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Research Article

Cognitive Ability and Personality Profile of Graduate Students vis-à-vis Their Academic Achievement

Gloria B. Abrazado*, Ralyn B. Rodriguez

Graduate School, Republic Central Colleges, Angeles City 2009, Philippines

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**Corresponding author:*
E-mail:
rccvpaabrazado@gmail.com

ABSTRACT

This study intended to correlate academic achievement of the graduate students with their cognitive ability and personality profile. Descriptive-correlational design was utilized with a total of 24 participants from one private Graduate School, who met the inclusion criteria set in this research. Frequency, percentage, rank, mean and Spearman rho correlation test were used for data analysis. Results show that the majority of the participants demonstrate superior to excellent academic performance in their discipline and the majority have average cognitive abilities based on the MD5 mental ability test. Results further reveal that the majority of the participants are average across personality traits based on Cattell's 16 PF which suggest that they generally possess a well-rounded and balanced approach to their academic and personal lives. It was found in this study that the academic achievement of the participants is not significantly correlated with their cognitive ability and personality profile which may indicate that variations in graduate students' performance may be influenced by factors beyond cognitive ability and measured personality traits, such as motivation and professional experience. The results of the study imply the need of the Graduate School to enhance the average levels of various personality traits by providing opportunities for personal growth, support, and development for graduate students.

Keywords: *Academic achievement, Cognitive ability, Personality profile, Graduate education*

Background

Higher education institutions offering graduate education programs are expected to deliver to the highest academic and professional standards. Pursuant to Commission on Higher Education (CHED) Memorandum Order No. 15, series of 2019, graduate programs are advanced academic undertakings designed to provide higher and more specialized levels of learning. The policy further emphasizes that

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the primary aim of graduate education is to advance knowledge acquisition, generation, sharing, and exchange in ways that are beyond undergraduate education. Accordingly, the CMO identifies the general outcomes of graduate programs as the mastery of a specialized field of study, the cultivation of original and critical thinking, and the demonstration of problem-solving competencies that prepare graduates for advanced scholarly pursuits, leadership in research and creative works, and professional practice within their respective disciplines.

Considering the academic standards from which the graduate programs should adhere to, it is deemed important to examine the factors that shape and support the achievement of students in graduate programs. Determining these factors could establish a framework for assessing the relevance of the graduate program and could serve as an avenue to inform the students and professors about the essential elements to succeed in graduate education.

For several decades, researchers have been interested in understanding the individual factors that contribute to academic achievement and success which can be broadly categorized into individual, social, and institutional factors.

Previous researchers reviewed a number of factors that contribute to student success in graduate education. Among these factors were financial support (Lovitts & Nelson, 2000), and student-advisor relationships (Earl-Novell, 2006; Nathan, 2005; Bain, 2004). Braunstein (2002) found that students' academic achievement in terms of GPA and work experience are positively associated with academic success in the MBA program, implying that greater professional exposure may enhance students' contributions to learning and overall achievement. The results of the multiple regression analysis of Lane et al. (2003) indicated that differences in cognitive ability, prior degree classification, and self-efficacy significantly accounted for 32% of the variability in postgraduate performances.

Specifically, Bain et al. (2011) emphasized that graduate student success is strongly influenced by supportive academic environments, particularly engaged professors, effective advising, and family encouragement, alongside students' enhanced self-esteem resulting from academic achievement. Moderately influential were personal motivation and access to flexible learning resources, while external rewards and material support were viewed as less critical. These findings suggest that, beyond cognitive ability and personality traits, contextual and motivational factors play a substantial role in the performance of graduate students, who often balance studies with work and family responsibilities. Meanwhile, the findings of Collier and Blanchard (2023) underscore the importance of holistic support systems, including effective mentorship, inclusive environments, and financial guidance, in promoting graduate student persistence and academic achievement.

In several review articles analyzed by Sverdlik et al. (2018) regarding the postgraduate experience, two primary sets of factors were identified as influencing the progress and completion of doctoral degrees: university factors and student factors. University factors generally encompass the compatibility with the supervisor and adherence to institutional (especially departmental) expectations and regulations. On the other hand, student factors generally refer to demographic and academic characteristics, including disciplinary background and aptitude, as well as personal life structures such as financial resources, living conditions, and dependent obligations.

Samouei et al. (2022) concluded in their study involving 771 students that some of the personality features, mental health indicators, and personality profile play such a significant role in the students' educational life that the disorder in any of them affects the students' educational performance and academic failure. The results further revealed that students' educational performance was significantly predicted by education, age, gender, and mental health–related variables, particularly depression and hypochondria

The Big Five personality factors except conscientiousness and the three approach to learning dimensions were found to be poor predictors of academic performance (Duff et al., 2004). Conscientiousness as a predictor of the academic performance was also found in the study of Caprara et al. (2011), Buju (2013), Chamorro-Premuzic and Adrian Furnham

(2003), De Feyter et al. (2012), Lievens et al. (2002), Paunonen and Ashton (2001), Mammadov (2021), and Smith et al. (2023).

In the study of Shehzad (2022), it was found that there was an association between depression, anxiety, and stress with students' academic performance. Medical students with low levels of depression (84.4%), anxiety (84.4%), and stress (83.8%) demonstrated higher academic performance. Significant correlations were observed in the study of Poropat (2009) between academic performance and agreeableness, conscientiousness, and openness. Importantly, in studies where conscientiousness was examined alongside intelligence, its correlation with academic performance remained largely unaffected. Moreover, even after controlling for secondary academic performance, conscientiousness contributed substantially to predicting tertiary academic performance, comparable to the contribution made by intelligence. In their findings, Osamika et al. (2021) observed that agreeableness, conscientiousness and openness had positive relationship with academic success. Beltran-Velasco et al. (2021) also concluded that university students with higher academic performance tended to exhibit greater levels of agreeableness. On the other hand, findings of Mohammed (2006) reveal that openness and neuroticism were positively related to students' academic achievement and were more important predictors of overall grade of the students than agreeableness and conscientiousness. The research of Mateus et al (2021) highlights that while certain personality traits like abstractedness and perfectionism can positively influence academic performance, openness to change does not have the same impact.

In the meta-analysis reports of Mammadov (2021), nearly 28% of the differences in how well individuals perform academically can be attributed to a combination of their cognitive abilities and personality traits. In the analysis, cognitive ability was identified as the primary predictor, accounting for 64% of relative importance. Conscientiousness also emerged as a strong predictor of academic performance, explaining 28% of the variance even after controlling for cognitive ability. According to Osamika et al. (2021), the personality traits of students play a crucial role in promoting psychological well-being and achieving academic success.

Given the literatures reviewed, it is important to understand the interplay between personality traits and academic performance among graduate student to help them develop strategies to boost motivation and engagement leading to greater satisfaction and success in the graduate programs.

In Figure 1, the conceptual paradigm of this research is illustrated. The academic achievement is a measure of how well an individual has performed in their educational pursuits, reflecting their mastery of concepts, skills, and the ability to apply knowledge effectively. In this study, it is quantified by a general weighted average of the participants. Another variable is the cognitive ability which was described based on the performance of the participants in the MD5 mental ability test. This test assesses mental abilities across a broad spectrum of educational backgrounds and skill levels, making it useful for staff selection, placement, and counselling (Buros Center for Testing, 2017). Cognitive ability refers to the mental capabilities involved in processes such as reasoning, problem-solving, learning, memory, and decision-making. It is used to describe anything related to thinking, learning, and understanding (Cherry, 2024).

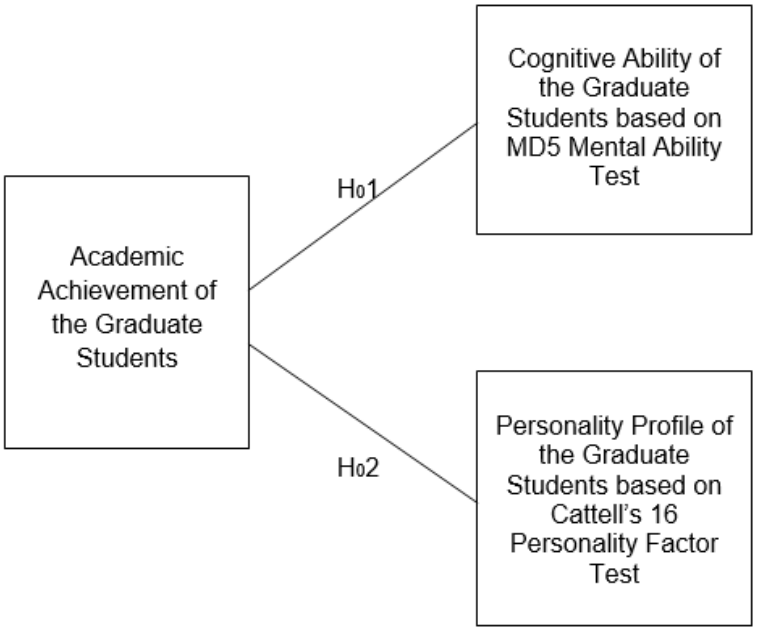

Figure 1. Cognitive Ability and Personality Profile of Graduate Students in Relation to Their Academic Achievement

Meanwhile, the personality profile of the participants was described based on Cattell's 16 Personality Factor (16 PF) test. The 16PF is "a comprehensive measure of normal-range personality found to be effective in a variety of setting where an in- depth assessment of the whole person is needed" (Boyle et al., 2008, p. 136). Based on Cattell's factor-analytic theory, this instrument assesses personality at multiple levels, including 16 primary factors and five global factors (as cited in Boyle et al., 2008). The 16 primary factors, representing the basic dimensions of individual differences, consist of warmth, reasoning, emotional stability, dominance, liveliness, rule-consciousness, social boldness, sensitivity, vigilance, abstractedness, privateness, apprehension, openness to change, self-reliance, perfectionism, and tension. These traits are subsequently grouped into overarching global factors.

The five global factors also known as second-order factors represent broad dimensions of personality derived from the 16PF. These are (1) extraversion which reflects the degree of sociability, assertiveness, and enthusiasm of a person; (2) anxiety or neuroticism that represents emotional stability versus instability; (3) receptivity or tough-mindedness which contrasts practicality and independence with sensitivity and openness to new experiences; (4) independence that reflects self-sufficiency and assertiveness versus a tendency to conform and rely on others; and (5) self-control which represents the degree of self-discipline and restraint versus impulsivity and spontaneity.

While previous studies show correlations of personality factors particularly Big Five personality traits with academic performance, Green et al. (1991) reported that academic performance was not related to any of Cattell's personality factors in a study involving 140 medical students at the University of Wales.

Correlating the cognitive ability and 16PF with academic achievement contributes to the body of knowledge particularly in education and behavioral sciences, offering insights that can inform teaching practices, curriculum design, and educational policies.

Specifically, this study aimed to:

1. Describe the academic achievement of the participants based on their general weighted average.
2. Describe the cognitive ability of the participants based on the MD5 mental ability test.
3. Describe the personality profile of the participants based on Cattell's 16 Personality Factor test.

4. Correlate the academic achievement of the participants with their personality and cognitive ability.

The researchers intended that this research can help in understanding the complex interplay between personality and learning, leading to more effective educational strategies that can improve graduate educational outcomes and support graduate student well-being.

Methods

This research used descriptive-correlational research design as it aimed to describe graduate students' academic achievement, cognitive ability and personality profile, and determine the relationship of these variables. Total enumeration was employed wherein 24 students consented to participate in this study. The respondents were drawn from three graduate programs of one private higher education institution in Pampanga, Philippines: the Master of Arts in Education (MAEd) group with majors in Educational Management, English, and Filipino, comprising 50% of the respondents; the Master in Public Administration (MPA) with 41.7%; and the Master in Business Administration (MBA) with 8.3%. Participation was strictly voluntary in compliance with ethical standards and the respondents should have met the inclusion criteria requiring them to have completed all academic requirements and to have taken the comprehensive examination in the Graduate School during the School Year 2023-2024. While this appropriately represents the target population, the study acknowledges that the small sample size limits the generalizability of the results of the study.

Archival data were obtained from the Registrar Office and the Guidance and Counselling Office. Confidentiality of the data were safeguarded through password-protected files.

Descriptive statistics like mean, standard deviation, frequency, and percentage, were used to describe the characteristics of data while Spearman rho correlation test was utilized to correlate the variables of interest.

The strength and the direction of relationship were determined based on the scale of Dancey and Reidy (2004). P values less than .05 entails significance in the relationship, hence, rejection of the following null hypotheses: $H_0$1: there is no significant relationship between academic achievement and cognitive ability based on MD5 Mental Ability Test, and $H_0$2: there is no significant relationship between academic achievement and personality profile based on Cattell's 16 Personality Factor test.

Results and Discussion

Table 1 presents the data on the academic achievement of the participants. It can be seen that, on the average, the participants achieved excellent academic performance having a mean grade of 93.84 or 94% and a standard deviation of 1.74. The highest grade recorded was 97.55 while the lowest grade was 90.80. One participant obtained marked excellence having a grade of 97-100. The finding that the participants are performing at an excellent level suggests that they are meeting or exceeding the rigorous demands of graduate-level education. It may indicate that the students are capable, motivated, and well-prepared for the challenges of advanced study.

Table 1. Distribution of the Participants according to Academic Achievement

Academic Achievement	Frequency	Percent
97%-100%	1	4.2
94%-96%	12	50.0
91%-93%	11	45.8
Total	24	100.0
Mean	93.84	
Std. Dev	1.74	

Data in Table 2 show the cognitive ability of the participants based on MD5 Mental Ability Test. Most of the participants (13, 54.2%) obtained average rating, 10 (41.7%) were below average, and one (4.2%) scored above average.

The finding suggests that more than half of the group demonstrated mental abilities that are typical for their level. The participants are performing at a level that aligns with what is generally expected in terms of mental ability. This could indicate that they have the cognitive skills necessary to handle the demands of graduate-level work. Notably, one individual demonstrated higher mental ability compared to the rest of the group. This participant stands out in terms of cognitive abilities, which might be reflected in his/her academic performance. However, nearly half of the group performed at a level lower than what is expected. These participants might be facing challenges in areas measured by the mental ability test, such as reasoning, problem-solving, or other cognitive tasks which are being carried out in their graduate studies. Furthermore, standardized tests like MD5 measure reasoning ability under timed conditions, which may not fully capture a student's ability to learn and perform over longer periods.

Table 2. Distribution of Participants according to Cognitive Ability based on MD5 Mental Ability Test

Cognitive Ability	Frequency	Percent
Above Ave.	1	4.2
Average	13	54.2
Below Average	10	41.7
Total	24	100.0
Mean	25.75	
Std. Dev	6.738	

The mean score of the participants on this test was 25.75, indicating that, on the average, the group demonstrated a moderate level of mental ability as measured by the test. This score reflects the centrality of the group's cognitive performance across verbal, numerical, and abstract reasoning tasks.

Although a significant portion of students scored below average on the MD5 Mental Ability Test, most still achieved superior to excellent academic performance. This aligns with research indicating that academic achievement is influenced not only by cognitive ability but also by non-cognitive factors such as personality and psychological well-being (Privado et al., 2024), peer effect (Hernández-Julián & Peters, 2017) and motivation (Kriegbaum, et al., 2018, Stover et al., 2014). These factors have been shown to contribute to academic outcomes beyond general cognitive ability. Further, it was reported that non-cognitive skills and dispositions hold equal or greater importance than cognitive abilities in shaping educational outcomes and employment potential (Khine & Areepattamannil, 2016).

Data about the frequency and percentage distribution of the participants according to primary personality factors were noted. In terms of warmth, 22 (91.7%) were average and two (8.3%) were reserved; 14 (58.3%) demonstrated concrete reasoning while 10 (41.7%) were average; as to emotional stability, 18 (75.0) were average, 4 (16.7%) were reactive, and 2 (8.3 5) were emotionally stable; in terms of dominance, 40 were (83.3%) were average and 4 (16.7) were cooperative; in liveliness, 20 (83.3%) were average and 4 (16.7%) were serious; in terms of rule consciousness, 23 (95.8%) were average and one (4.2%) was expedient; 17 (70.8%) were found to be average in social boldness, five (20.8%) were shy, and two (8.3&) were socially bold; as to sensitivity, 19 (79.2%) were average, three (12.5%) were objective, and two (8.3%) were sensitive; as to vigilance, 11 (45.8%) were average, 11 (45.8%) were vigilant, and 2 (8.2%) were trusting; in terms of abstractedness, 23 (95.8%) were average and 1 (4.2%) was imaginative; 21 (87.5%) were average in terms of privateness and 3 (12.5%) were private; 23 (95.8%) were average in apprehension and one was (4.2%) apprehensive; 15 (75.0%) were average in terms of openness and six (25.0%) were experimenting; 22 (91.7%) were average in self-

reliance and two (8.3%) were self-reliant; 17 (70.8%) were average in perfectionism and seven (29.2%) were perfectionist; and lastly, 21 (87.5%) were average as to tension, two (8.3%) were relaxed, and one (4.2%) was tense.

Data show that the majority of the participants were average in terms of emotional stability, warmth, dominance, liveliness, rule consciousness, social boldness, sensitivity, abstractedness, privateness, apprehension, openness, self-reliance, tension, and perfectionism. Being average across these personality traits may imply that they generally possess a well-rounded and balanced approach to their academic and personal lives. This balance allows them to handle the demands of graduate school effectively, from managing stress to collaborating with peers and engaging in both practical and theoretical work. While they are likely to succeed in their programs, there may also be opportunities for further development in specific areas to enhance their academic and professional outcomes.

In terms of reasoning, findings show that the majority of them were concrete while as to vigilance, many of them with equal frequency were vigilant and average. Being concrete in their reasoning may imply that they prefer dealing with clear, practical information rather than engaging in abstract or theoretical thinking. This may mean they are more comfortable with tasks that involve concrete details, such as following instructions, working with data, or solving problems that have clear, real-world implications. While graduate studies typically require abstract and critical thinking, a preference for clear and practical information may reflect a learning orientation that is shaped by the professional backgrounds of the respondents, many of whom are professional practitioners in education, public administration, and business. These fields often emphasize the application of knowledge to real-world problems, which may lead students to value concrete, experience-based understanding alongside theoretical engagement. This is aligned to adult learning theory which suggests that adult learners prefer practical, problem-centered learning tied to real tasks, which can initially appear more concrete than abstract (Knowles et al., 2015) and in the experiential learning models that states that concrete experience can serve as a foundation for subsequent abstract conceptualization (Kolb, 1984).

With these results, it can be implied that the participants may prefer clear, structured assignments and may find it easier to engage with coursework that has direct, observable outcomes. They may excel in projects or case studies in the graduate program that allow them to work with data and see the immediate impact of their work.

On the other hand, those who are vigilant in the context of personality tend to be more alert, cautious, and wary of potential problems, often carefully assessing situations to avoid being misled or taken advantage of. Those with average levels of vigilance may be more adaptable in group work or collaborative projects.

Data on the frequency and percentage distribution of the participants according to global personality factors were also reported. Considering extraversion, 23 (95.8%) were average and one (4.2%) were introverted; 17 (70.8%) demonstrated average anxiety, five (20.8%) high anxiety, and two (8.3%) were low anxiety; 21 (87.5%) were average in toughmindedness, two (8.3%) were receptive, and one (4.2%) was tough-minded; in terms of independence, 22 (91.7%) were average and two (8.3%) was accommodating, and lastly, as to self-control, 21 (87.5%) were average, two (8.3%) were unrestrained, and one (4.2%) was self-controlled.

Data reveal that the majority of the participants demonstrated average personality in terms of extraversion, anxiety, toughmindedness, independence, and self-control. The findings suggest that graduate students with average extraversion are likely to be moderately social, enjoying social interactions but also value time spent working independently on their studies. This balance is crucial in graduate school, where both collaboration and individual work are important. Meanwhile, students with average anxiety are likely to manage academic pressures well, experiencing enough anxiety to stay motivated and alert but not so much that it impairs their performance. With average tough-mindedness, the results imply that the participants balance practicality with empathy and openness to new ideas which is

useful in graduate studies, where students need to analyze data and evidence critically but also remain open to new perspectives and the implications of their findings. Students with average independence are self-reliant but also recognize the value of collaboration and advice from others. Lastly, the participants' average level of self-control may mean that they can be flexible and adaptive to changing circumstances, such as unexpected academic challenges, while still staying focused on their goals.

Table 3 shows the results of the correlational test among the variables. It was found in this study that the academic achievement of the participants has no statistically significant relationship with the cognitive ability of the participants based on the MD5 mental ability test. This is in contrast with the findings of the previous studies that cognitive ability is correlated with post graduate performance (Lane et al., 2003).

Moreover, the participants' personality profile based on Cattell's 16 personality factor psychometric tool did not also show statistically significant relationship with the participants'' academic achievement. This is parallel with the results of Green et al. (1991) that personality traits as defined by the Cattell's 16PF model did not play a significant role in determining academic achievement.

According to Mammadov's (2021) study, cognitive abilities and personality traits together explain about 28% of the variation in academic performance among individuals. While these factors are important, they are not the sole determinants of academic success; other factors account for the remaining 72% of the differences.

Table 3. Correlation between Participants' Academic Achievement and Their Cognitive Ability and Personality Profile

Items	Correlation Coefficient	Sig. (2-tailed)
Cognitive ability	.320	0.127
Primary Personality Factors		
Warmth	0.107	0.69
Reasoning	0.299	0.156
Emotional Stability	-0.037	0.864
Dominance	-0.29	0.327
Liveliness	-0.281	0.184
Rule Consciousness	0.271	0.308
Social Boldness	0.068	0.752
Sensitivity	-0.096	0.656
Vigilance	-0.294	0.168
Abstract	0.093	0.665
Privateness	0.048	0.822
Apprehension	-0.063	0.770
Openness	-0.140	0.513
Self-Reliance	0.197	0.357
Perfectionism	0.314	0.315
Tension	0.093	0.135
Global Personality Factors		
Extraversion	-0.097	0.652
Anxiety	-0.084	0.696
Toughmindedness	0.177	0.409
Independence	-0.311	0.139
Self-Control	0.047	0.828

One limitation of the study is the small sample size which was limited to graduate students who had complied with all academic and examination requirements of the program. Although

this ensured that participants possessed adequate academic exposure relevant to the variables studied, the limited number of respondents restricts the generalizability of the findings to other graduate populations. The results should therefore be interpreted with caution, and future studies involving larger and more diverse samples are recommended.

Conclusion

Based on the results of the study, the participants demonstrate superior to excellent academic performance based on their general weighted average. The majority of them have average cognitive abilities based on the MD5 mental ability test. Educators and administrators might need to be aware also that a portion of graduate students are not performing at an average or above-average level in terms of mental ability. This could indicate a need for targeted interventions, such as academic support services, to help these students develop the cognitive skills necessary for success in the graduate program specifically to meet the demands of their coursework and research.

Considering Cattell's 16 Personality Factors, majority of the participants are average in terms of warmth, emotional stability, dominance, liveliness, rule consciousness, social boldness, sensitivity, abstractedness, privateness, apprehension, openness, self-reliance, perfectionism and tension. Further, the majority have average personality in terms of extraversion, anxiety, toughmindedness, independence, and self-control. Given this, the Graduate School should build on the average levels of various personality traits by offering opportunities for personal growth, support, and development of graduate students to enhance their strengths and work on areas where they may need additional support, ultimately leading to improved overall well-being and success. Specifically, workshops and training programs focused on enhancing key personality traits like emotional stability and self-reliance may be provided.

It was also shown in the results that the academic achievement of the participants does not correlate significantly with their cognitive ability based on MD5 Mental Ability test and personality profile based on Cattell's 16PF. The absence of a significant correlation between academic performance, and cognitive ability and personality traits may be due to the small sample size that may have limited the statistical power to detect personality effects, and to the assessment of academic performance that is based on institutional grading system and comprehensive examination results, which may reflect structured evaluation and compliance with program requirements. Moreover, the respondents were graduate students from different professional programs whose motivation and performance may be more heavily influenced by prior professional experience, intrinsic goal orientation, or program-specific requirements than by personality traits.

Future researchers may consider other aspects, such as skills, learning strategies, and environmental factors, when trying to understand and enhance academic performance of graduate students.

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