

Intelligence and Self-Control Predict Academic Performance of Gifted and Non-gifted Students

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In this study, the role of intelligence and self-control on academic performance of academically gifted and non-gifted students was investigated. Intelligence was measured by the General Ability Test (GAT), and consisted of two subscales; explicitly, verbal subtest and quantitative subtest. Self-control was assessed by observing the level of student commitment to submit assignments and homework on time. The sample consisted of 74 freshmen male students at an institute in eastern Saudi Arabia. Academically gifted students were selected according to academic performance as measured by GPA scores; the separation point was 3.50 of 5.00. Intelligence and self-control were entered through a simultaneous linear multiple regression model as independent variables, whereas the student GPA in the first semester was entered as the criterion variable. The results showed that both intelligence and self-control correlated significantly with GPA for the sample, $r(74) = .31$ and $.58$ respectively with ($p < .01$). Intelligence and self-control did not correlate significantly with each other. The results also showed that for the sample both intelligence and self-control accounted for 42% of the variance in students GPAs as indicated by $R^2_{Adjusted} = .42$ ($p < .0001$). For the gifted sample, both intelligence and self-control explains around 59% of the variance in the GPA as indicated by $R^2_{Adjusted} = .59$ ($p < .0001$). The findings are essential to admissions and gifted education programs.

Introduction

Academically gifted students experience personal qualities beyond intelligence. Traditionally, academic performance has been linked to scores on intelligence tests (Sternberg & Kaufman, 1998). Although intelligence is one of the most known predictors of student performance within schools, it is not in isolation (ACT, 2007; Ceci, 1996; Ceci & Liker, 1986; Gannon & Ranzijn, 2005; Gardner, 1993; Neisser,

1976; Renzulli, 1986; Sternberg, 2003; Sternberg & Williams, 1998). Several personal qualities, including cognitive and non-cognitive competencies, are among the essential factors connected to successful performance in various domains, including academia (Ericsson, 1996; Grigorenko, Meier, Lipka, Mohatt, Yanez, & Sternberg, 2004; Sternberg & Ruzgis, 1994). During the course of researching successful human performance, scholars have studied personality using various approaches and revealed a number of important personal attributes that are associated with successful, intelligent, gifted, and creative behaviors. In this study, the author explores the role of two distinctive psychological constructs emerging from two schools of thoughts in

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explaining academic performance of gifted and non-gifted students; intelligence from a psychometric approach and self-control from a social-cognitive prospective.

Intelligence is a recognized construct that underlies academic performance. Historically, Binet and Simon developed the first test of intelligence to objectively discern those who performed well in school (Guilford, 1967; Sternberg, 2003). Thus, the initial purpose of tests of intelligence was to identify students who fell behind in schools. Today, many admission authorities use tests of intelligence to qualify students for gifted education programs. For example, Scholastic Aptitude Tests (SAT) is an important criteria for admitting students into gifted programs (Shore, Cornell, Robinson, & Ward, 1991). In Saudi Arabia, for instance, scores of General Ability Test (GAT), similar to SAT, are a prerequisite for admission into programs for gifted and talented students. Infrequently is there an identification system for gifted students that does not include tests of intelligence as one of the most important criteria for student selection. Yet, although tests of intelligence are limited in explaining this phenomena, they are used by many admission authorities (Alsaif, 2004). Recently, King Abdullaziz and his Companions Foundation for Giftedness and Creativity (Mawhiba), the primary authority for the education for gifted students, appointed the National Center for Assessment in Higher Education (Qiyas) to develop intelligence tests that can be used for the identification of gifted students.

Success is an optimal mixture of excellent personal competencies (Burger, 2004). The personal qualities include patterns of our thinking, feeling, and acting. In addition to intelligence, successful performance in academic domains is associated with a vast amount of personal and contextual factors. Personal factors include cognitive and

non-cognitive competencies, such as memory, reasoning, analysis, motivation, emotion, self-efficacy, beliefs, self-concept, self-control, etc. Even though most of intelligence tests are limited in the number of cognitive competencies they embrace, there is substantial evidence that intelligence scores predict performance with medium precision in academic domains. However, in other contexts, including the workplace, social life, and health issues, additional personality factors, such as self-control, motivation, and emotional management, predict performance beyond that of intelligence (Blanchard-Fields, Chen, & Norris, 1997; Burger, 2004; Carraher, Carraher, & Schliemann, 1985; Ceci, 1996; Ceci & Liker, 1986; Dai & Sternberg, 2004; Davidson & Sternberg, 2003; Gardner, 1999; Gottfredson, 2001; Jaušovec, 1997; Kohn & Schooler, 1983; Liff, 2003; Neisser, 1976; Renzulli, 1986; Sternberg, 1990).

The fact is that additional personality attributes predict academic performance and are more precise than intelligence. For example, in the Three-Ring theory, Renzulli argued that gifted behaviors reflect an interaction of three human attributes; above average ability, high level of task commitment, and a high level of creativity (Renzulli, 1986). A high level of task commitment is a form of self-control and a distinctive psychological construct associated with academic success. Self-control, for instance, is a hypothetical construct that explains a great deal of human performance in various domains, including academia. Self-control is “the ability to control one’s behavior and desires and delay gratification for later rewards” (Myers, 2010). According to Rotter (1966), people tend to behave in a certain fashion because of the expectation of rewards. For example, students study diligently because of the expectation of high scores in a course. Thus, students make decisions on whether to continue

based on the expectation of rewards. Similarly, we rely on general beliefs about ability to influence situations. Students who believe that they can achieve well in schools tend to have a high internal locus of control and persist with school tasks. On the other hand, students who think that the school is too difficult tend to be influenced by an external locus of control orientation and relinquish tasks easily. Thus, individual perceptions, feelings, and beliefs on an issue tend to influence decisions and choices. Hence, how do gifted and non-gifted students differ on this construct, and, furthermore, to what extent does self-control explain high performance in academia when compared to intelligence?

Academically gifted students who perform extremely well in school tend to perform well on tests of intelligence. Tests of intelligence are used as a major criterion by many educational authorities to qualify students for gifted programs, despite the fact that the predictable power of such tests in academic performance is moderate (Gottfredson, 2001; Grigorenko et al., 2004; Kaia, Helle, & Juuri, 2007; Sternberg, 1982; Sternberg & Grigorenko, 2002; Sternberg, Okagaki, & Jackson, 1990; Sternberg & Ruzgis, 1994). Further, admissions to a gifted program places prominent weight on the IQ score criterion, because of the quality of the psychometric properties of the tests. In doing so, these programs neglect high quality students who are exceedingly motivated, self-disciplined, and self-controlled specifically by preferring those who show high verbal and quantitative abilities. For example, in Saudi Arabia the definitive criterion in the identification of potential students for gifted programs (e.g., summer programs, schools for gifted) is to have high scores on the GAT; essentially testing verbal and quantitative abilities. Therefore, investigating the role of both intelligence and self-control would indicate an important segment of the gifted and the

successful performance within academic domains. Furthermore, taking into consideration the two distinctive factors that are associated with performance of academically gifted students would yield a more precise approach in the identification of gifted students who have confidence to accept a challenging program.

In the current study, the author argues that intelligence partially explains the performance of academically gifted and non-gifted students. Other personality factors such as self-control are associated with school performance. Furthermore, the two constructs, intelligence and self-control, are distinctive attributes of individuals, and, when considering both aspects of a person, together explain academic performance more than either in seclusion. Hence, the present study encloses a number of significant virtues that contribute to the body of knowledge in the field of education for gifted students. Firstly, the study examines the role of intelligence when compared to self-control within academic performance. Secondly, the author explores the function of intelligence and self-control in the academic performance of gifted and non-gifted students. Thirdly, the study demonstrates to what extent academic performance is explained by intelligence and self-control. Finally, the author pinpoints how both constructs could be applied by admission authorities to identify gifted students and minimize the false positive selection for gifted programs.

Intelligence and Academic Performance

For over a century, intelligence has dominated the field of psychometric testing as a single construct of human behavior. Superiority of performance in various talent fields is determined by the capacity of this construct (Sternberg, 2003). Early scholars in the field of intelligence contended that all human behaviors are underpinned by one psychological construct; that is the “g”

factor (Ceci & Liker, 1986; Sternberg, 2000, 2003; Sternberg & Detterman, 1979, 1986; Sternberg & Grigorenko, 2004a). References to this creed can be traced back to the work of Spearman, Thurstone, Terman, and Cattell. This classical view of intelligence, as a “g” factor, has been criticized by previous and contemporary scholars and researchers from various schools of thoughts (cognitive, social, biological, contextual), affirming that intelligence unfolds in various contexts and the “g” factor does not articulate what is intelligence (Ceci, 1996; Sternberg, 1984; Sternberg & Grigorenko, 2003). Further, there is no consensus among scholars on how to define intelligence. Despite these controversies, the psychometric approach covers an extensive array of tests of intelligence. For example, the Stanford-Binet, Raven's Progressive Matrices, the Wechsler Adult Intelligence Scale, and the Kaufman Assessment Battery for Children are widely used in various settings, including education, business, and military due to the power of predicting successful behaviors. A number of contemporary scholars argue that tests of intelligence have limited predictive power outside of academia and provide evidence that tests of intelligence, at best, predict student performance in schools, and not outside of the context of school (Ceci & Liker, 1986; Sternberg, 2000; Sternberg & Grigorenko, 2002, 2003; Sternberg, Nokes, Geissler, Prince, Okatcha, Bundy, & Grigorenko, 2001; Sternberg & Ruzgis, 1994).

The influence of intelligence testing traversed academic boundaries to other areas, including the identification of gifted and various other developmental programs. Intelligence, as measured by IQ tests, dominates the field of education for gifted and talented students, and tests of intelligence have become the most recognized instrument in identifying gifted students. Consequently, other important instruments of personal attributes

associated with high performers in diverse human endeavors are neglected. For example, many schools and programs for gifted students recognize tests of intelligence as a major criterion in qualifying students for special programs. Nonetheless, the persisting question remains as to whether intelligence, as measured by IQ tests, accounts for such complex phenomena?

At present, intelligence has been defined in a broader sense. Many scholars argue that intelligence is what constitutes success within a culture (Baron, Byrne, & Baron, 2004; Cacioppo, 2004; Gardner, 1993; Neisser, 1976; Richardson, 2002; Sternberg, 1988, 2003; Sternberg & Grigorenko, 2004b). From this contemporary view, intelligence is a relative concept and based accordingly on how each culture perceives success. Further, Sternberg's views on intelligence, which have been ignored by many intelligence theorists, involve what occurs due to the continuous interactions among people and the environment. Others specifically define intelligence in more narrow terms, involving learning competencies like memory, reasoning ability, verbal ability, quantitative ability, etc. Intelligence is best understood in terms of context, in which the construct unfolds while taking into consideration a person's culture, and the quality of interactions. Intelligence, as measured by various IQ tests, predicts student academic performance within moderation. In a recent study conducted by Laidra, Pullmann, and Allik on 3618 Estonian students from grade 2 to 12, intelligence as measured by Raven's Standard Progressive Matrices was found to be the best predictor of GPA as an indicator of school performance among the Big Five personality factors. The correlations ranged between 0.32 to 0.54 (Kaia et al., 2007). Intelligence correlates with academic performance only moderately. Studies reported that intelligence scores

correlated approximately around 0.5 with scores on various academic indices, depending on which measures are applied (Neisser, Boodoo, Bouchard, Boykin, Brody, & Ceci, 1996). Thus, intelligence accounts for approximately 25% of student performance. Hence, what are the other factors that explain the remaining variance?

Self-control and Academic Performance

Self-control is conceived of as a core feature of an individual, leading to success and happiness in life. People who control or regulate desires, behaviors, performance and responses, achieve better in various domains. Modern psychology views human behaviors from a biopsychosocial perspective (Ceci, 1996; Dai & Sternberg, 2004; Gottfredson, 2001; Maker, Rogers, Nielson, & Bauerle, 1996; Neisser et al., 1996; Sternberg & Grigorenko, 2004b). That is, actions cannot be explained in the absence of social and biological contexts. The social cognitive theorists believe that behaviors are influenced through social learning, observing others, and are subject to perceptions or how a situation is perceived. That is, considered an important trait associated with achievement is whether we have control or surrounding events govern the situation. Julian Rotter distinguishes between external and internal control, where external control refers to the perception of outside forces and events that control destiny and that of an internal control of destiny (Burger, 2004). Researchers reported that an internal control is more successful at school and in work (Myers, 2010). The reasoning is that an internal self-control has the ability to suppress an instant gratification towards a lasting outcome of desires. Ericson refers to this as the ten-year rule, consisting of a universal ingredient towards a high performance in chess, dancing, sports, computer programming, etc.; that is, approximately ten years of intense daily training is required. Individuals are not born with demonstrable talents. A high level of performance comes with intensive

practice over an extensive period of time. With elevated self-control and persistence, excellence is achieved. Educational researchers refer to self-control within academia as self-regulated learning.

Self-Regulated Learning (SRL) is a concept of educational psychology. It is used to illustrate the learning process that is guided by self. SRL is defined as “an active, constructive process whereby learners set goals for their learning and then monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and contextual features in the environment” (Zeidner, Pintrich, & Boekaerts, 2000), p.453). The definition implies that SRL is a complex process that includes higher-and-lower order cognitive processes supported by a high motivational level to achieve goals in the academic domain. Zimmerman emphasizes that the common attributes self-regulated learners include are metacognitively, motivationally, and behaviorally active participation in learning (Zimmerman, 1990). Magno hypothesizes that self-regulated learning is influenced by effect of activation, consisting of persistence (self-directed attention), initiative, disengagement (impulse control), and self-determination (Magno, 2008). The above mentioned definitions manifest the following processes: planning, setting goals, organizing, self-monitoring, self-evaluation, high self-efficacy, intrinsic motivation, persistence, structure, time management skills, and selecting an environment for learning. Students who have a high degree of SRL tend to believe that success is attainable and under control. As a result, all possible efforts are exerted towards the achievement of goals and desires. In contrast, those who have low SRL tend to attribute failure to external factors beyond the capacity to control. The withdrawal from tasks and school work is rationalized. Scholars reported that deficient learning and work habits, low

control conviction levels, and poor self-concepts are among the causes of underachievement (Stoeger & Ziegler, 2005). Stoeger reported that gifted students are in need of SRL skills for several reasons: (a) the impact of SRL on academic performance, (b) SRL is very important in a challenging environment (e.g., gifted schools and programs), (c) SRL is crucial to the attainment of a high level of performance in talent domains, (d) SRL is associated with deliberate practice in any performance domain, and (e) SRL is important to help underachieving gifted students (Stoeger, 2010). Zimmerman argued that SRL students approach tasks with confidence, diligence, resourcefulness, and proactively pursue goals (Zimmerman, 1990).

An elevation of self-control and motivation predict academic performance. ACT research demonstrates that high self-control and motivation are associated with a high GPA (ACT, 2007). Lindner and Harris (1990) reported that academic performance as measured by GPA correlated significantly with SRL ($r = .54$, $p < .001$) in a sample consisting of 160 college students. The instrument was an inventory of 71 items distributed into five categories: metacognition scale (reliability coefficient, .77), learning strategies scale (reliability coefficient, .83), motivation scale (reliability coefficient, .77), contextual awareness/sensitivity scale (reliability coefficient, .64), and environment utilization/control scale (reliability coefficient, .79). In a meta-analysis of 109 studies that examined the relationship between psychological and study skills and college outcomes as measured by GPA and retention rate, the authors found that the best predictors of GPA were self-efficacy and achievement motivation ($r = .496$ and $.303$, respectively); that is, other than academically related skills (Robbins, Lauver, Davis, Langley, & Carlstrom, 2004). In the Marshmallow study,

academic and cognitive performance correlated significantly with delay time (Shoda, Mischel, & Peake, 1990).

Purpose of the Study

The author of the current study investigated the role of intelligence and self-control on the academic performance of academically gifted and non-gifted students. In many studies, researchers have shown the role of intelligence on academic success. However, the role of self-control in academic performance and the interaction with intelligence requires more research. In this study, the author explores the role of self-control in regard to academic performance and underpinned how intelligence interacts with self-discipline to predict academic performance. Additionally, various cognitive, emotional, and personal constructs have a role within human performance. The author explores the role of intelligence and self-control defined as personality qualities in academically gifted students.

Method

The current study aims to investigate the predictive power of intelligence and self-control of students on academic performance among gifted and non-gifted students. The criterion variable was the GPA of students and the predicting variables were intelligence (verbal ability and quantitative ability) and self-discipline. The linear multiple regression statistical model was applied in assessing the predictive power of intelligence and self-control on academic performance.

Participants

Participants were 74 freshmen male college students from an eastern province of Saudi Arabia. Students were assessed on general ability prior to admission to a special education program at The College of Education; precisely, an average mean of 73.0 ($SD = 8.0$). The GPA was 2.68 out of 5.0 ($SD = .81$). Student majors in high

school were literature and arts. The gifted student sample was drawn from the original sample based on academic performance as indicated by GPA. Scores of one standard deviation above the mean were considered a range in which the academically gifted sample fell, while non-gifted students were below the GPA of 3.5.

Measurements

General Ability Test: Scores on GAT is one of the predicting (independent) variables of academic performance in the current study. The GAT is similar to the SAT test. Since the year 2000, Saudi Arabia has established a National Center for Assessment in Higher Education (Qiyas). Qiyas aims to develop standardized general ability and achievement tests whereby the results are among admission requirements for higher education institutions. The test is high stakes and a requirement in order for high school students to attend Saudi universities. GAT consists of two subtests: verbal and quantitative. The GAT intends to assess analytical reasoning and student readiness for learning (Qiyas, 2011). Specifically, GAT measures the following abilities: reading comprehension, ability to understand logical relationships, solving problems based on basic mathematical concepts, and deductive and inductive reasoning (Qiyas, 2011). The verbal subtest consists of 68 questions for the science track students in high school and 92 questions for the literature track students. Four types of questions are presented in this subtest; reading comprehension, verbal analogy, sentence completion, and word meanings. The quantitative subtest consists of 52 questions for science track students and 30 questions for literature track students. This subtest includes arithmetic, geometric, algebraic, and statistic questions. The GAP is administered in two and half hours in six parts; 25 minutes for each part.

Self-Control Assessment: Self-control is another predicting variable for academic performance in this study. Self-control was assessed by observing the level of student commitment to submit their assignments and homework punctually. Students were given nine assignments during the semester and were asked to submit the assignments on a predetermined date. A student was given one point if the assignment was submitted on the proposed due date and zero if after the due date. The due dates of the assignments were typically at 12:00 am every Friday of every other week during the semester. The quality of the assignments was not taken into consideration when scoring. The maximum score for self-control was eight points and the minimum score zero. The reliability of the self-control scale was derived from the internal consistency of the nine assignments. As indicated by Alpha coefficient, the reliability was at the acceptable level after omitting one problematic item ($r = .73$).

Grade Point Average: The GPA is the criterion variable in this study. Student academic performance was based on their GPA scores. The GPA scores ranged from 1.41 to 4.85 out of 5.00, with a mean of 2.68 ($SD = .81$). The GPA was calculated based on sixteen credit hours for eight courses completed the first semester.

Procedure

The author of the current study investigated the role of intelligence and self-control attributes in explaining academic performance of both gifted and non-gifted students. The GAT and Self-control data were collected during the fall semester of the year 2009. The data for the criterion variable was collected during the spring semester of the year 2010. Students were asked to voluntarily participate in the study and provide needed data. A simultaneous linear multiple regression model was used with both intelligence and self-control to predict academic

performance as measured by student GPA. The power was specified at $(1 - \beta) = .80$ to control for type II error and Alpha was held at .05 to control for Type I error.

Results

Research Question 1: What is the relationship pattern between verbal ability, quantitative ability, GAT composite scores and GPA? To answer this question, a Pearson Product-Moment correlation coefficient was used to illustrate the relationship between verbal ability scores, quantitative ability scores, GAT composite scores, self-control scores, and GPA. Table 1 shows the relationship between these scores.

As predicted, intelligence and self-control significantly correlated with academic performance (Table 1). Verbal ability, GAT as a measure of intelligence, and self-control significantly correlated with academic performance as indicated by scores on the GPA. The criterion variable of the GPA moderately correlated with verbal scores ($r = .4, p < .01$), moderately with the GAT composite score ($r = .31, p < .01$), and highly with self-control scores ($r = .58, p < .01$). Furthermore, the correlation between quantitative ability and academic performance was low ($r = .09, p > .05$). The results were consistent with predictions concerning factors associated with academic performance. Further,

verbal scores explained approximately 16% of variance on the GPA ($r^2 = .157$). Self-control, by contrast, explained around 34% of the variance on the GPA separately ($r^2 = .336$). As a note, intelligence as measured by GAT did not correlate with self-control, whereas predictors correlated significantly with the criterion variable, constructing a prime case for explaining the variance on the criterion variable. Finally, this result would support the argument that intelligence and self-control are distinct psychological constructs.

Research Question 2: To what extent do intelligence and self-control predict the academic performance of students? The purpose of this research question was to investigate the role of intelligence and self-control on student academic performance as measured by the GPA. To answer this question, a simultaneous multiple regression model was used with two independent variables: verbal ability scores and self-control scores as predictors (independent variables) and academic performance as measured by GPA as a criterion variable (dependent variable). Since the quantitative ability did not correlate significantly with GPA in the previous question, it was omitted from this analysis.

As indicated in Table 2, verbal ability and self-control together explains 42% of the variance in academic performance as measured by GPA ($R^2_{Adjusted} = .422$). The

Table 1

Correlations between Scores on the all variables for All Students (N=74)

Variable	1	2	3	4
GPA	1.00			
Verbal Ability	.40 **	1.00		
Quantitative Ability	.09	.33 **	1.00	
GAT Score	.31 **	.84 **	.56 **	1.00
Self-control Attribute	.58 **	.13	-.01	.17

** $p < .01$

Table 2

The Multiple Regression Analysis on Academic Performance as Predicted by Intelligence and Self-Discipline for All students (N=74)

Predictor	$R^2_{Adjusted}$	F_{Change}	β	t	r	r_p
Verbal Ability	.42	27.68	*** .33	3.64	*** .40	.32
Self-control Attribute			.54 ***	5.96	.58	.53

*** $p < .001$

simultaneous multiple regression model shows that R^2 is significant [$F(2, 71) = 27.682, p < .0001$]. After removing the effect of the other predictor, verbal ability contributes to academic performance around 10% and self-control attribute contributes to academic performance around 28%. The power analysis showed that the above analysis has sufficient power [$(1 - \beta) = 1.0$]. As shown in Table 2, the self-control ($\beta = .535, t = 5.962, p < .0001$) contributed more than the verbal ability ($\beta = .326, t = 3.637, p < .0001$) to the academic performance of all students.

Research Question 3: To what extent do intelligence and self-control predict academic performance for academically gifted students? Students are ranked based on their GPA scores into two groups, gifted and non-gifted. Gifted students were those who scored 3.5 and above on the GPA and the non-gifted students were those who scored below 3.5. The total number of gifted students was 16. A power analysis was run to ensure that the sample had a sufficient power with Alpha at .05 and observed $R^2 > .64$. The analysis showed that there was a sufficient power to run a multiple regression analysis [$(1 - \beta) = .99$]. A Pearson Product-Moment correlation coefficient was used to illustrate the relationship between verbal ability scores, quantitative ability scores, GAT composite scores, self-control scores, and GPA for the gifted sample. Table 3 shows the relationship between these scores.

Again, as forecasted, both intelligence and self-control explained academic

performance for academically gifted students (Table 3). For the gifted sample, quantitative ability, a composite score of intelligence, and self-control were significantly correlated with student academic performance as indicated by scores on the GPA. The criterion variable was highly correlated with quantitative scores ($r = .731, p < .01$), highly with GAT composite scores ($r = .544, p < .05$), and highly with self-control scores ($r = .615, p < .05$). The correlation between verbal ability and academic performance was moderate and was not significant ($r = .397, p > .05$). These results in general were consistent with the author's prediction about factors associated with academic performance. Quantitative ability explained around 53% of the variance in the GPA of gifted students ($r^2 = .534, p < .01$). Self-control, by contrast, explained around 38% of the variance in the GPA ($r^2 = .378, p < .05$). Of value is that intelligence, as measured by GAT, did not correlate with self-control of the gifted sample. Yet, quantitative ability predicted the academic performance of gifted students, while verbal ability did not predict performance.

Further analysis was carried out to investigate the roles of quantitative ability and self-discipline on the performance of academically gifted students. A simultaneous multiple regression model was used with two independent variables: quantitative ability scores and self-control scores as predictors (independent variables) and academic performance as measured by GPA as a criterion variable (dependent variable). Since the verbal ability did not

correlate significantly with GPA in the gifted sample, it was eliminated from this analysis.

As indicated in Table 4, quantitative ability and self-control together explained over 45% of the variance in academic performance as measured by GPA, $R^2_{Adjusted} = .590$. The simultaneous multiple regression model showed that R^2 is significant, [$F(2, 13) = 11.773, p < .001$].

After removing the effect of the other predictor, it is clear that quantitative ability contributed to academic performance around 27% and self-control contributed to academic performance around 11%. As shown in Table 4, the quantitative ability ($\beta = .527, t = 3.117, p < .01$) accounts ($\beta = .368, t = 2.007, p < .05$) for the academic performance of academically gifted students sample more than self-control.

Table 3

Correlations between Scores on the all variables for Gifted Students Sample (N=16)

Variable	1	2	3	4
GPA	1			
Verbal Ability	.397	1		
Quantitative Ability	.731 ^d	.589 ^d	1	
GAT Score	.544 ^a	.957 ^d	.795 ^d	1
Self-control Attribute	.615 ^a	.225	.432	.319

a: $p < .05$; b: $p < .005$; c: $p < .0005$; d: $p < .01$; e: $p < .001$; f: $p < .0001$

Table 4

The Multiple Regression Analysis on Academic Performance as Predicted by Intelligence and Self-Discipline for Gifted Students Sample (N=16)

Predictor	$R^2_{Adjusted}$	F_{Change}	β	t	r	r_p
Quantitative Ability	.590	11.773 ^e	.527 ^d	3.117 ^d	.731	.516
Self-control Attribute			.368 ^a	2.007 ^a	.615	.332

a: $p < .05$; b: $p < .005$; c: $p < .0005$; d: $p < .01$; e: $p < .001$; f: $p < .0001$

Discussion

In this study, the author examined the roles of two psychological constructs, intelligence (verbal, quantitative abilities) and self-control, in explaining academic performance of academically gifted and non-gifted students. Also, the author investigated the pattern of relationships between academic and non-academic factors associated with academic performance in the first set of analyses. The multiple regression model shows that both verbal ability and self-control together accounted for over 42% of academic performance as measured by GPA. Verbal ability alone, when excluding the effect of self-discipline, explained around 10% of the GPA, while self-control

alone, after removing the effect of the verbal ability, accounted for over 28%. Further, there was no significant correlation between intelligence and self-control, which confirmed the author's prediction that the two constructs are unique and both constructs explained academic performance together more than either one alone. Further, self-control outperforms verbal ability in explaining academic performance. Academic performance, therefore, is best understood in the light of both cognitive and non-cognitive factors. Furthermore, in addition to intelligence, psychological factors such as motivation, self-efficacy, self-control, and self-confidence are critical attributes to success in academia and other performance domains.

The positive correlation between verbal ability and GPA could be due to the fact the GPA scores are a result of courses that are heavily loaded with linguistic content other than quantitative reasoning content (e.g., Arabic and English literature, education, and psychology). One course out of eight, statistics to be precise, required a numerical ability. This result was consistent with previous research that indicated the role of self-discipline, motivation, and self-regulated learning in academic performance (ACT, 2007; Lindner & Harris, 1992; Robbins et al., 2004; Shoda et al., 1990). Thus, quantitative ability did not correlate significantly with GPA. Intelligence (the composite score of both verbal and quantitative ability) correlated significantly with academic performance. On the other hand, self-discipline, even though it was measured in only one course (eight different times), was a more powerful predictor of GPA than intelligence. Yet, this result has to be taken with precaution because of the limitations of the current study.

In the second set of analyses concerned with academically gifted students, different patterns of results were evident. The multiple regression model showed that quantitative ability and self-control accounted for over 59% in GPA variance. Quantitative ability alone, when excluding the effect of self-discipline, explained over 27% of the GPA, while self-control alone, after removing the effect of the quantitative ability, accounted for around 11% of the GPA variance. Quantitative ability outperformed self-control in explaining academic performance for the academically gifted student sample. Thus, for the academically gifted student sample, the verbal ability had little to say about performance, and self-control accounted only for a limited variance in the GPA. A possible interpretation of such results is that gifted students relied on their quantitative

reasoning for a high level of performance more than verbal ability.

Implications and limitations

Identification authorities of academically gifted students should consider factors such as self-control in addition to intelligence in identification practices. The recommendations of the current study preferably should be used by practitioners and specialists in education, especially in the education of gifted students. Firstly, intelligence is not the only determinant criterion for selecting academically gifted students. Other psychological constructs, such as self-discipline, motivation, self-efficacy, commitment to school, and self-regulation are also important factors when ensuring high performance. In addition, programs for the gifted must capitalize on the role of self-control towards academic success and develop the ability to control behaviors in order to achieve a high level of performance. Future research can focus on the application of self-control towards the successful performance in various domains.

Several limitations regarding gender, sample selection, and self-control scale surrounding the current research leave the possibility for other interpretations, considerations and generalizations. As indicated, all participants were male and selected on a voluntarily bases. The reliability of self-control is narrowly sufficient and observation of this trait was conducted in one semester and restricted to one course. These limitations should be considered when conclusion has to be made from this study.

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