

Are Grit and Self-Regulation indicators of Academic Achievement? A Regression Analysis

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Abstract

A significant number of Indian students take The Common Admission Test for admission into management programs in premier institutions like the IIMs which is highly stressful. Researchers state that non-cognitive factors like Grit, Self-Regulation enhance academic performance. This study aims to examine the relationship between the variables Grit, Self-Regulation, and Academic Achievement. Grit, Self-Regulation were assumed to predict Academic Achievement. Purposive sampling technique was employed to collect data from 402 students aged between 22 to 27 years, who had taken the CAT. The Grit Scale and The Self-Regulation Questionnaire were employed to measure the variables. The percentile ranks obtained on the CAT entrance were taken as a measure of Academic Achievement. Data was analysed using SPSS 28. Multiple Regression revealed Grit and Self-Regulation as two significant predictors of Academic Achievement. Implementing, planning and assessing dimensions of Self-Regulation, Passion and Perseverance dimensions of Grit were significant predictors of Academic Achievement. As Grit and Self-Regulation contribute to Academic Achievement, training children in school, will help them develop these skills for enhancing their performance. The results provide significant implications for psychologists, teachers, parents, researchers.

Keywords: *Grit, Self-Regulation, Academic Achievement, CAT.*

Introduction and Overview of Literature

Research has embraced Positive Psychology in the realm of education, specifically to understand factors that impact students' academic performance at school and college levels as well as on competitive entrance examinations. Factors affecting academic achievement range from environmental and socio-demographic influences (Peltzer & Pengpid, 2014) to variations in non-cognitive and cognitive factors. Academic achievement of students can plausibly be explained by the non-cognitive factors namely; Grit, Self-Regulation.

Grit

Duckworth et.al. (2007) defined Grit as "Passion and Perseverance for long-term goals". Miller (2017) defined authentic Grit as "the passionate pursuit of hard goals that awes and inspires others to become better people, flourish emotionally, take positive risks, and live their best lives". Researchers traced the origin of Grit by carrying out studies on identical and fraternal twins. A study conducted in the United Kingdom on 16-year-old twin girl pairs (Rimfeld et. al., 2016) showed Grit to be moderately heritable, with 37 percent heritability on the perseverance subscale and 20 percent heritability on the passion subscale. A body of cross-sectional and longitudinal research has strongly confirmed the influence of Grit in determining an individual's accomplishments. There existed a positive correlation between Grit, achievement and success in challenging academic and professional settings (Eskreis-Winkler, Shulman, Beal & Duckworth 2014). Studies found Grit to be similar to conscientiousness or self-control (Duckworth, Peterson, Matthews & Kelly,

2007). Eskreis-Winkler, Gross and Duckworth (2016) state that teaching students to employ deliberate practice by setting clear goals, building on their strengths, and addressing weaknesses develops Grit.

Grit was found to significantly predict academic outcomes across various levels of educational attainment (Eskreis-Winkler et al, 2014). Duckworth and colleagues (2007) observed that individuals scoring higher on the Grit scale achieved higher GPAs at university. In a study by Bowman et al. (2015), effort perseverance, a component of Grit positively correlated with current college GPA and predicted students' GPA in the upcoming semester. Strayhorn (2014) tested the role of Grit in the academic success of 140 black male college students studying in an institution dominated by whites and found that "Grit added incremental predictive validity to a model predicting college grades". A study by Weisskirch (2018) on 302 undergraduate students, revealed that perseverance of effort predicted estimated grades. A positive correlation was found between Grit, academic motivation and academic achievement in Turkish university students (Reraki, Celik & Saricam, 2015). The same study also found Grit and academic motivation to significantly predict academic success. This further substantiates the notion that the chances of academic achievement increase when focus on the goal and persistent hard work support talent and motivation. Grittier students employ self-regulated learning to course correct and direct thoughts and behaviors towards their end goal (Wolters & Hussain, 2015).

Self-Regulation

Self-Regulation refers to the vigorous participation in the learning process where the individual self-directs their emotions, thoughts, and behavior to achieve a specific goal (Zimmerman, 1998). Self-Regulation necessitates the learner to be cognizant of their self-knowledge and strategies used to meet the task demands. Bandura (1977) first used the term "Self-Regulation" to explain how people control their behaviour through rewards and punishments. Self-Regulation encompasses self-observation, self-judgment as well as self-reaction (Bandura, 1986). Relational developmental systems framework states that interactions between individuals and their immediate environments influence all aspects of their development. Kopp (1982) postulated that "early self-control is characterized by external (other) regulation, which evolves into internalized self-regulation as children develop". The cognitive psychology perspective sees self-regulation as "a set of self-directed actions often private but not necessarily so, that the individual uses to change their subsequent behaviour so as to alter the likelihood of some future outcome (Barkley, 2012). Several research studies found that higher levels of self-control predict better academic scores (Wolfe & Johnson, 1995). Self-regulation showed a positive correlation to college completion and is a critical predictor of social and academic outcomes (McClelland & Cameron, 2011). High Self-Regulation in childhood is associated positively with academic and social success in early adolescence (Mischel, Shoda & Peake, 1998).

Academic Achievement

Academic achievement is the level of accomplishment of a student in instructional and educational environments like school, college or university. It comprises of various learning domains and reflects the outcomes of one's performance indicating the degree of specific academic goal achievement. Knowledge acquired in school, college, or university, grades, GPA, or scores achieved on academic tests indicates academic achievement level and reflects the intellectual capabilities of a student. Standardized tests like SAT, GRE, CAT, GMAT, NEET, etc. decide a student's opportunity to pursue higher education, impacting career success and socioeconomic status.

Recent research has established evolving and pervasive traits such as Grit and self-regulation as good predictors of academic achievement and professional success above and beyond mere intelligence and talent. Despite growing interest in these constructs, little focus has been on exploring the relationship between these traits in diverse cultural and academic contexts. The current study proposes to fill this gap by systematically examining the significance of Grit and self-regulation in predicting academic success in a group of Indian college students taking the Common Admission Test. It is intuitively evident that maintaining long standing interest and motivation (Grit) and regulating one's behavior (self-regulation) are essential skills required to navigate academic and professional settings effectively.

In a critical study examining the correlation between Grit and self-regulated learning among college students, Wolters & Hussain (2014) found that perseverance and passion dimensions of Grit, were reliable predictors of key aspects of self-regulated learning. A study based at the Sakarya University in Turkey (Arslan, Akin & Citemel, 2013) found that scores of university students on the Metacognitive Awareness Scale and the Grit Scale were positively correlated,

suggesting that perseverance in the face of challenge goes hand in hand with the awareness of problems and effort regulation. Self-regulation makes way for everyday academic and social success, while Grit leads to remarkable achievements in highly competitive environments such as the National Spelling Bee (Duckworth & Gross, 2014). Hence, it stands to argue that students who manage to crack the highly competitive Common Admission Test successfully require high levels of Grit for arduous preparation work and high levels of self-regulation to manage their thoughts, actions, and emotions to reach the end goal.

Research Question

Will Grit, Self-Regulation predict Academic Achievement?

Objective

To explore if Grit and Self-Regulation predict Academic Achievement

Hypothesis

Grit and Self-Regulation will predict Academic Achievement

Method

Research Design

Quantitative, correlational design was used to study the interconnectedness of Grit and its dimensions, Self-regulation and its dimensions and Academic Achievement, measured based on the CAT scores.

Sample

Non-Probability Purposive Sampling was used to collect data from 402 students aged between 22 and 27 years, studying the final year of under graduation or first year of MBA and have written the CAT entrance for admission into an MBA program. Students attempting the entrance for a second time or pursuing their second master's program were excluded from the study.

Research Instruments

The Grit Scale - by Duckworth, Peterson, Matthews, and Kelly in 2007, is a 12-item scale answered on a 5-point Likert scale where 1 = "not at all like me" to 5 = "very much like me." Six items are reverse scored. Reliability is 0.79 and internal consistency is 0.85

The Self-Regulation Questionnaire – developed by Brown, Miller, and Lawendowski in 1999, has 63 items marked on a 5-point Likert scale. The scores range is from strongly agree to strongly disagree. The items are grouped into seven subscales, and Test-retest reliability and internal consistency for the total SRQ score are ($r = .94$, $p < .0001$), ($\alpha = .91$).

Procedure:

The instruments along with consent form and demographic data were prepared, permissions from Degree and MBA colleges and participants' consent were taken. Participants meeting the inclusion criteria were included in the study. Queries of participants were duly clarified. Data was collected, sorted, organized, and analyzed using SPSS 28.

Results

Table 1

Summary of Multiple Regression analysis (Stepwise) for Grit and Self-Regulation predicting Academic Achievement.

Predictor variable	B	SEB	β	t	p	
Step 1					2.78	0.006
Self-Regulation	0.26	0.33	0.36	7.90	<0.001	
Step 2					2.81	0.005
Self-Regulation	0.20	0.04	0.28	4.58	<0.001	
Grit	0.32	0.15	0.13	2.17		0.030

Stepwise multiple linear regression analysis shown in table 2 suggests that as a significant predictor ($\beta = .36, t = 7.90, p < 0.001$), Self-Regulation explained 13.5% proportion of the variance in Academic Achievement, $R^2 = 0.135, F(1,400) = 62.47, p < 0.001$. Grit when entered into the stepwise model already containing the predictor Self-Regulation, explained significantly 1% more variance ($\Delta R^2 = .10, F\text{-change} = 4.73, p = 0.03$) in Academic Achievement. The model explained a total 14.5% of the variance in Academic Achievement, $R^2 = 0.145, F(1,399) = 33.89, p < 0.001$. Self-Regulation ($\beta = 0.28, t = 4.58, p < 0.001$) and Grit ($\beta = 0.13, t = 2.17, p = 0.03$) significantly predicted academic achievement.

Table 2

Summary of Multiple Regression analysis (Stepwise) for dimensions of Grit and Self-Regulation – Passion, Perseverance, receiving, Evaluating, Triggering, Searching, Planning, Implementing, and Assessing; predicting Academic Achievement.

Predictor variable	B	SEB	β	t	p
Step 1				9.27	<0.001
Implementing	1.11	0.14	0.35	7.66	<0.001
Step 2				7.95	<0.001
Implementing	0.66	0.22	0.21	3.00	0.003
Planning	0.61	0.22	0.19	2.70	0.007

Table 2 shows that as a significant predictor ($\beta = .35, t = 7.66, p < 0.001$), Implementing explained a statistically significant 12.6% proportion of the variance in Academic Achievement, $R^2 = 0.126, F(1,400) = 58.78, p < 0.001$. Next, both predictors explained significantly 1.4% more variance ($\Delta R^2 = .14, F\text{-change} = 7.33, p = 0.07$) in Academic Achievement. The model explained a total 14% statistically significant proportion of the variance in Academic Achievement, $R^2 = 0.14, F(1,399) = 33.51, p < 0.001$. Implementing ($\beta = 0.21, t = 3.00, p = 0.003$) and Planning ($\beta = 0.19, t = 2.70, p = 0.007$) dimensions of Self-Regulation significantly predicted academic achievement whereas the other dimensions of Self-Regulation and Grit were found to be insignificant predictors.

Table 3

Summary of Multiple Regression analysis (Stepwise) for Grit and Self-Regulation predicting Academic Achievement for male students.

Predictor variable	B	SEB	β	t	p
Step 1				2.36	0.01
Self-Regulation	0.26	0.04	0.39	6.08	<0.001
Step 2				2.34	0.02
Self-Regulation	0.16	0.05	0.25	2.922	0.004
Grit	0.52	0.20	0.21	2.50	0.01

Table 3 shows that as a significant predictor ($\beta = .39, t = 6.08, p < 0.001$), Self-Regulation explained a statistically significant 15.3% proportion of the variance in Academic Achievement, $R^2 = 0.153, F(1,199) = 37.07, p < 0.001$. Next, Grit and self-regulation together explained 2.6% more variance ($\Delta R^2 = .026, F\text{-change} = 6.27, p = 0.013$) in Academic Achievement. The model explained a total 17.5% statistically significant proportion of the variance in Academic Achievement, $R^2 = 0.175, F(1,198) = 22.16, p < 0.001$. Two significant predictors of Academic Achievement were found to be Self-Regulation ($\beta = 0.25, t = 2.92, p < 0.004$) and Grit ($\beta = 0.21, t = 2.50, p = 0.01$).

Table 4

Summary of Multiple Regression analysis (Stepwise) for dimensions of Grit and Self-Regulation – Passion, Perseverance, receiving, Evaluating, Triggering, Searching, Planning, Implementing, and Assessing; predicting Academic Achievement for male students

Predictor variable	B	SEB	β	t	p
Step 1				7.02	<0.001
Planning	1.24	0.20	0.40	6.19	<0.001

Step 2				3.48	<0.001
Planning	0.80	0.26	0.25	3.05	0.003
Assessing	0.86	0.33	0.22	2.59	0.01

Table 4 shows that as a significant predictor ($\beta = .40$, $t = 6.19$, $p < 0.001$), Planning explained a statistically significant 15.7% proportion of the variance in Academic Achievement, $R^2 = 0.157$, $F(1,199) = 38.35$, $p < 0.001$. Next, both predictors planning and assessing explained significantly 2.8% more variance ($\Delta R^2 = .028$, $F\text{-change} = 6.74$, $p = 0.010$) in Academic Achievement. The model explained a total 18.9% statistically significant proportion of the variance in Academic Achievement, $R^2 = 0.189$, $F(1,198) = 23.10$, $p < 0.001$. Two significant predictors of Academic Achievement were found to be Planning ($\beta = 0.252$, $t = 2.92$, $p = 0.004$) and Assessing ($\beta = 0.21$, $t = 2.50$, $p = 0.013$) dimensions of Self-Regulation.

Table 5

Summary of Multiple Regression analysis (Stepwise) for Grit and Self-Regulation predicting Academic Achievement for female students.

Predictor variable	B	SEB	β	t	p
Step 1				1.35	0.177
Self-Regulation	0.27	0.05	0.34	5.20	<0.001

Table 5 showed that in the first step, the predictor Self-Regulation, was entered into the stepwise model. As a significant predictor ($\beta = .34$, $t = 5.20$, $p < 0.001$), Self-Regulation explained a statistically significant 11.5% proportion of the variance in Academic Achievement, $R^2 = 0.115$, $F(1,199) = 27.09$, $p < 0.001$. However, Grit was not a significant predictor of Academic Achievement in female students.

Table 6

Summary of Multiple Regression analysis (Stepwise) for dimensions of Self-Regulation – Receiving, Evaluating, Triggering, Searching, Planning, Implementing, and Assessing; predicting Academic Achievement for female students

Predictor variable	B	SEB	β	t	p
Step 1				6.50	<0.001
Implementing	1.02	0.21	0.32	4.82	<0.001

Table 6 showed that in the first step, the predictor Implementing, was entered into the stepwise model. As a significant predictor ($\beta = .32$, $t = 4.82$, $p < 0.001$), Implementing explained a statistically significant 10% proportion of the variance in Academic Achievement, $R^2 = 0.10$, $F(1,199) = 23.28$, $p < 0.001$. Other dimensions of Self-Regulation were not significant predictors

Discussion

The hypothesis that Grit and Self-Regulation would predict Academic Achievement was accepted, as results revealed both grit and self-regulation to be significant predictors of academic achievement. This finding aligns with previous research which indicates that grit with its dimensions passion and perseverance positively influences academic outcomes. Regression analysis done in a study showed grit to be a statistically significant predictor of academic achievement, which would determine the development and continuity of grit (Beyhan, 2016). The findings support the numerous studies on grit, indicating that perseverance in productive tasks is a crucial feature of motivation in students and should be emphasized (Pasha-Zaidi et.al. 2019).

Grit, consisting of Passion and Perseverance and two dimensions of Self-Regulation – implementing and planning, contributed in predicting Academic Achievement. Passionate people plan their work well and rely on internal motivational factors, making them more consistent and organised in achieving their goal, in this context – Academic Achievement. Passionate people exhibit higher levels of focus on tasks of their interest with a belief that they will be successful. This

translates into self-discipline and consistent effort. Research proves that when other conditions like intelligence, ability, economic status are at the same level, a gritter individual will be highly self-regulated, hence achieving greater success on any given task. However, in this study, grit did not contribute towards predicting academic achievement in women. A study conducted by Whipple and Dimitrova-Grajzl (2021) grit significantly predicted higher GPAs for male students but not for female students. These gender differences can possibly be due to the various socio-cultural factors as well as personal choices. Women in spite of being grittier, may not have the same opportunities for education and training as that of men resulting in grit not translating into academic achievement. This study was conducted on students aspiring to study management and a study done by Kirk and Belovics (2006) found that gender differences exist in entrepreneurship intent because “women choose entrepreneurship to balance work and family, whereas men seek wealth creation”. Women, to balance work with domestic tasks may look for less demanding jobs than management which may prevent grittier women to aspire and achieve success in that domain. Whereas, men, to achieve higher levels of success move towards management.

Self-regulation strategies such as goal-setting, time management, proactive planning result in academic success. Better implementation and planning skills are core traits of achievers in general. Regression analyses revealed grit, planning and assessing dimensions of self-regulation to be significant predictors in the male sample. Effective planning is crucial for academic success and time-management, a part of the planning process is known to contribute to academic achievement Britton and Tesser (1991). Barkley (2012) states that “a conscious sense of time” is crucial for directing actions towards goals. Assessing dimension involves self-reflection and metacognitive abilities. Research emphasizes the importance of metacognitive skills in academic achievement. A significant positive correlation was observed between metacognitive awareness and academic achievement in undergraduate students (Sawhney & Bansal, 2015). Implementing dimension of self-regulation was revealed to be the only significant predictor in the female sample indicating that executing the plan results in higher academic achievement in women. Plan or strategy execution plays a significant role in predicting academic achievement (Gakenia et al., 2017). These gender-specific patterns in self-regulation may have socio-cultural basis hence males and females may engage in very different strategies of self-regulation because of the societal norms and social expectations.

Limitations and future directions

Firstly, the sample consists of a homogeneous group with a similar cultural and socio-economic background, specifically limited to Telangana and Andhra Pradesh colleges. The education system also has a similarity index in terms of delivering information and teaching methods. Future studies should strongly include other state colleges and universities to broaden the sample's properties and make it more diverse. It will also be interesting to draw contrasts between the variables in different states of India. Future studies can compare students' appearing for several other entrance examinations, such as NEET, EAMCET, UPSC, JEE, CUET, CLAT, etc., instead of restricting the sample to CAT aspirants alone like in the present study. Secondly, studying the same sample at different timelines, would make for an intriguing study. As the research design used was quantitative in nature, a mixed method employing quantitative and qualitative techniques might yield more comprehensive results. Lastly, factors such as availability of resources, parental support, level of parental education and learning skills can be taken up in future studies.

Implications

As Grit and Self-Regulation contribute to Academic Achievement, training students in these skills can help improve performance. Gender-specific modules for targeted and focussed interventions can be designed to enhance students' academic success. The sample size of 400+ students in this study, supports the results to be generalized to a larger population with similar sample characteristics.

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