

Personality Moderation on Intelligence and Academic Achievement

By: **Khin Nyunt Nyunt Saw**

Lecturer, Department of Educational Psychology, Yangon University of Education, 11041
Kamayut Township, Yangon Region, Myanmar

Email: khinnyuntnyuntsaw@gmail.com

Abstract

Both cognitive and non-cognitive factors are important for success in life and academics. The reason of some undergraduate students, who enrolled in Universities of Education in Myanmar based on high scores on matriculation examination, obtained low scores in academic achievement may possibly be their personality factors. The purposes of the study are 1) to investigate the prediction of general intelligence (*g*) on academic achievement, 2) to find out how personality moderates the relationship between *g* and Grade Point Average (GPA). Quantitative survey method was used and undergraduate students ($N = 328$) from teacher education participated in the study. Participants had to complete Cattell's culture fair test, and Big Five Personality Inventory (BFI). The study found that *g* and GPA are modestly correlated. Among big five personality factors (conscientiousness, openness, extraversion, agreeableness, and neuroticism), only conscientiousness predicted GPA significantly. Moderation analysis found conscientiousness, openness, low emotional stability (neuroticism), and extraversion improved the relationship of *g* with GPA. Teacher education encourages closed tasks in the exam. Students who are interested in social affairs which are important factor for life success acquired low academic achievement.

Keywords: General Intelligence, Personality, GPA

1. INTRODUCTION

Psychologists and pedagogical researchers generally describe two factors namely, cognitive and non-cognitive factors for life success and academic success. Cognitive factors include intelligence and special cognitive abilities and non-cognitive factors include personality, interests, and attitudes. Many educators and researchers have been studying variables like personality and intelligence and their role in academic success. Cognitive ability or intelligence reflects an individual's ability but personality factors reflect an individual's desire. Long-term achievement is better predicted by typical performance tests rather than maximal performance tests (Goff & Ackerman, 1992).

Prospective teachers are future leaders for education. They should have high intelligence and good personality. The undergraduate students of Universities of Education in Myanmar are prospective teachers. Hence, improving their intellectual ability is important to improve the quality of education in Myanmar. Studying prospective teachers' academic success could give insights to their future career success. While teaching, the teachers not only have to apply their intellectual ability but also social problem solving skills. Some undergraduate students enrolled in universities of education in Myanmar based on high scores on Matriculation national examination are assumed to be highly intelligent students.

Kappe and van der Flier's (2012) study on post-secondary students found that intelligence and the big five personality variables were not significantly correlated; however, academic achievement and intelligence are correlated trivially. In this study, only conscientiousness correlated largest with academic achievement measures such as thesis and team project, and GPA. Then, intercorrelations of big five personality traits are low and showed that extraversion and neuroticism are high negatively correlated ($r = -0.41$).

Budsankom, Sawangboon, Damrongpanit, and Chuensirimongkol (2015) found that psychological characteristics have a higher effect on higher order thinking skills than classroom environment followed by intellectual characteristics. The family characteristics effect higher order thinking skills indirectly through the psychological characteristics. This study highlights that psychological factors are better predictors for higher order thinking skills than intellectual factors.

Personality and intelligence are important for academic achievement. According to Rammstedt, Danner, and Martin (2016), emotional stability is a stronger predictor of intelligence than extraversion, openness, and conscientiousness. However, high conscientiousness is associated with lower cognitive ability.

Researchers showed that personality predicts academic achievement stronger than intelligence, especially at the post-secondary level of education (Bratko, Chamorro-Premuzic & Saks, 2006; Conard, 2006; Poropat, 2009). Busato et al. (2000) described the correlation value of intelligence and academic achievement ($r = 0.13$) for university psychology students. As the students became older, the correlation of intelligence with academic achievement decreased. One of the reasons is that low intelligence students drop out at each education stage (Boekaerts, 1995). The meta-analysis result of conscientiousness and academic achievement is $r = 0.24$ (O'Conner & Paunonen, 2007) and $r = 0.22$ (Poropat, 2009). If academic achievement is measured by written performance, it was more strongly predicted by intelligence; whereas academic achievement as measured by classroom participation was strongly predicted by personality, especially extraversion. In a study by Kappe and van der Flier (2010), conscientiousness plays as an important indicator of academic achievement irrespective of its measured way. There was nonlinearity in the association between personality and academic performance. Therefore, it is necessary to investigate the interaction terms of intelligence and personality.

General intelligence scores are positively correlated with income, job prestige, academic achievement, education level, creativity ranging and creativity products in adults career, adult socioeconomic status, life expectancy, job performance, offspring intelligence, and functional independence in old age and negatively correlated with high blood pressure, smoking behavior, long-term unemployment, hospitalization, psychiatric illness, criminal behavior, receiving public assistance, and death by automobile accident (Warne, 2015).

Gottfredson (1997) explained that the effects of intelligence are probability, not guarantee. High intelligence is not enough for life success. Some important traits for success are creativity, motivation, ambition, and conscientiousness.

Some of the personal background variables (e.g., socioeconomic status and family connections) are able to support adult life success. According to the longitudinal study of Spinks et al., (2007), childhood academic test scores and midlife IQ scores were correlated ($r = 0.64$). In Deary, Whiteman, Starr, Whalley, and Fox (2004) study, the correlation result of the same test of participants whose ages at 11 and at 80 was $r = 0.66$. These studies depict that intelligence is a steady ability. Many pathways of success in life require more than just high intelligence.

Based on the literature review, the important effect of cognitive intelligence factor and non-cognitive factors on academic success is recognized. Researches showed that personality is more important than intelligence in post-secondary education level because intelligence difference range is not as large as the high school level. In Myanmar, undergraduate prospective teachers who want to attend the University of Education must get high scores in matriculation examination. They are assumed to have high intelligence. But some students fail in the exams because they are not interested in the subjects or have other personality styles. So, the influence of personality and intelligence of those undergraduate students on education should be investigated.

1.1. Research Objectives and Hypotheses

1.1.1. Objectives

1. To find out whether general intelligence can predict undergraduate prospective teachers' Grade Point Average (GPA).
2. To investigate whether the big five personality factors moderate the relationship between general intelligence and GPA of undergraduate prospective teachers.

1.1.2. Hypotheses

1. General intelligence can predict undergraduate prospective teachers' GPA.
2. Emotional stability can moderate the relationship between the general intelligence and undergraduate prospective teachers' GPA.
3. Conscientiousness predicts the GPA of undergraduate students of education.

1.2. Definition of Key Terms

“**General intelligence** is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience.” (Gottfredson, 1997a, pp. 13).

Personality is the degree of displaying specific traits of an individual (Weisberg, DeYoung, & Hirsh, 2011).

GPA is a short form of Grade Point Average which denotes the average value of accumulated final grades over time.

2. Materials and Methods

2.1. Participants

Undergraduate students (prospective teachers) in third year from the Universities of Education (SUOE) and (YUOE) totally ($N=328$) in Myanmar were selected using convenience sampling method.

Table 1: Numbers of Selected Participants

University	Gender		Total
	Male	Female	
Yangon University of Education	59 (17.99%)	117 (35.67%)	176 (53.66%)
Sagaing University of Education	47 (14.33%)	105 (32.01%)	152 (46.34%)
Total	106 (32.32%)	222 (67.68%)	328 (100%)

2.2. Measures

2.2.1. General intelligence measure

To measure general intelligence, Cattell’s culture fair test of g (Cattell & Cattell, 1963) (scale-3 Form A), which is a non-verbal test with 50 items, was used. This test has direct correlation with pure intelligence factor and correlation with other tests of general intelligence tests.

The test involves four quizzes, which are series, classification, matrices and the last one, conditions (topology). For quiz one to four, two to three items were given to the students showing how to answer the remaining items. The series section contains 13 items; classification section, 14 items; matrices section, 13 items; and conditions section, 10 items.

Culture fair test scale-3 is intended for individuals from the age of 14 to college students and adults of superior intelligence. All items are multiple-choice items with figures. The original reliability is 0.85 for this test. The total time allowed for the Cattell's test is 12.5 minutes (3 minutes for series, 4 minutes for classification, 3 minutes for matrices, 2.5 minutes for conditions). Participants were asked to stop each quiz after the allotted time, and not to look at the next section if they finished each section earlier than the stipulated time. The possible highest score is 50 and the lowest score is 0. Participants get one score for each correct answer. Those students with correct answers for all items will get 50 scores. The reliability of Cronbach alpha value has been reported from 0.85 to 0.91. However, the reliability of the current study is 0.67. When all participants finished all 50 items, they were given a 5-minute break. After that, the remaining tests were given. During the test administration, students were not allowed to speak each other.

2.2.2. Personality measure

For measuring the personality of undergraduate students, the Big Five Personality Inventory (BFI) was used (John & Srivastava, 1999). It contains 44 items for personality traits such as extraversion (8 items), neuroticism (8 items), conscientiousness (9 items), agreeableness (9 items), and openness to experience (10 items). Sample items for extraversion are "I see myself as somewhat who is talkative"; neuroticism, "I see myself as somewhat who worries a lot"; conscientiousness, "Perseveres until the task is finished"; agreeableness "Is helpful and unselfish with others"; and openness to experience "Is curious about many different things". The original English version of BFI is translated into Myanmar. Then, for expert validity, three experts from Educational Psychology reviewed it. The reliability of each personality sub-scales range from 0.430 to 0.773: for conscientiousness, $\alpha = 0.715$; for openness, $\alpha = 0.681$; for extraversion, $\alpha = 0.430$; for agreeableness, $\alpha = 0.594$; for neuroticism, $\alpha = 0.773$; and its opposite end emotional stability,

$\alpha = 0.773$. A 5-point Likert-type scale ranging from “disagree strongly” to “agree strongly” was used. The Cronbach’s alpha value of BFI for current study is 0.631. The possible maximum score for conscientiousness is 45 and minimum score is 9; for openness, possible maximum score is 50 and minimum score is 10; for extraversion, possible maximum score is 40 and minimum score is 8; for agreeableness, possible maximum score is 45 and minimum score is 9; and for neuroticism, possible maximum score is 40 and minimum score is 8.

2.2.3. Academic achievement measure

As for the academic achievement, GPA of participants was asked from the administrators of the two universities. GPA is the average result of final exam marks, tutorial marks, assignment marks and attendance of all subjects that participants got from their second year.

2.2.4. Procedure of Data Collection

The researcher asked permission to collect data from rectors and administrative staff from the two universities. The test administration was done during the class period after taking permissions from the subject teachers. The total number of items they had to answer was 94. The teachers in the universities provided clarifications to the students and motivated them to complete all items. Before they started filling the questionnaire, they were informed of the objectives of the research and the estimated duration. Participation was voluntary, but they were rewarded with pens and chocolates after they completed all questionnaires. The participants could withdraw anytime they wished. The findings of the research would be used to improve education and the participants would remain anonymous. The participants’ second year achievement results of GPA were taken from the registers.

2.2.5. Statistical Analysis

The data were analyzed using SPSS version 23 and Microsoft Excel to conduct mean, standard deviation, correlation, *t*-test, moderation and hierarchical regression analysis.

3. Results

General intelligence test (Cattell’s culture fair test) scores were converted into percentile scores. Percentile scores (97–99) were regarded as very superior, (90–96) as superior, (75–89) as above average, (60–74) as high average, (40–59) as average, (24–39) as below

average, (10–23) as low average, (4–9) as low group, and (1–3) as very low group. Table 2 describes the intelligence groups and their frequencies.

Table 2: Intelligence Level Groups

Intelligence Level	Frequency	Percent
Very Low	9	2.7
Low	22	6.7
Low Average	50	15.2
Below Average	43	13.1
Average	75	22.9
High Average	49	14.9
Above Average	48	14.6
Superior	23	7.0
Very Superior	9	2.7
Total	328	

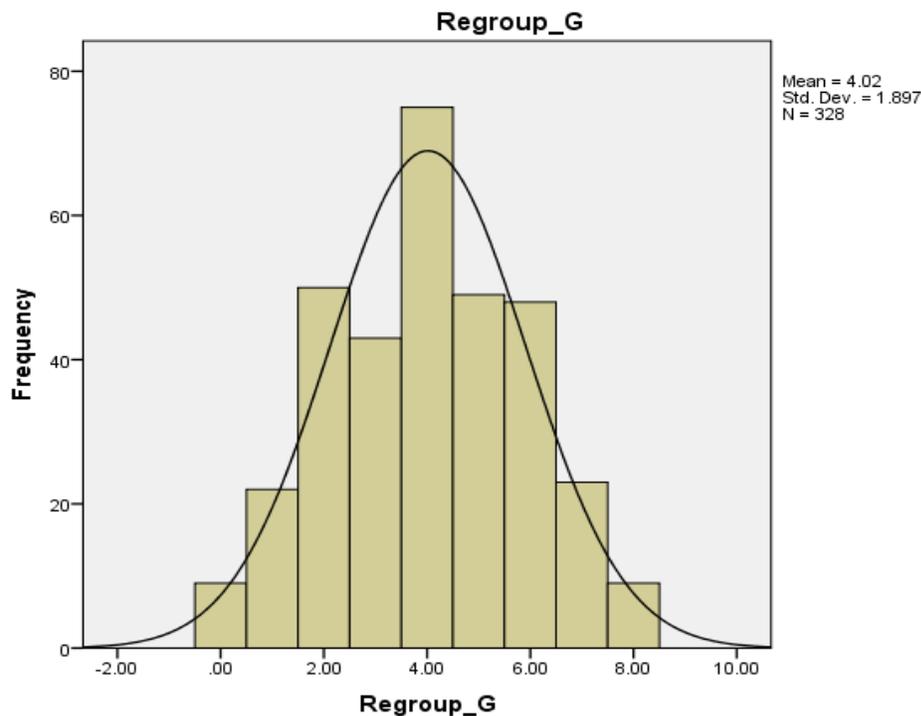


Figure 1. Histogram of Intelligence Groups

The average general intelligence score was 21.99; standard deviation, 4.816; maximum, 34; and minimum, 9.

The mean, median, and mode values of intelligence score were 21.99, 22, and 22, respectively. Since all mean, median, and mode scores were the same, the distribution was normal. The average intelligence score of Cattell's test (21.99) was converted into the IQ score, and its average IQ value (IQ = 98) was obtained. Myanmar National average IQ value is 87 and ranks at 60th percentile among 184 countries (see also Lynn & Vanhanen, 2019). There are 60 countries which have intelligence value below Myanmar National intelligence. Average IQ value is always regarded as IQ = 100 and the other values are classified as follows: above 130, very gifted; 121–130, gifted; 111–120, above average; 90–110, average; 80–89, below average; and 70–79, cognitively impaired (Thiel, 2019). As a result, Myanmar national intelligence value (IQ = 87) was found to be below the average level. Undergraduate students in this study had an average IQ value of 98 which was the average level and higher than the national IQ value.

3.2. Comparison of General Intelligence from Two Universities

Significant differences of two university students were found on general intelligence ($t = 2.612$, $p < 0.01$). YUOE students' g scores were significantly higher than SUOE students' g scores. The reason may be that YUOE is situated in a downtown area of the commercial city, previously capital of Myanmar, which is more populated than Sagaing, where SUOE situated. Students from more developed city obtained more g intelligence score than students from less developed city.

Table 3: Comparison of SUOE and YUOE Students on General Intelligence

Type of Intelligence	University	Mean	SD	t	p	Cohen's d	Degree of Effect Size
General Intelligence	SUOE	21.25	4.597	2.612	0.009	0.29	Small
	YUOE	22.63	4.921				

SUOE= Sagaing University of Education, d = Cohen's d Effect Size

YUOE= Yangon University of Education

Male students' general intelligence mean score is (21.34), standard deviation (22.30). For female students, mean score is (22.30), and standard deviation is (4.821). Gender differences did not exist for *g* scores ($t = -1.697$, $p = 0.091$).

The comparison of the achievement of male students and female students for both YUOE and SUOE is shown in Table 4. Female students got significantly higher scores than male students in both universities. For YUOE sample, $t = -7.934$, $p < 0.01$ with Cohen's *d* effect size (1.27) which was a very large effect size, and for SUOE sample, $t = -5.072$, $p < 0.01$, with Cohen's *d* effect size (.89) which was also a large effect.

Table 4. Gender Differences on GPA

Gender	<i>N</i>	Mean	SD	<i>t</i>	<i>p</i>	Cohen's <i>d</i>	Degree of Effect Size
YUOE							
Male	59	3.67	0.380	-7.934	0.000	1.27	Very Large
Female	117	4.13	0.321				
SUOE							
Male	47	3.86	0.409	-5.072	0.000	0.89	Large
Female	105	4.19	0.291				

* $p < 0.05$, ** $p < 0.01$, YUOE = Yangon University of Education, SUOE = Sagaing University of Education

3.3. Descriptive Statistics of Personality

Descriptive statistics of big five personality measures are described in Table 5.

Table 5: Descriptive Statistics of Big Five Personality Traits

Personality Traits	Mean	SD	Maximum	Minimum	Mean %
Conscientiousness	29.99	4.39	43	18	66.64
Openness	34.55	4.58	48	21	69.1
Extraversion	25.00	3.62	35	12	62.5
Agreeableness	32.01	4.31	43	20	71.13
Neuroticism	22.45	5.53	37	8	56.13
Emotional Stability	25.56	5.53	40	11	63.9

3.4. Gender Differences on Personality

For gender differences on personality factors, independent sample *t*-test result showed that male students were significantly higher on conscientiousness than female students $t = 2.197$, $p < 0.05$ with Cohen's *d* effect size value of 0.24 which was small effect size. For openness factor, male students got significantly higher scores than female students $t = 2.213$, $p < 0.05$ with Cohen's *d* effect size value of 0.24. And then, gender difference was not significant for extraversion factor $t = -1.198$, $p = 0.232$, female value was larger than male value with Cohen's *d* effect size value of 0.16. For agreeableness personality factor, male students got significantly higher values than female students $t = 2.195$, $p < 0.05$ with Cohen's *d* value effect size of 0.24. For neuroticism variable, female students' scores were higher than male students $t = -2.551$, $p < 0.05$ with Cohen's *d* value effect size of 0.28, a small effect size.

Then, Pearson correlation coefficient of the big five personality factors (conscientiousness, neuroticism, agreeableness, extraversion, and openness), *g*, and academic achievement (GPA) are described in Table 6. None of the personality factor was significantly correlated with general intelligence.

Table 6: Intercorrelations among Big Five Personality Factors, General Intelligence and GPA

Personality Factor	1	2	3	4	5	6	7	8	9	10
1. Conscientiousness	-									
2. Neuroticism	-0.210*	-								
3. Agreeableness	0.345*	-0.453*	-							
4. Extraversion	0.161*	-0.132*	0.142*	-						
5. Openness	0.198*	-0.127*	0.214*	0.347*	-					

6. General Intelligence	-0.045	-0.031	-0.044	-0.005	0.106	-				
7. GPA	0.146*	0.001	0.051	0.027	0.015	0.114*	0.290*	-0.067	0.053	-

* $p < 0.05$, ** $p < 0.01$

3.5. Moderator Analysis

The hierarchical regression analysis to test the moderation effect of conscientiousness on the relationship between general intelligence and GPA is shown in Table 7. At the first step of the analysis, gender and university variables were controlled. In the second step, main effect variables (i.e., general intelligence and conscientiousness) were entered. In the third step, the cross-product term of general intelligence \times conscientiousness was entered. The result shows that general intelligence and conscientiousness were significant predictors of GPA ($R^2 = 0.291$, $p < .001$), $F(4,323) = 8.232$, $p < 0.001$. However, the addition of the interaction of (general intelligence \times conscientiousness) had no significant influence on GPA, The change in R^2 was not significant $F(5,322) = 0.003$, $p = 0.959$. Therefore, conscientiousness did not mediate the relationship between g and conscientiousness. Despite no significant interaction effect of conscientiousness and general intelligence on GPA. Figure 2 show that high conscientiousness students had high academic achievement because the R^2 value of low conscientiousness group was 0.049 that was lower than high conscientiousness (0.066). So, 4.9% of general intelligence accounted for GPA of low conscientiousness group and 6.6% of general intelligence can predict GPA of high conscientiousness group. If intelligent students do not have high conscientiousness, their academic achievement would become lower. High conscientiousness students can acquire high academic achievement in spite of less general intelligence. Hard work and self-discipline were more important than intelligence in academic success. On the other hand, low conscientiousness students can also acquire high academic achievement due to high general intelligence and for them, conscientiousness was not very important.

Table 7: Hierarchical Regression: Moderating effect of Conscientiousness on the Relationship between General Intelligence and GPA

Variables	β (Standardized coefficient)	T	R^2	ΔR^2	F for Change in R^2	P
Step 1						
Gender	0.475	10.066***				
University	0.161	3.373**				
			0.255	0.255	55.621	0.000
Step 2						
General Intelligence	0.104	2.186*				
Conscientiousness	0.168	3.573***				
			0.291	0.036	8.232	0.000
Step 3						
General Intelligence × Conscientiousness	0.002	0.051				
			0.291	0.000	0.003	0.959

Dependent variable: GPA, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The moderation effect of emotional stability on the relationship between general intelligence and GPA is described in Table 8. Gender and university variables were controlled in the first step. General intelligence score and emotional stability were entered at the second step. The result showed that the predictions of general intelligence and emotional stability on GPA were not significant ($R^2 = 0.267$, $F(4,323) = 2.683$, $p = 0.07$). In the third step, the cross-product term of general intelligence × emotional stability was entered. The addition of interaction of general intelligence and emotional stability had no significant influence on GPA. The change in R^2 was not significant $F(5,322) = 3.749$, $p = 0.054$. Therefore, emotional stability did not mediate the relationship between general intelligence and GPA.

However, the relationship of g and GPA is lower for the high emotional stability group. The R^2 value for high emotional stability group was 0.004 and R^2 for low emotional stability group was 0.149 (see Figure 2). Low emotional stability (anxiety) can help the students to acquire high academic achievement. High emotional stability or without anxiety can cause a weak relationship between g and academic achievement, in other words, highly intelligent students should have anxiety for high achievement.

Table 8: Hierarchical Regression: Moderating effect of Emotional stability on the Relationship between General Intelligence and GPA

Variables	β (Standardized coefficient)	t	R^2	ΔR^2	F for Change in R^2	p
Step 1						
Gender	0.480	10.025***				
University	0.150	3.131**				
			0.255	0.255	55.621	0.000
Step 2						
General Intelligence	0.094	1.958				
Emotional Stability	0.065	1.360				
			0.267	0.012	2.683	0.070
Step 3						
General Intelligence× Emotional Stability	-0.092	-1.936				
			0.276	0.008	3.749	0.054

Dependent variable: GPA, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The moderation effect of openness on the relationship between general intelligence and GPA is described in Table 9. Gender and university variables were controlled in the first step. General intelligence score and openness were entered at the second step.

The result showed that the prediction of general intelligence and openness on GPA were significant ($R^2 = 0.275$, $F(4,323) = 4.529$, $p < 0.05$). In the third step, the cross-product term of general intelligence \times openness was entered. The addition of interaction of general intelligence and openness had no significant influence on GPA. The change in R^2 was not significant, $F(5,322) = 0.007$, $p = 0.934$. Therefore, openness did not mediate the relationship between general intelligence and GPA. However, the relationship of g and GPA was lower for high openness group. The R^2 value for high openness group was 0.077 and for low openness group was 0.016 (see Figure 2). Although R^2 values were low, it can be assumed that intelligence can predict high academic achievement more for high openness students. Highly intelligent students could have lower academic achievement when their openness was low.

Table 9: Hierarchical Regression: Moderating effect of Openness on the Relationship between General Intelligence and GPA

Variables	β (Standardized coefficient)	t	R^2	ΔR^2	F for Change in R^2	P
Step 1						
Gender	0.490	10.116***				
University	0.150	3.125**				
			0.255	0.255	55.621	0.000
Step 2						
General Intelligence	0.074	1.513				
Openness	0.113	2.339				
			0.275	0.020	4.529	0.011
Step 3						
General Intelligence \times Openness	-0.004	-0.083				
			0.275	0.000	0.007	0.934

Dependent variable: GPA, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The moderation effect of extraversion on the relationship between general intelligence and GPA is described in Table 10. Gender and university variables were controlled in the first step. General intelligence score and extraversion were entered at the second step. The result showed that the prediction of general intelligence and extraversion on GPA were not significant ($R^2 = 0.266$, $F(4,323) = 2.329$, $p = 0.099$). In the third step, the cross-product term of general intelligence \times extraversion was entered. The addition of interaction of general intelligence and extraversion had no significant influence on GPA. The change in R^2 is not significant, $F(5,322) = 0.417$, $p = 0.519$. Therefore, extraversion does not mediate the relationship between general intelligence and GPA. It is found that the relationship of g and GPA was higher for high extraversion group. The R^2 value for high extraversion group was 0.071 and for low extraversion group was 0.036 (see Figure 2). Although R^2 values were low, it can be assumed that highly intelligent students who also show high extraversion can acquire high academic achievement.

Table 10: Hierarchical Regression: Moderating effect of Extraversion on the Relationship between General Intelligence and GPA

Variables	β (Standardized coefficient)	t	R^2	ΔR^2	F for Change in R^2	P
Step 1						
Gender	0.474	9.873***				
University	0.147	3.044**				
			0.255	0.255	55.621	0.000
Step 2						
General Intelligence	0.099	2.003*				
extraversion	0.051	1.062				
			0.266	0.011	2.329	0.099
Step 3						
General Intelligence \times extraversion	0.031	0.645				
			0.267	0.001	0.417	0.519

Dependent variable: GPA, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The moderation effect of agreeableness on the relationship between general intelligence and GPA is described in Table 11. Gender and university variables were controlled in the first step. General intelligence score and agreeableness were entered at the second step. The result showed that the prediction of general intelligence and agreeableness on GPA were not significant ($R^2 = 0.265$, $F(4,323) = 2.182$, $p = 0.115$). In the third step, the cross-product term of general intelligence \times agreeableness was entered. The addition of interaction of general intelligence and agreeableness had no significant influence on GPA. The change in R^2 is not significant $F(5,322) = 1.282$, $p = 0.258$. Therefore, agreeableness did not mediate the relationship between general intelligence and GPA. However, the relationship of g and GPA was higher for low agreeableness group. The R^2 value for high agreeableness group was 0.042 and for low agreeableness group was 0.055 (see Figure 2).

Table 11: Hierarchical Regression: Moderating effect of Agreeableness on the Relationship between General Intelligence and GPA

Variables	β (Standardized coefficient)	T	R^2	ΔR^2	F for Change in R^2	P
Step 1						
Gender	0.479	9.957***				
University	0.155	3.194**				
			0.255	0.255	55.621	0.000
Step 2						
General Intelligence	0.091	1.879				
Agreeableness	0.044	0.917				
			0.265	0.010	2.182	0.115
Step 3						
General Intelligence \times Agreeableness	-0.054	-1.132				
			0.268	0.003	1.282	0.258

Dependent variable: GPA, ** $p < 0.01$, *** $p < 0.001$

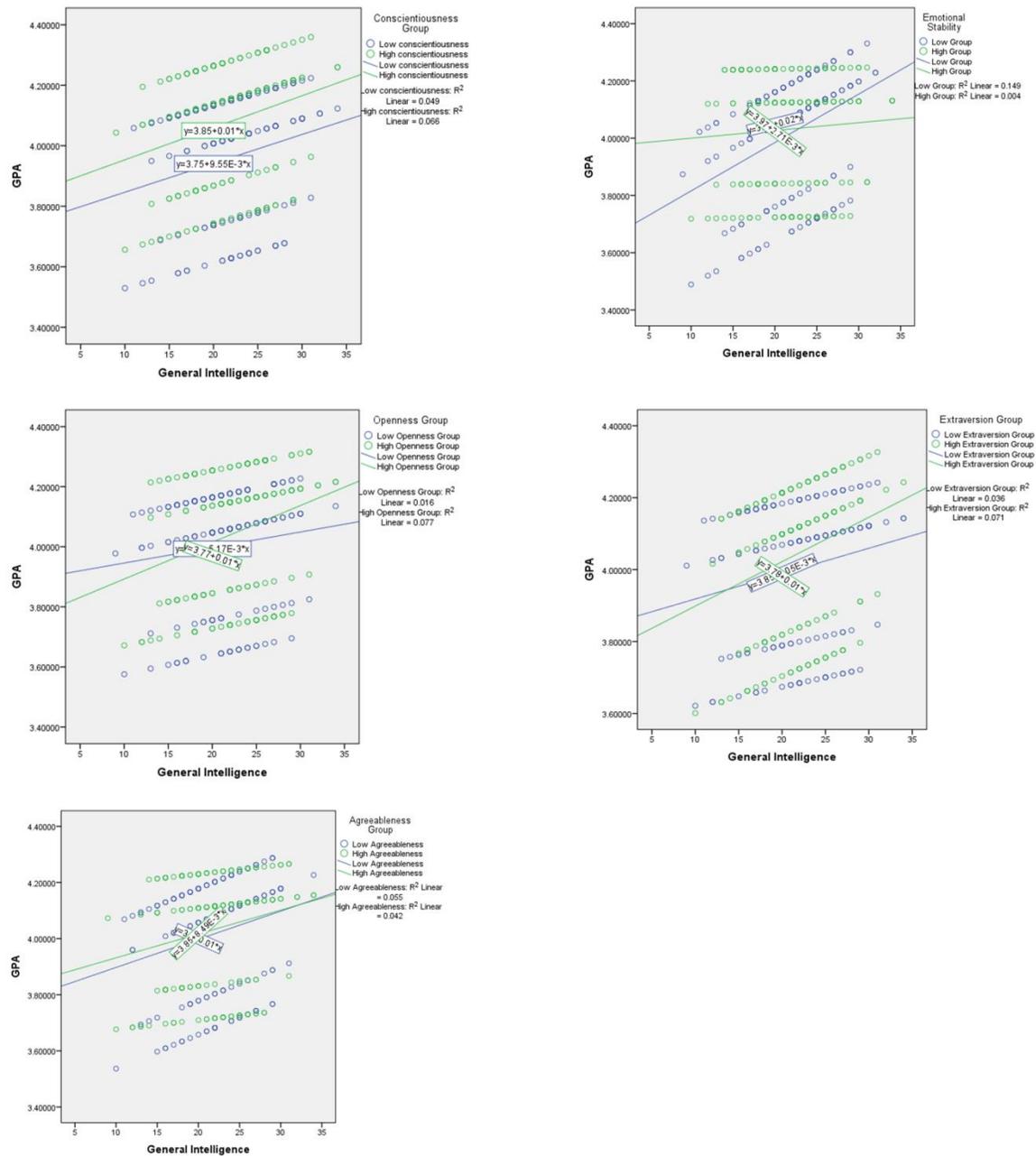


Figure 2. Personality Moderation on Intelligence and Academic Achievement

4. Discussion

4.1. Relationship between General Intelligence and GPA

The relationship between general intelligence and GPA is positively modest significant.

The undergraduate students in this study are assumed to be high intelligent students and the restriction of intelligence range causes low value of correlation. In contrast, Dumfart and Neubauer's (2016) study of secondary school found significant positive correlation between intelligence and GPA because the participants of this study are high school level students. In addition, the non-significant prediction of general intelligence on the academic achievement is possibly due to the use of non-verbal test, and culture fair test to measure intelligence. The meta-analysis of Roth et al. (2015) found that the use of non-verbal intelligence tests has lower correlation with achievement compared to verbal tests than both verbal and non-verbal tests (Farsides & Woodfield, 2003). Intelligence and achievement are more related with science than language (Dumfart & Neubauer, 2016), fine arts, music and sports. The current study is undergraduate students in the education field, and so most of the subjects are related with education (social science). Consequently, the correlation coefficient is not as high as science or engineering. In addition, the students have to memorize the materials or tasks and recall them in the exam. Another reason is that correlation between intelligence and academic achievement vary according to academic levels, declining from primary to secondary education due to range restriction (Jensen, 1980; Poropat, 2009).

4.2. Relationship between Big Five Personality Factors and GPA

The current study found that conscientiousness predicts academic achievement highly among big five personality factors. Conscientiousness predicted academic achievement larger than intelligence especially at the tertiary level. The result is consistent with (De Fruyt & Mervielde, 1996; Dumfart & Neubauer, 2016; Fabio & Busoni, 2007; Goff & Ackerman, 1992; Rosander & Backstrom, 2014; Rothstein et al., 1994). In the study of Poropat (2009), except conscientiousness, the correlation of big five personality factors and academic achievement decrease from primary to tertiary levels. The traits included in conscientiousness are self-discipline, hard work, deliberation, ambition, persistence, diligence, and dutifulness which are essential for not only school success but also job success.

Other personality factors like openness, extraversion, and agreeableness are correlated more with academic achievement for primary level of education (Poropat, 2009).

The present study found that neuroticism is not significantly correlated with academic achievement. This result is in line with Busato et al. (2000), Halamandaris and Power (1999) and Heaven et al. (2002). Some studies have found negative correlation between neuroticism and academic achievement (e.g., Ackerman & Heggestad, 1997). The nature of the relationship between neuroticism and academic achievement is not linear (Eysenck and Cookson, 1969). Anxiety can restrict achievement scores; on the other hand, anxiety is also needed to some extent as a motivation to strive harder for the exam. The result is consistent with Poropat's (2009) meta-analysis which also found that correlation of academic achievement and emotional stability are weaker (nearly zero) than openness and agreeableness.

With regard to openness to experience personality factor, the current study found no significant relationship with academic achievement, which was consistent with Busato et al. (2000), Rothstein et al. (1994), Wolfe and Johnson (1995) which all are tertiary level samples. In contrast, Farsides and Woodfield (2003) found that openness has the strongest association with academic success. The students who enjoy spending time on intellectually demanding tasks are more likely to succeed in academic areas. On the other hand, openness characteristics such as inquisitive behavior may probably encourage being interested in out-of-school activities. This openness characteristic is really useful for intellectually demanding tasks and to solve less-structured problems. Future studies should investigate the openness with post graduate level achievements and in-service performance when the undergraduate students become teachers. This study result showed that openness is highly correlated with successful intelligence rather than general intelligence. It can be assumed openness is a suitable personality factor to real-life problems or ill-structured problems rather than well-structured problems. In Poropat's (2009) meta-analysis, openness is the second-largest predictor of academic achievement.

This study found no association between agreeableness and academic achievement, consistent with Ackerman and Heggestad (1997), Busato et al. (2000), De Fruyt and Mervielde (1996), and Poropat (2009), Rothstein et al. (1994), contrast with Farsides and Woodfield (2003), and Heaven et al. (2002). Agreeable characteristic, like flexible and prosocial behavior can probably improve good relationship with teachers and peers which, in turn, help in refining academic achievement. The weak relationship with academic achievement may possibly be due to the fact that agreeableness is more related with social relationship than academic context.

No significant relationship between extraversion and academic achievement was found which is consistent with (Ackerman & Heggestad, 1997; Farsides & Woodfield, 2003; Furnham & Mitchell, 1991; Halamandaris & Power, 1999; Heaven et al., 2002; Poropat, 2009). In contrary, negative relationship was found in the study of Goff and Ackerman (1992). Extraversion may be associated larger with academic success in presentations, interviews or oral tests but it may not be associated with written examinations. Extraversion characteristics like sociability and assertiveness fall in the interpersonal domain and are not related with GPA. A good social relationship plays an important role for success in life even though it is not important for academic achievement. Poor social relationship cannot lead to success in life. Most of the assessments in undergraduate students are written type but oral tests (presentation) are also included in GPA to evaluate their academic success in both Universities of Education. The present study findings suggest using not only written tests but also oral tests to evaluate achievement in the Universities of Education.

Consistent with many studies, this study found that openness is correlated with intelligence (Poropat, 2009). The current study suggests that openness, agreeableness, and extraversion should be cultivated.

4.3. Comparison of YUOE and SUOE

While comparing the two universities for General Intelligence, it was found that YUOE students got higher scores than SUOE students. This is probably because YUOE is situated in downtown area of commercial city of Myanmar and students have more daily life problems to solve and more chances to improve their general knowledge such as attending

language training and computer training. On the other hand, SUOE is situated separately and outside of downtown area. So, their daily life problems are not as complicated as those of YUOE students.

4.4. Personality Moderation on General Intelligence and GPA

Although intelligence and conscientiousness are the most significant predictors of academic achievement, no interaction effect was found between general intelligence g and conscientiousness on GPA. The personality factor, conscientiousness cannot change the relationship strength of intelligence and academic achievement significantly. The reason is probably that high conscientiousness and intelligence are negatively correlated. An extremely high conscientiousness is due to low intelligence. Moutafi, Farnham, and Paltiel (2004) reported that conscientiousness and intelligence are negatively correlated. Conscientiousness is needed to overcome the low intelligence to reach the same achievement level as the high intelligence students (Moutafi, et al., 2004). Moreover, according to Spinath et al., (2014), school achievement and openness, agreeableness, conscientiousness, neuroticism, extraversion, and learning goals are weakly correlated and the strongest correlations are with intelligence, self-discipline, and ability self-concept. Both conscientiousness and intelligence can improve the academic achievement separately (Poropat, 2009). A student who has high intelligence does not need conscientiousness apparently and vice versa, as they can depend on their intellectual abilities to solve problems and to acquire achievement. Every student needs either conscientiousness or intelligence to acquire high academic achievement. However, the undergraduate students in this study were selected based on high scores on matriculation examination. High conscientiousness is more important for school success than high intelligence. The students received high GPA due to conscientiousness because they already have a high level of intelligence. The addition of higher conscientiousness on higher intelligence leads to high academic achievement.

Even though the R^2 value changes are not significant, a moderation effect of conscientiousness (orderliness, self-discipline, will to achieve, industrious) was found on the relationship between g and GPA. High intelligence students with high conscientiousness (orderliness) can achieve high GPA.

Regarding the hypothesis of emotional stability moderation of g and GPA, emotional stability does not moderate these relationships significantly. This may be due to the relationship between emotional stability (neuroticism) and academic performance, which is not linear. Moreover, intelligence offers greater capacity for managing one's emotional responses for higher intelligence students (Perkins & Corr, 2006).

Despite no significant moderation effects, emotional stability can change the relationship of intelligence and academic achievement to some extent. Low emotional stability group students acquired academic achievement more highly than high emotional stability group students. Anxiety motivates high intelligent students to study harder because of fear of failure in academics. On the other hand, high emotional stability students have less anxiety, and hence, they have less motivation to study. .

The relationship of g with GPA becomes stronger when openness to experience (broad-mindedness, preference for variety, imaginativeness, and resourcefulness) develops. Even though openness characteristics or intellectual curiosity cannot predict academic achievement, it can raise academic achievement when combined with intelligence. According to the meta-analysis by Poropat (2009), openness is still associated with school achievement after controlling for intelligence. Therefore, openness characteristics should be encouraged.

As extraversion rises, the relationship between g and GPA rises. Extraversion characteristics (like assertiveness) can help to get knowledge and information, and improve academic achievement through intelligence. As high extraversion students perform better academically due to their higher energy levels (Rosander & Backstrom, 2014).

The relationship between general intelligence and GPA become robust for low agreeableness group. Agreeableness characteristics such as altruism and kindness encourage doing social work and as a result, it can reduce academic achievement. Students who are interested in social affairs too much are likely to face a decline academic performance, even though they are of high intelligence. Many students who participate in social activities too much have less time to study.

On the other hand, social relationship is required for knowledge sharing. So, the moderation effects values of high agreeableness and low agreeableness groups are very low.

One limitation is probably GPA graded by teachers can cause a ceiling effect. The present study measures personality as five broad factors and not specific facets. The relationship of intelligence with academic achievement depends on specific personality facets (Bergold & Steinmayr, 2018). As a measure of intelligence, the Cattell's culture fair test, which is a non-verbal test, is used. As a result, high intelligence students can be assumed to be high in non-verbal intelligence. However, many measures of academic achievement demand good verbal ability in education.

5. Conclusions

In conclusion, general intelligence (g) and academic achievement (GPA) are modestly correlated. Regarding big five personality factors, only conscientiousness predicts GPA. Other personality factors such as agreeableness, openness, and extraversion do not predict GPA. Neuroticism and academic achievement are nearly zero correlated. Consequently, emotional stability does not moderate the relationship between intelligence and academic achievement significantly. Conscientiousness does not moderate the relationship between general intelligence and GPA significantly. Sociability and intellectual curiosity play crucial role for success in life. Regarding the relationship between general intelligence and GPA, the moderation analysis found that high conscientiousness, low emotional stability, high openness, high extraversion, and low agreeableness make the relationship stronger.

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