures of intelligence. The academic achievement is measured by cumulative total GPA and GPA per course group calculated at the end of the third year of university education. The course group kinds are four: English courses, general education courses, discipline specific core courses, and discipline specific optional courses. As to the entrance examination category this paper focusses on the difference between the examinations imposing written academic tests and those not imposing them. In

the analysis, high-school GPA and high-school rank are also adopted as control variables; these have been empirically confirmed to be relevant to academic achievement in college (Cohen, Cohen, Balch, & Bradley Jr, 2004; Nofhle, & Robbins, 2007; Onozuka, 2020).

The primary contribution of this paper is to adduce quantitative evidence showing statistically significant relationship between the GPAs and the Competency test scores and material differences between the GPAs of the students admitted through the different admissions category with controlling for the academic specialities as well as high-school GPA and high-school rank. The implication of the results is also argued from the viewpoint of university admissions.

Samples & Measures

Subjects.

The sample size was 649 and the selected were enrolled on the three academic specialities of the faculty for two years: 2018 and 2019. It accounts for 95.7% of the faculty enrolments. About the half of the subjects (45.9%) were admitted to the faculty through written examinations, and the rest (54.1%) through interview-based examinations. The sample sizes for the three specialities were 223 (34.4%), 216 (33.3%), and 210 (32.4%), respectively, in which there is no strong bias.

Personality traits of competency.

To assess personality traits of the subjects, this paper used the Competency scores of the Progress Report on Generic Skills, which is designed to assess non-cognitive skills (Matsumura & Tanabe, 2019). The subjects took the Competency test immediately after admission, which was implemented in the

university orientation programme for first-year students. It is a 195-item instrument composed of three realms: Teamwork skills, Personal skills, and Problem-solving skills. Each realm is divided into three components; e.g., the components of Teamwork skills are Relating with others, Collaborating with others, and Team management. A detailed description of the components of the Competency test and the symbols corresponding to the components are listed in Table 1a, where the descriptions follow Matsumura & Tanabe's (2019). Each realm and each component were measured at 7 levels on a scale of 1 to 7, one being the lowest and seven the highest. Table 1b presents a summary of other symbols used in the analysis.

High-school rank and high-school GPA.

The high-school rank was estimated by DAIGAKUTSUSHIN Corp. The rank ranged from 1 (the highest rank) to 20 (the lowest rank). This attribute is fairly related to the entrance examination categories; applicants for the general examinations tend to be from higher-ranked high schools (Table 2(1)). The high-school GPA is also relevant to the entrance examination categories; The average school GPA of the applicants for the general examinations is lower than that of applicants for the interview-based examinations (Table 2(2)).

College GPA.

The academic achievement was measured by five kinds of GPAs calculated at the end of the third year of university education. The five kinds are the cumulative total GPA, GPA of the English course, GPA of the general education courses, GPA of the discipline specific core courses, and GPA of the discipline specific optional courses. The English courses and the

Table 1a. Correspondence between symbols used in the paper and components of the Competency test (following Matsumura & Tanabe (2019))

| Total | | Large category | | Medium category | |
|-------|------------|----------------|--|-----------------|---------------------------|
| T | Competency | R1 | Teamwork skills <i>Build trust between each other other and activate teamwork</i> | C11 | Relating with others |
| | | | | C12 | Collaborating with others |
| | | | | C13 | Team management |
| | | R2 | Personal skills <i>Control emotion and motivation</i> | C21 | Self-control |
| | | | | C22 | Self-confidence |
| | | | | C23 | Behaviour control |
| | | R3 | Problem solving skills <i>Think yourself how to act to solve problems</i> | C31 | Problem identification |
| | | | | C32 | Planning solutions |
| | | | | C33 | Implementing solutions |

Table 1b. Description of symbols used for the analysis

| Symbol | Description | |
|--------|---------------------|---|
| igen | 0.igen | Student category admitted by interview-based or holistic admissions |
| | 1.igen | Student category admitted by written-examination based admissions |
| dpt | 1.dpt, 2.dpt, 3.dpt | Identification of the three academic specialties |
| GPA | Total | Total cumulative GPA |
| | English | GPA of the English courses |
| | d_Options | GPA of the general education courses |
| | Cores | GPA of the discipline specific core courses |
| | Options | GPA of the discipline specific optional courses |
| hrank | | High-school rank ($1 \leq \text{hrank} \leq 20$) |
| hgpa | | High-school GPA |

Note: GPAs are calculated at the end of the third year of university education.

The high-school ranks were estimated by DAIGAKUTSUSHIN Corp;

The rank ranged from 1 (the highest) to 20 (the lowest).

Table 2. Difference in means of the high-school rank and the high-school GPA for the entrance examination categories.

(1) t-test for the difference in means of the high-school rank

| Group | Obs | Mean | Std. err. | Std. dev. | [95% conf. interval] | | t | Pr(T > t) | Cohen's d |
|----------|-----|--------|-----------|-----------|----------------------|--------|--------|-------------|-----------|
| 0.igen | 351 | 13.040 | 0.142 | 2.656 | 12.761 | 13.319 | | | |
| 1.igen | 298 | 10.641 | 0.187 | 3.220 | 10.274 | 11.008 | | | |
| Combined | 649 | 11.938 | 0.124 | 3.161 | 11.695 | 12.182 | | | |
| diff | | 2.399 | 0.234 | | 1.939 | 2.859 | 10.240 | 0.000 | 0.819 |

(2) t-test for the difference in means of the high-school GPA

| Group | Obs | Mean | Std. err. | Std. dev. | [95% conf. interval] | | t | Pr(T > t) | Cohen's d |
|----------|-----|-------|-----------|-----------|----------------------|-------|--------|-------------|-----------|
| 0.igen | 351 | 3.868 | 0.025 | 0.464 | 3.819 | 3.917 | | | |
| 1.igen | 298 | 3.477 | 0.027 | 0.467 | 3.424 | 3.530 | | | |
| Combined | 649 | 3.688 | 0.020 | 0.504 | 3.650 | 3.727 | | | |
| diff | | 0.391 | 0.037 | | 0.319 | 0.463 | 10.656 | 0.000 | 0.840 |

general education courses are intended for all the students of the university. The former courses are required in the faculty and the latter courses are optional. The discipline specific core courses and the discipline specific optional courses, on the other hand, are exclusively designed in each of the three academic specialities. The former courses are compulsory and essential to the specialities. The latter courses are optional and more specialized than the former. Table 3 shows the average weights in the GPA calculation, which reflect the number of credit hours. The table indicates that the faculty places more importance on the discipline specific course grades than those of the general education courses including English.

Except for the general education courses, the students admitted through the written academic examination earned the higher grades on average than those admitted through interview-based admission (Table 4). The admissions and the grade evaluating criteria for the discipline specific courses are independently established

by the three specialities of the faculty; consequently, the GPA of the discipline specific courses significantly varied in the specialties (Table 5). The GPAs were also significantly but weakly correlated with the high-school GPA, while not showing any noticeable direct correlation with the high-school rank. (Table 6a); nonetheless, the high-school GPA and the high-school ranking themselves have statistically moderate and significant relationship (Table 6b).

Results:

Table 7 summarizes the results of the multiple regression analysis with the Competency test components and the admissions category as predictors of the GPAs and with the high-school rank, the high-school GPA and the academic specialties as control variables. This model explained over 20% variances of the total GPA (21.5%) and the discipline specific core course GPA (23.8%), which are considered to be moderate

Table 3. Average weights in the GPA calculation

| Courses | Total | English | d_Options | Cores | Options |
|---------|--------|---------|-----------|-------|---------|
| Weights | 117.47 | 10.03 | 25.06 | 29.27 | 49.17 |

Table 4. GPA statistics for the examination categories

| Category | Statistics | Total | English | d_Options | Cores | Options |
|------------------------------|------------|-------|---------|-----------|-------|---------|
| 0.igen (non-Written Exam) | obs | 351 | 351 | 351 | 351 | 351 |
| | mean | 2.457 | 2.804 | 2.421 | 2.438 | 2.356 |
| | sd | 0.491 | 0.460 | 0.515 | 0.555 | 0.571 |
| 1.igen (Written Exam) | obs | 298 | 298 | 298 | 298 | 298 |
| | mean | 2.522 | 2.857 | 2.407 | 2.542 | 2.443 |
| | sd | 0.578 | 0.554 | 0.607 | 0.612 | 0.683 |
| Total | obs | 649 | 649 | 649 | 649 | 649 |
| | mean | 2.487 | 2.828 | 2.414 | 2.486 | 2.396 |
| | sd | 0.533 | 0.505 | 0.559 | 0.584 | 0.626 |

Table 5. GPA statistics for the three departments

| Department | Statistics | Total | English | d_Options | Cores | Options |
|------------|------------|-------|---------|-----------|-------|---------|
| 1.dpt | obs | 223 | 223 | 223 | 223 | 223 |
| | mean | 2.603 | 2.868 | 2.540 | 2.655 | 2.492 |
| | sd | 0.504 | 0.481 | 0.547 | 0.558 | 0.570 |
| 2.dpt | obs | 216 | 216 | 216 | 216 | 216 |
| | mean | 2.388 | 2.746 | 2.384 | 2.345 | 2.292 |
| | sd | 0.522 | 0.519 | 0.538 | 0.560 | 0.607 |
| 3.dpt | obs | 210 | 210 | 210 | 210 | 210 |
| | mean | 2.464 | 2.870 | 2.312 | 2.450 | 2.400 |
| | sd | 0.553 | 0.509 | 0.570 | 0.591 | 0.686 |
| Total | obs | 649 | 649 | 649 | 649 | 649 |
| | mean | 2.487 | 2.828 | 2.414 | 2.486 | 2.396 |
| | sd | 0.533 | 0.505 | 0.559 | 0.584 | 0.626 |

Table 6a. Correlations between the GPAs and high-school GPA and those between the GPAs and high-school ranking

| GPA | High-school GPA | | High-school rank | |
|-----------|-----------------|---------|------------------|---------|
| | correlation | p-value | correlation | p-value |
| Total | 0.287 | 0.000 | -0.049 | 0.216 |
| English | 0.199 | 0.000 | -0.052 | 0.187 |
| d_Options | 0.274 | 0.000 | -0.005 | 0.910 |
| Cores | 0.270 | 0.000 | -0.049 | 0.213 |
| Options | 0.266 | 0.000 | -0.059 | 0.136 |

Table 6b. Correlations between high-school GPA and high-school ranking

| | High-school rank | |
|-----------------|------------------|---------|
| | correlation | p-value |
| High-school GPA | 0.386 | 0.000 |

Table 7. Multiple regression analysis with the Competency test scores as predictors of the GPAs

(1) Regression analysis with the Competency total score variable

| Variables | Total | English | d-Options | Cores | Options |
|--------------------|----------------------|---------------------|----------------------|----------------------|----------------------|
| T | -0.002 (0.013) | 0.016 (0.013) | 0.001 (0.014) | -0.010 (0.014) | -0.004 (0.016) |
| 1.igen | 0.166*** (0.045) | 0.110* (0.045) | 0.096* (0.049) | 0.213*** (0.049) | 0.196*** (0.053) |
| 2.dpt | -0.171*** (0.046) | -0.100* (0.046) | -0.115* (0.050) | -0.259*** (0.050) | -0.151** (0.053) |
| 3.dpt | -0.135** (0.047) | 0.002 (0.046) | -0.222*** (0.051) | -0.202*** (0.052) | -0.088 (0.057) |
| hgpa | 0.415*** (0.041) | 0.280*** (0.040) | 0.380*** (0.045) | 0.435*** (0.044) | 0.465*** (0.051) |
| hrank | -0.026** (0.008) | -0.020** (0.007) | -0.019* (0.009) | -0.026** (0.008) | -0.030*** (0.009) |
| F statistic | 21.464 | 9.856 | 16.372 | 23.800 | 17.021 |
| Prob > F | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| R-squared | 0.153 | 0.081 | 0.121 | 0.168 | 0.132 |
| Adjusted R-squared | 0.145 | 0.072 | 0.112 | 0.160 | 0.124 |
| RMSE | 0.493 | 0.487 | 0.527 | 0.535 | 0.586 |
| Number of obs. | 649 | 649 | 649 | 649 | 649 |

Note: Standard errors in parentheses. Stars: *** significant at the 0.1% level; ** at 0.1%; * at 5%

(2) Regression analysis with the Competency large-category variables

| Variables | Total | English | d-Options | Cores | Options |
|--------------------|----------------------|---------------------|----------------------|----------------------|----------------------|
| R1 | -0.035* (0.015) | -0.005 (0.014) | -0.039* (0.016) | -0.034* (0.016) | -0.039* (0.017) |
| R2 | 0.011 (0.017) | 0.004 (0.016) | 0.019 (0.019) | 0.004 (0.019) | 0.007 (0.021) |
| R3 | 0.060*** (0.013) | 0.042** (0.014) | 0.058*** (0.014) | 0.055*** (0.015) | 0.072*** (0.016) |
| 1.igen | 0.158*** (0.045) | 0.108* (0.045) | 0.086 (0.049) | 0.206*** (0.049) | 0.187*** (0.053) |
| 2.dpt | -0.169*** (0.045) | -0.098* (0.046) | -0.112* (0.049) | -0.258*** (0.050) | -0.148*** (0.052) |
| 3.dpt | -0.133** (0.047) | 0.005 (0.046) | -0.221*** (0.050) | -0.200*** (0.052) | -0.085 (0.057) |
| hgpa | 0.388*** (0.042) | 0.265*** (0.040) | 0.353*** (0.046) | 0.410*** (0.045) | 0.434*** (0.051) |
| hrank | -0.024** (0.008) | -0.019* (0.007) | -0.018* (0.009) | -0.024** (0.008) | -0.028** (0.009) |
| F statistic | 19.404 | 8.368 | 15.047 | 19.774 | 16.017 |
| Prob > F | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| R-squared | 0.183 | 0.093 | 0.147 | 0.189 | 0.163 |
| Adjusted R-squared | 0.173 | 0.082 | 0.137 | 0.179 | 0.152 |
| RMSE | 0.485 | 0.484 | 0.519 | 0.529 | 0.577 |
| Number of obs | 649 | 649 | 649 | 649 | 649 |

Note: Standard errors in parentheses. Stars: *** significant at the 0.1% level; ** at 0.1%; * at 5%

(3) Regression analysis with the Competency medium-category variables

| Variables | Total | English | d-Options | Cores | Options |
|--------------------|----------------------|---------------------|----------------------|----------------------|---------------------|
| C11 | -0.011 (0.014) | -0.012 (0.015) | -0.011 (0.015) | -0.012 (0.016) | -0.009 (0.017) |
| C12 | -0.008 (0.015) | 0.023 (0.015) | -0.010 (0.016) | -0.007 (0.017) | -0.015 (0.018) |
| C13 | -0.030* (0.016) | -0.018 (0.017) | -0.034 (0.017) | -0.021 (0.018) | -0.036 (0.019) |
| C21 | -0.012 (0.015) | -0.003 (0.015) | -0.015 (0.016) | -0.018 (0.016) | -0.015 (0.018) |
| C22 | 0.010 (0.016) | -0.003 (0.017) | 0.006 (0.018) | 0.005 (0.018) | 0.015 (0.019) |
| C23 | 0.019 (0.016) | 0.015 (0.018) | 0.026 (0.017) | 0.020 (0.018) | 0.019 (0.018) |
| C31 | 0.015 (0.012) | -0.008 (0.012) | 0.034** (0.014) | 0.001 (0.015) | 0.021 (0.014) |
| C32 | 0.039** (0.015) | 0.047** (0.015) | 0.018 (0.015) | 0.043** (0.016) | 0.047** (0.017) |
| C33 | 0.018 (0.015) | 0.001 (0.015) | 0.021 (0.016) | 0.017 (0.016) | 0.020 (0.018) |
| 1.igen | 0.164*** (0.045) | 0.125** (0.045) | 0.084* (0.049) | 0.218*** (0.049) | 0.192*** (0.052) |
| 2.dpt | -0.168*** (0.046) | -0.102* (0.046) | -0.108* (0.049) | -0.259*** (0.050) | -0.146** (0.053) |
| 3.dpt | -0.128*** (0.047) | 0.010 (0.046) | -0.219*** (0.050) | -0.192*** (0.052) | -0.080 (0.056) |
| hgpa | 0.384*** (0.042) | 0.265*** (0.041) | 0.348*** (0.047) | 0.408*** (0.046) | 0.427*** (0.052) |
| hrank | -0.025** (0.008) | -0.019** (0.007) | -0.018* (0.009) | -0.025** (0.008) | -0.029** (0.009) |
| F statistic | 11.393 | 5.610 | 8.921 | 11.652 | 9.466 |
| Prob > F | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| R-squared | 0.187 | 0.102 | 0.153 | 0.192 | 0.169 |
| Adjusted R-squared | 0.169 | 0.082 | 0.134 | 0.175 | 0.151 |
| RMSE | 0.486 | 0.484 | 0.520 | 0.530 | 0.577 |
| Number of obs. | 649 | 649 | 649 | 649 | 649 |

Note: Standard errors in parentheses. Stars: *** significant at the 0.1% level; ** at 0.1%; * at 5%

relationships. In addition, β coefficient (a measure of the effect size) and the semi-partial R^2 (an increment in R^2) of each variable is presented in Table 8. Although the total score of the Competency test was statistically irrelevant to the GPAs (Table 7 (1)), the scores

of the components relevant to the problem-solving skills were weak but statistically significant predictors of the GPAs (Table 7 (2) and (3); Table 8 (1) and (2)); the significance was considerable particularly in predicting the GPAs of the discipline specific courses. The admissions

Table 8. Beta (β) and Semi-partial R^2 for the multivariable regression analysis with the Competency large categorical variables:

(1) Regression analysis with the Competency large-category variables.

| Variables | Beta | Semi-partial corr.^2 | Significance value |
|-------------------------------|--------|-------------------------|-----------------------|
| Total GPA (R^2 :0.183) | | | |
| R1 | -0.108 | 0.007 | 0.020 |
| R2 | 0.029 | 0.001 | 0.530 |
| R3 | 0.169 | 0.026 | 0.000 |
| 2.dpt | -0.149 | 0.016 | 0.000 |
| 3.dpt | -0.117 | 0.010 | 0.005 |
| 1.igen | 0.147 | 0.017 | 0.000 |
| hgpa | 0.367 | 0.102 | 0.000 |
| hrank | -0.142 | 0.016 | 0.001 |
| English GPA (R^2 :0.093) | | | |
| R1 | -0.018 | 0.000 | 0.719 |
| R2 | 0.010 | 0.000 | 0.833 |
| R3 | 0.123 | 0.014 | 0.002 |
| 2.dpt | -0.091 | 0.006 | 0.038 |
| 3.dpt | 0.005 | 0.000 | 0.910 |
| 1.igen | 0.106 | 0.009 | 0.013 |
| hgpa | 0.264 | 0.053 | 0.000 |
| hrank | -0.119 | 0.011 | 0.006 |
| d-Options GPA (R^2 :0.147) | | | |
| R1 | -0.115 | 0.008 | 0.016 |
| R2 | 0.048 | 0.001 | 0.312 |
| R3 | 0.155 | 0.022 | 0.000 |
| 2.dpt | -0.095 | 0.007 | 0.026 |
| 3.dpt | -0.185 | 0.026 | 0.000 |
| 1.igen | 0.077 | 0.005 | 0.064 |
| hgpa | 0.318 | 0.077 | 0.000 |
| hrank | -0.100 | 0.008 | 0.016 |
| Cores GPA (R^2 :0.189) | | | |
| R1 | -0.095 | 0.005 | 0.040 |
| R2 | 0.010 | 0.000 | 0.828 |
| R3 | 0.142 | 0.018 | 0.000 |
| 2.dpt | -0.208 | 0.032 | 0.000 |
| 3.dpt | -0.161 | 0.020 | 0.000 |
| 1.igen | 0.176 | 0.024 | 0.000 |
| hgpa | 0.354 | 0.095 | 0.000 |
| hrank | -0.132 | 0.014 | 0.001 |
| Options GPA (R^2 :0.163) | | | |
| R1 | -0.102 | 0.006 | 0.030 |
| R2 | 0.016 | 0.000 | 0.735 |
| R3 | 0.172 | 0.027 | 0.000 |
| 2.dpt | -0.111 | 0.009 | 0.009 |
| 3.dpt | -0.063 | 0.003 | 0.128 |
| 1.igen | 0.149 | 0.017 | 0.000 |
| hgpa | 0.349 | 0.093 | 0.000 |
| hrank | -0.143 | 0.016 | 0.001 |

(2) Regression analysis with the Competency medium-category variables

| Variables | Beta | Semipartial corr.^2 | Significance value |
|-------------------------------|--------|------------------------|-----------------------|
| Total GPA (R^2 :0.187) | | | |
| C11 | -0.037 | 0.001 | 0.429 |
| C12 | -0.028 | 0.000 | 0.593 |
| C13 | -0.090 | 0.004 | 0.068 |
| C21 | -0.036 | 0.001 | 0.436 |
| C22 | 0.028 | 0.000 | 0.576 |
| C23 | 0.057 | 0.002 | 0.232 |
| C31 | 0.047 | 0.002 | 0.287 |
| C32 | 0.118 | 0.010 | 0.006 |
| C33 | 0.051 | 0.002 | 0.230 |
| 2.dpt | -0.148 | 0.016 | 0.000 |
| 3.dpt | -0.113 | 0.010 | 0.006 |
| 1.igen | 0.154 | 0.018 | 0.000 |
| hgpa | 0.363 | 0.099 | 0.000 |
| hrank | -0.146 | 0.017 | 0.000 |
| English GPA (R^2 :0.102) | | | |
| C11 | -0.042 | 0.001 | 0.389 |
| C12 | 0.081 | 0.003 | 0.145 |
| C13 | -0.058 | 0.002 | 0.260 |
| C21 | -0.009 | 0.000 | 0.857 |
| C22 | -0.010 | 0.000 | 0.852 |
| C23 | 0.045 | 0.001 | 0.361 |
| C31 | -0.028 | 0.001 | 0.549 |
| C32 | 0.152 | 0.016 | 0.001 |
| C33 | 0.002 | 0.000 | 0.962 |
| 2.dpt | -0.096 | 0.007 | 0.030 |
| 3.dpt | 0.009 | 0.000 | 0.836 |
| 1.igen | 0.123 | 0.012 | 0.005 |
| hgpa | 0.264 | 0.052 | 0.000 |
| hrank | -0.122 | 0.012 | 0.004 |
| d-Options GPA (R^2 :0.153) | | | |
| C11 | -0.034 | 0.001 | 0.468 |
| C12 | -0.033 | 0.001 | 0.542 |
| C13 | -0.097 | 0.005 | 0.055 |
| C21 | -0.044 | 0.001 | 0.356 |
| C22 | 0.017 | 0.000 | 0.732 |
| C23 | 0.071 | 0.003 | 0.141 |
| C31 | 0.102 | 0.007 | 0.022 |
| C32 | 0.051 | 0.002 | 0.245 |
| C33 | 0.058 | 0.002 | 0.188 |
| 2.dpt | -0.091 | 0.006 | 0.033 |
| 3.dpt | -0.183 | 0.025 | 0.000 |
| 1.igen | 0.075 | 0.004 | 0.073 |
| hgpa | 0.314 | 0.074 | 0.000 |
| hrank | -0.103 | 0.008 | 0.013 |
| Cores GPA (R^2 :0.192) | | | |
| C11 | -0.035 | 0.001 | 0.445 |

| | | | |
|-----------------------------|--------|-------|-------|
| C12 | -0.022 | 0.000 | 0.676 |
| C13 | -0.059 | 0.002 | 0.227 |
| C21 | -0.050 | 0.002 | 0.284 |
| C22 | 0.013 | 0.000 | 0.793 |
| C23 | 0.054 | 0.002 | 0.250 |
| C31 | 0.003 | 0.000 | 0.944 |
| C32 | 0.120 | 0.010 | 0.005 |
| C33 | 0.043 | 0.001 | 0.308 |
| 2.dpt | -0.209 | 0.032 | 0.000 |
| 3.dpt | -0.154 | 0.018 | 0.000 |
| 1.igen | 0.186 | 0.026 | 0.000 |
| hgpa | 0.352 | 0.093 | 0.000 |
| hrank | -0.137 | 0.015 | 0.001 |
| Options GPA (R^2 :0.169) | | | |
| C11 | -0.027 | 0.000 | 0.569 |
| C12 | -0.042 | 0.001 | 0.431 |
| C13 | -0.093 | 0.005 | 0.062 |
| C21 | -0.039 | 0.001 | 0.412 |
| C22 | 0.037 | 0.001 | 0.463 |
| C23 | 0.047 | 0.001 | 0.324 |
| C31 | 0.058 | 0.002 | 0.192 |
| C32 | 0.121 | 0.010 | 0.006 |
| C33 | 0.047 | 0.002 | 0.274 |
| 2.dpt | -0.110 | 0.009 | 0.009 |
| 3.dpt | -0.060 | 0.003 | 0.150 |
| 1.igen | 0.153 | 0.018 | 0.000 |
| hgpa | 0.344 | 0.089 | 0.000 |
| hrank | -0.146 | 0.017 | 0.000 |

category also had positive and highly significant positive correlation with the GPAs of the discipline specific, though the effect size was small (Table 7(2) and (3); Table 8(1) and (2)). The admissions category explained over 2% variance of in the discipline specific core course GPA, even after controlling for the rest of the variables; none of the Competency components explained significant variation in the GPAs beyond that explained by the admissions category.

Similarly, high-school GPA and high-school rank were statistically significant predictors. High-school GPA had a moderate effect for all the kinds of GPA and explained about 10% variance of them; thus, high-school GPA was

the strongest predictor in the variables.

Discussion and Conclusion:

This study examined the relationship of college GPA to personality traits and admissions category and indicated that students with high problem-solving competency and admitted through written academic test earned higher GPA than those admitted through interview-based admission, especially of the discipline specific courses, after controlling for high-school GPA and high-school rank,. The findings that students admitted through written academic test had higher competency for acting to solve problems and that problem-solving competency

had strong correlation with academic achievement sound reasonable; that is because general examinations require intellectual engagement and students admitted through general examinations would have higher cognitive skills which bring them the higher academic performance. However, the result that Personal skills for controlling emotion and motivation and Teamwork skills for building trust between the others and activating teamwork were irrelevant to academic achievement appears to be inconsistent to the literature, in which sociability and emotional stability are important influences on academic achievement (Chamorro-Premuzic & Furnham, 2003; Komarraju, Karau, & Schmeck, 2009; MacCann, et al., 2020; Nofle & Robins, 2007). However, as Burbidge, Horton and Murray (2018) pointed out, while Conscientiousness in the five-factor model, which reflect tendencies towards intrinsic motivation, self-discipline, achievement striving and dutifulness (Furnham, Nuygards and Chamorro-Premuzic, 2013), is a reliable predictor of academic achievement, a third-variable such as college-going-culture can mediate the predictive strength of it. The admissions category reflects college-going cultures in high schools and, thus, could reduce the influence of the other two Competency realms; students admitted through written examination came from higher ranked high-schools (Table (1)), which naturally cultivate a selective-college-going culture and effectively prepare their students to challenge rigorous entrance examinations. A second explanation for low correlation between academic performance and the other two realms is the homogeneity of the sample; the subjects of the analysis were all female and enrolled in the same faculty, even though their academic specialties were different, which may have

restricted individual differences in personality traits. A third explanation is that grade assessment criteria may have been hardly relevant to competency associated with Personal skills or Teamwork skills; otherwise, scores in written examinations may have had a determinant role in grading criteria for the discipline specific courses.

From the admissions perspective, the result that students admitted through interview-based admission were significantly lower in academic achievement, especially in their speciality courses, than those admitted through written academic test indicate that there would be deficiency in the interview-based admissions. Although Onozuka (2022) argued that there were no evidence supporting inferiority of students admitted through interview-based admission in academic performance, the argument would be valid if college is selective and students are admitted from high-ranked high schools, as he suggested. At moderately selective colleges, such as Otsuma Women's, students admitted through interview-based admission tend to come from middle or lower ranked high schools, their motivations, ambition, or aptitude demonstrated at the admission selection process may not necessarily guarantee autonomy in study habits and social activities at college; thus, at the time of admissions, it is difficult to select and assess non-academic attributes or achievements of applicants desirable for the academic specialties. It should be therefore required for admissions committees to trial at least establishing a framework for exploring relationships between admissions scores and college grades, aiming to develop reliable admissions decision criteria for interview-based examinations.

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