

Big Five Traits and Academic Performance: Mediation of Metalinguistic Awareness

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ABSTRACT: Lexical hypothesis suggested that natural language development is an underlying relationship between big five traits and metalinguistic awareness. Academic performance is also strongly influenced by the natural language development. Hence, the objective of the present study was to examine the relationships among these three variables particularly highlighting the mediation of metalinguistic awareness between big five traits and academic performance. Three hundred sixty undergraduate students completed the Five Factor Inventory, metalinguistic test and reported their grade point average. All the correlations between big five traits, three measures of metalinguistic awareness and GPA were significant. Regression analyses showed that big five traits explained significant variances in each of the three measures of metalinguistic awareness. Two separate multiple regression analyses having big five traits and metalinguistic awareness as predictors on GPA showed that while big five traits explained 24% of variances in GPA, metalinguistic awareness explained 35%. Subjecting the data to hierarchical multiple regression analysis by entering big five traits in the first and metalinguistic awareness in the second step, beta coefficients were decreased for each of the big five traits. Analysis of mediation effect by Sobel's test pointed out that neuroticism, openness, and conscientiousness are significantly mediated by all the three measures of metalinguistic awareness while extraversion and agreeable were mediated by metalinguistic recognition and reproduction.

KEY WORDS: Big Five traits, lexical hypothesis, metalinguistic recognition, reproduction, error correction

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I. INTRODUCTION

1.1 The lexical hypothesis

The aim of the research is to study the relationships between personality traits and academic achievement. First of all, it is important to consider why personality traits should be expected to correlate with academic performance when most measures of personality, including the Five Factor Model (FFM), were not designed to predict academic performance (1). However, there are many good reasons to expect that the FFM dimensions should predict academic performance because of the theoretical position that initially guided its development. For example, the lexical hypothesis (2) was the theoretical basis for the FFM which claimed that there is an evolutionary advantage in being able to identify valuable differences among people and that natural languages are developed in ways that would aid this identification (28). Further, a corollary of the lexical hypothesis states that in the natural languages more descriptors are used to identify more valued features of human personality. This in turn implies that it should be possible to determine the valued features of human personality by identifying its descriptors that have similar meanings in a natural language. In fact, the lexical hypothesis inspired factor analyses of comprehensive sets of personality descriptors, resulting in the development and validation of the Five Factor Model (28). Hence, the theory clearly suggested a strong relationship between big five personality traits and natural language development, which is also a profound predictor of academic performance. Arising from this logic, it may be hypothesized that metalinguistic awareness, a significant component of the natural language development, would mediate between big five traits and academic performance.

1.2 Cross-linguistic evidence

Further, FFM has also been established from analyses of varied linguistic items of different cultures and language groups (e.g., 13, 17, 18). Hendriks et al., (2003) confirmed the Five Factor Model drawing from 14 different language groups, which not only provided evidence for the FFM but also for a lexical origin of the FFMs. Further, other models of personality developed on the basis of the lexical hypothesis (e.g., 3, 27) do not contradict the FFM, rather they add to it. Even, Saucier (2003) re-oriented the FFM dimensions following the

lexical hypothesis. The FFM remains by far the most widely researched personality model based on the lexical hypothesis, and hence forms the basis for examining the academic performance. It may be proposed that if the lexical hypothesis is the basis of FFM, then dimensions of the FFM should be related to the academic behaviors and their outcomes for the students. Although prior studies (e.g., 6, 26) have examined this relationship, the extent to which each attribute of metalinguistic awareness mediates the relationship between each of the Big five traits and academic performance have not been examined.

Another important reason to examine the relationship between Big five traits and academic performance is that every society has substantial investment in the education of their children and hence they place a high value on the educational their performance. Therefore, it is an obligation of the social scientists to help people know how personality of the students is also a fact behind their academic performance. Further also, researchers have proved that intelligence; socioeconomic status and personality affect the socially valued behaviors of people. Performance in academic settings is determined by factors relating to capacity to perform, opportunity to perform, and willingness to perform (11, 31). Capacity incorporates knowledge, skills and intelligence; opportunity to perform is affected by environmental constraints and a resource including socioeconomic resources (31), but willingness to perform reflects motivation, cultural norms and personality (11). All these reasons support to examine a mediating link between Big five factors and academic performance.

1.3 Big five traits and academic performance

De Raad and Schouwenburg (1996) argued that Agreeableness may have some positive impact on academic performance by facilitating cooperation with learning processes. This is consistent with later research that found Agreeableness was linked to compliance with teacher instructions, and effort and staying focused on learning tasks (33). Conscientiousness as the FFM dimension most closely linked to the ‘will to achieve’ (15), the ‘W’ factor described by Webb (34), has often been linked to academic performance (14). This factor is associated with sustained effort and goal-setting (4), both of which contribute to academic success (29), as well as compliance with and concentration on homework (32), and learning-related time management and effort regulation (10).

People who are low on Emotional Stability are more anxious and tend to focus on their emotional state and self-talk, thus interfering with attention to academic tasks, thereby reducing performance (14). More positively, Emotional Stability is associated with self-efficacy (20), which is positively correlated with academic performance (26). De Raad and Schouwenburg (14) argued that students who are high on Extraversion would perform better academically because of higher energy levels, along with a positive attitude leading to a desire to learn and understand. On the other hand, they cited Eysenck (16) who suggested that these same students would be more likely to socialize and pursue other activities rather than studying, leading to lower levels of performance. Unfortunately, it is not clear from De Raad and Schouwenburg (14) which of these effects is more likely to affect academic performance of students who are high on extraversion.

Finally, De Raad and Schouwenburg (14) stated that Openness appears to reflect ‘the ideal student, because of its association with being foresighted, intelligent and resourceful. Correspondingly, Openness is positively correlated with approach to learning (33), learning motivation (30) and critical thinking (10), and it has also the strongest negative correlation with absenteeism (21). In summary, a range of arguments support associations between academic performance and each of the FFM dimensions. Most of these arguments depend on correlations between FFM measures and other constructs that have been associated with academic performance. Although suggestive, such arguments are inconclusive because the correlations cited in the various studies are not strong enough to definitively establish the corresponding FFM–academic performance relationships. This emphasizes the importance of directly testing the relationships between the FFM dimensions and academic performance and it is the primary objective of the present study.

The above discussions, relevant citations and analyses of prior research lead to believe that Big five personality traits moderated by several sociocultural and environmental factors influence the academic performance. All the moderating variables cannot be included under the scope of the present study because of the fact that it would increase the complexity of the design to be difficult to deal with. Admitting the limitation, the present study examined the relationship between big five personality traits and academic performance of the college students addressing the moderating effects of metalinguistic awareness.

1.4 Metalinguistic awareness and academic performance

Metalinguistic awareness refers to the ability to consciously reflect on and manipulate the rules, structures, and functions of language (24). This construct has emerged as a crucial component in student’s cognitive, linguistic, and academic functioning (7). Researchers have found that metalinguistic awareness of students largely explained their ability for execution and transfer of linguistic knowledge and function across the domains of linguistic and academic behavior (9). These studies indicate that metalinguistic awareness learned in one academic condition is transferred to the other academic conditions, enhancing a global skill among the

students for better academic performance (8,12). Several studies have reported strong correlations between attributes of metalinguistic awareness and academic performance of students under different disciplines of study (e.g., 23, 22). Hence, no doubt, metalinguistic awareness is a strong predictor of academic performance.

1.5 The current research

Prior studies have established that both big five traits and metalinguistic awareness are associated with academic achievement of students; but not much is known about the joint influence of big five traits and metalinguistic awareness on academic achievement. It is also not known how metalinguistic awareness mediates the relationship between big five traits and academic performance. Therefore, the present research sought to fill this gap in the literature by examining relationships between big five traits, metalinguistic awareness and academic performance and also by examining the extent to which relationships between big five traits and academic achievement might be mediated by specific aspects of metalinguistic awareness. Specifically, the following hypotheses were tested:

II. HYPOTHESES

The FFM was developed and validated on the basis of performances in tests on natural language descriptors. Metalinguistic awareness is a level of development of natural language where the child becomes flexible in manipulating the context of the language to develop complex semantic networks for derived meaning of the language.

Hypothesis I: Hence, it is hypothesized that there would be significant relationships between big five traits and measures of metalinguistic awareness.

Language is no doubt the forerunner of academic performance. Studies have reported that students with better metalinguistic awareness perform better in academic performance.

Hypothesis II: Hence it is hypothesized that there would be significant relationships between metalinguistic awareness and academic performance.

Admitting the principles of lexical hypothesis, natural language development is the underlying factor for big five traits, metalinguistic awareness, and academic achievement.

Hypothesis III: Hence it is hypothesized that the measures of metalinguistic awareness would mediate the relationships between big five traits and academic performance.

III. METHOD

Participants were 360 undergraduate college students, including equal number of boys and girls who completed the Five Factor Inventory (NEO-FFI), Metalinguistic tests (25), and reported their current GPA. In the sample, students represented all the undergraduate classes from 1st year to 3rd year in equal numbers from each class. They were from three different measures namely arts, science and commerce ranging between 17 and 20 years of age. The NEO-FFI consists of 60 items designed to assess the big five personality traits. It is the most widely used and robust measure of personality traits with sound psychometric properties established by previous researchers (3). In the present study, the Cronbach alpha values for each subscale's internal consistency were as follows: .81 (neuroticism), .77 (extraversion), .72 (openness), .78 (agreeableness), and .86 (conscientiousness). The metalinguistic test included three measures namely; metalinguistic recognition, metalinguistic production, and error correction & explanation. In metalinguistic recognition, the subjects are requested to select a word or a phrase from a complex sentence that exemplify the grammatical term requested. There are 24 items in this part of the test and if the subject identifies the correct word he / she gets a score of '1' and failing to identify, gets a score of '0'. Hence, the maximum score for this test is 24. In the metalinguistic production test, the subject is given a sentence with an underlined word and the subject's task is to describe the underlined word with its appropriate grammatical form. There are 24 items in the test and for each correct response the subject gets a score of '1' and a score of '0' for each incorrect response, resulting in a maximum score of 24. In metalinguistic error correction and explanation, the subject is given a sentence which is grammatically correct but semantically wrong. The subject is asked to change the version of the sentence to communicate semantic meaning of the sentence. There are 24 items in this test and each correct response is scored '1' and wrong response '0', also resulting in a maximum score of 24. A number of studies have found good initial evidence for internal consistency and construct validity, as well as for structural validity based on factor-analytic results for this test (e.g., 25).

IV. RESULTS

4.1 Correlational analyses

All the correlations between big five traits, metalinguistic measures and GPA were statistically significant (Table 1). (a) Neuroticism is negatively correlated with each of the three metalinguistic measures as well as with GPA. (b) Extraversion, openness, conscientiousness, and agreeableness, all were positively

correlated with each of the metalinguistic measures as well as with GPA. Finally, all the three measures of metalinguistic awareness were positively correlated with GPA. The results of correlational analyses clearly implied for regression analyses.

4.2 Regression analyses

The extent to which big five personality traits predicted each of the three measures of metalinguistic awareness was first analyzed (Table 2). It is observed that each of the big five traits significantly predicted metalinguistic recognition of the subjects and taken together explained 32% of the variances in metalinguistic recognition, [F (5, 354) = 27.83, $p < .01$]. Similarly metalinguistic production is also significantly predicted by each of the big five traits. Together, the traits predicted 31% of variances in the metalinguistic production [F (5, 354) = 24.19, $p < .01$]. Further, each of the big five traits also significantly predicted the measure of error correction in metalinguistic awareness. The amount of variance in error correction explained by all these predictors is 29% [F (5, 354) = 22.76, $p < .01$]. From the results, it is evident that in conformity with the role of lexical hypothesis, each of the big five traits is significantly related to the measures of metalinguistic awareness. The items in the NEO-FFI have underlying characteristics which are sensitive to the metalinguistic awareness of the subjects. Hence, big five traits and metalinguistic awareness are in complimentary relationship with each other and therefore, taken together, those must be strong predictors of academic performance.

Arising from the above results of regression analyses, it seems pertinent to look into how the big five traits and metalinguistic measures independently explained variations in GPA. Those were examined by two separate multiple regression analyses (Table 3). Results pointed out that each of the big five traits significantly predicted the GPA. While neuroticism is a negative predictor of GPA, the other four traits are positive predictors. Together, the Big five traits explained 24% of the variances in GPA, [F (5, 354) = 12.63, $P < .01$]. On the other hand, metalinguistic awareness explained 35% of the variances [F (4, 356) = 18.15, $p < .01$] in GPA having all its three measures as significant predictors independently. Now, it is imperative to examine whether metalinguistic awareness mediates on the big five traits to further improve its predictivity of GPA. Hierarchical regression analyses were performed where all the Big five traits were entered in the first step and all the three metalinguistic awareness measures were entered in the second step (Table 4). It is observed that the Big five traits independently explained 24% of variances in GPA with all the five traits being significant predictors. On the other hand, Big five traits and metalinguistic awareness together explained 39% of the variances of GPA, showing an additional variance of 15% which may be attributed to the mediating effects of metalinguistic awareness. Hence, the results clearly implied the mediation of metalinguistic awareness between Big-Five traits and academic performance. Hence, further analyses were used to examine the nature of mediation by each of the measures of metalinguistic awareness.

4.3 Mediation analyses

To understand the intricate relationship between Big five traits and metalinguistic awareness as predictors of academic performance, the extent to which metalinguistic awareness mediated the relationship between Big five traits and GPA were examined using hierarchical multiple regression. The results showed that when metalinguistic awareness measures; such as metalinguistic recognition, metalinguistic production, and metalinguistic error correction were included in regression analysis; the relationship between neuroticism and GPA was reduced from -.31 to -.25. The mediation analyses by Sobel's test pointed out that each of the three measures of metalinguistic awareness (Sobel's test: recognition 2.41, $p < .01$; production-3.15, $p < .01$; error correction-3.97, $p < .01$), partially mediated the relationship between neuroticism and GPA. Similarly, when the measures of metalinguistic awareness were entered into hierarchical regression analyses, the relationship between extraversion and GPA was reduced from 0.26 to 0.20, which indicates the mediation of metalinguistic measures between extraversion and GPA. Sobel's test pointed out that two of the metalinguistic awareness measures (Sobel's test: recognition 2.28, $p < .01$; production-2.48, $p < .01$; error correction-0.97, $p > .0501$) namely metalinguistic recognition and production partially mediated the relationship between extraversion and GPA. Further, when metalinguistic measures entered into the hierarchical regression analyses, the beta coefficient openness with GPA decreased from 0.21 to 0.16, indicating the mediation of metalinguistic measures between openness and GPA. The Sobel's test pointed out that all the three measures metalinguistic awareness partially mediated the relationship between openness and GPA (Sobel's test: recognition 1.63, $p < .05$; production-2.02, $p < .01$; error correction-1.81, $p < .01$). When metalinguistic measures were entered into hierarchical regression analysis, the beta coefficient for agreeableness was decreased from 0.23 to 0.19 and Sobel's test pointed out that two of the metalinguistic measures partially mediated between agreeableness and GPA (Sobel's test: recognition 2.86, $p < .01$; production-2.44, $p < .01$; error correction-0.75, $p > .05$). Finally, the beta coefficient was decreased from 0.31 to 0.23 for conscientiousness and Sobel's test results pointed out that all the three measures of metalinguistic awareness partially mediated the relationship between conscientiousness and GPA (Sobel's test: recognition 3.19, $p < .01$; production-3.12, $p < .01$; error correction-2.31 $p < .01$).

TABLE 1: Correlations between big five personality traits, metalinguistic awareness measures and GPA

Big five personality traits	Recognition	Production	Error correction	GPA
Neuroticism	-0.17**	-0.23**	-0.35**	-0.34**
Extraversion	0.21**	0.24**	0.19**	0.30**
Openness	0.27**	0.29**	0.24**	0.36**
Agreeableness	0.35**	0.32**	0.26**	0.23**
Conscientiousness	0.44**	0.44**	0.37**	0.42**
GPA	0.37**	0.42**	0.44**	

TABLE 2: Multiple regression analyses with big five traits regressed on each of the three measures of metalinguistic awareness.

Criterion	Predictor	Beta	R ²	Adjusted R ²
Recognition	Neuroticism	-0.27		
	Extraversion	0.22		
	Openness	0.31		
	Agreeableness	0.34		
	Conscientiousness	0.41	0.32	0.301
Production	Neuroticism	-0.31		
	Extraversion	0.24		
	Openness	0.29		
	Agreeableness	0.29		
	Conscientiousness	0.37	0.31	0.303
Error correction	Neuroticism	-0.35		
	Extraversion	0.22		
	Openness	0.27		
	Agreeableness	0.31		
	Conscientiousness	0.34	0.29	0.276

TABLE 3 Two separate multiple regression analyses with big five traits regressed on GPA and the three metalinguistic awareness measures regressed on GPA.

Criterion	Predictor	Beta	R ²	Adjusted R ²
GPA	Neuroticism	-0.31.		
	Extraversion	0.26		
	Openness	0.21		
	Agreeableness	0.23		
	Conscientiousness	0.31	0.24	0.213
GPA	Metalinguistic regulation	0.36		
	Metalinguistic production	0.38		
	Metalinguistic error correction	0.33	0.35	0.326

TABLE 4 Hierarchical multiple regression analyses with the significant big five personality traits and metalinguistic awareness measures regressed on GPA

Criterion	Predictor	Beta	R ²	Adjusted R ²
GPA	Step 1	Neuroticism	-0.25	
		Extraversion	0.20	
		Openness	0.16	
		Agreeableness	0.19	
		Conscientiousness	0.23	0.21
GPA	Step 2	Metalinguistic regulation	0.38	
		Metalinguistic production	0.40	
		Metalinguistic error correction	0.39	0.39

V. DISCUSSION

The results of the study pointed to some relationships between big five traits of personality, measures of metalinguistic awareness, and academic performance of college students. As a whole, the study established a strong relationship between big five traits and academic performance to the extent that 24% of variances in academic performance is determined by big five traits. Further, when only neuroticism negatively influences academic performance, the other four traits positively influence having conscientiousness as best influencing

trait of academic performance. On the other hand, metalinguistic awareness is a stronger predictor of academic performance than big five traits because it explained 39% of variances as compared to 24% by big five traits. Each of the three measures of metalinguistic awareness has nearly similar impact on academic performance. Further, the mediation of metalinguistic awareness measures between big five traits and academic performance are also proved from the results. But all the three measures of metalinguistic awareness do not mediate for each of the big five traits. While all the three measures of metalinguistic awareness mediated for neuroticism, openness, and conscientiousness; extraversion and agreeableness were mediated by metalinguistic recognition and production and by error correction. However, over all the results justify the role of lexical hypothesis to understanding a relationship among big five traits, metalinguistic awareness and academic performance of college students.

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