

Influence of Self-Efficacy, Year of Study and Sex on Grit among Medical Students

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Abstract

Previous studies throw light to the fact that the curriculum of medicine and the profession itself gives them stress and related problems. In this study, the investigator tried a different view by trying to investigate positive variables like grit and self efficacy in the medical population. The present study aimed at finding out the influence of self efficacy (the belief in one's ability), year of study and biological sex on Grit (perseverance and passion for long term goals) among medical students. The participants of the study consisted of 449 medical students from various medical colleges in India and included both male and female medical students from 1st year MBBS to Post Graduation. A survey E-form was developed by the investigators to collect the relevant data. The survey was created using Google Forms. General self-efficacy scale (GSE) and Short grit scale (Grit-S) were used to measure self-efficacy and grit respectively. Results show that higher the levels of self-efficacy, the grit shown by students was also seen high. There is also interaction effect shown by sex and self-efficacy on grit. The results show that females who have high self-efficacy show high grit while females with low self-efficacy show low grit. It was also clear from the results that the year of study have no independent or interaction effect on grit.

Key words: Biological sex, Google Form, Grit, Medical students, Self-efficacy, Year of study.

Introduction

Achievement tests are a primary means of gaining entry into prestigious universities and medical and graduate programs. However, these tests are lacking when it comes to important factors other than intelligence that are predictive of success.

Grit

Angela Duckworth, a researcher, a MacArthur Fellowship winner and with a TED talk with over 8 million views defines grit as “perseverance and passion for long term goals.” As a seventh grade math teacher, after calculating scores and assigning grades Angela Lee Duckworth noticed that some students were outperforming others. Students with lower IQ’s were some of the best performers rather than those with high IQ’s. This made her to return to graduate school and begin research into motivation for how and why students persist to reach academic goals and others do not. The speciality of her studies was it explored education from a motivational and psychological standpoint instead of one of the most common measurement across schools - IQ test scores. “Who is successful here and why?” This one question undergird her entire research study.

Grit can be described as a commitment to achieve long term goal, in conjunction with the ability to persist through obstacles. (Duckworth et al., 2007). The grit theory has argued that the major dimensions of grit are consistency of interests and perseverance of effort. Perseverance of effort means the tendency to persevere even when faced with hardships in life while consistency of interests refers to the tendencies to choose and maintain similar set of aspirations or interests over time (Duckworth et al. 2007).

By way of definition, “Grit implies working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress” (Duckworth, et al., (2007). The basic theme is one of persistence despite challenge, a definition largely unchanged over more than a century.

Grit has been found to be a high predictor of success in many high achievements, highly stressful fields, above and beyond that explained by IQ. When measured, grit can quantify the ability of an individual to maintain sustained effort throughout an extended length of time, for example, the time it takes to become a competent physician (Duckworth et al., 2007). Grittier individuals are seen able to maintain focused interest, show sustained effort, and are less likely to quit the task at hand (Eskreis-Winkler, Duckworth, Shulman, & Beal, 2014).

Duckworth et al (2007) conducted studies to determine what grit is and its affects and as her research expanded she learned that Dweck (2007), a Stanford University researcher was conducting research studies about two different mind sets. Dweck (2007) defined two different mind sets ie, fixed mind set and growth mind set which can lead to a grittier predisposition. Students who value effort are said to have a growth mind set and they believed that their ability could be enhanced through hard work. They perceive ability as a malleable skill. The people with a ‘fixed’ mind set believe that their talent/ability is primarily defined by their innate, genetic makeup. They think that their intelligence is inherent and unchangeable and so they exert less effort to succeed. Students who persevere when faced with challenges and adversity seem to have what Duckworth calls grit. This is the idea behind a growth mind set in learning (Dweck, 1999, 2007, 2010; Duckworth, 2007). Duckworth concluded that grit could be developed by having a “growth mind set.” Our brain is capable of changing and Dweck studies demonstrated this, which helped people to persevere and develop a growth mind set. Thus it can be concluded that grit is a bit of both nature and nurture. Studies conducted by Halliday et al (2017), Tahir, Mukkaram and Jamal (2018); Walker, Hines and Brecknell (2016) on medical professionals confirms that grit can vary over time. So it becomes important to understand the influence of beliefs about our own abilities and skills as it may influence grit.

Self efficacy

Self-efficacy is considered as one of the most enabling psychology models to have been adopted in to the positive psychology. There is a fundamental need among the medical professionals to have high levels of self-efficacy as they frequently deal with unanticipated circumstances. Competencies and outcome which are very important for performance of medical professionals requires not only necessary knowledge and skills but also beliefs of personal efficacy to use both effectively.

Bandura proposes that the self-system consist of an individual's attitudes, abilities and cognitive skills. Self-system has an important role to play in determining an individual's perception of a situation and their behavioral response it. Self-efficacy can be defined as the belief in one's ability in order to influence events that effect one's life and control over the way these events are experienced (Bandura, 1994).

Efficacy judgment is not much concerned with what skills and abilities individuals possess. Rather it considers more important what individuals believe they can do with whatever skills and abilities they may possess. They are also considered not simply with the ability to perform trivial motor acts but with the ability to coordinate and organize skills and abilities in changing and challenging situations. Self efficacy beliefs are not simply predictions about our behaviour instead they are what people believe they can do under unfavourable and challenging situations.

Further researches were carried out by Albert Bandura in the area of self efficacy which led to the strengthening of the psychological theory of self efficacy. Bandura noted that an individual has the ability within themselves to influence the events occurring in their lives. This behaviour had not yet been systematically observed or defined. Self-efficacy can influence the coping behaviour that is initiated when an individual is faced with stress or challenges, also determines the amount of effort that will be expended by the individual to reach their goals and how long the goals will be pursued (Bandura, 1999). Bandura theorized that self-efficacy is a self-sustaining trait. In an individual who is compelled to labour through their difficulties in their own terms, an increase in the levels of self-efficacy can be observed as the individual attains positive experiences.

Self-efficacy is a constantly evolving process from childhood to old age which increases when an individual becomes more confident that he or she is able and can accomplish a task. Bandura proposed that self-efficacy beliefs are constructed from four sources of information. They are one's own performance experiences, vicarious experiences, persuasions (verbal or others) and physiological and emotional state of the person.

According to theory and research it is understood that self-efficacy makes a difference in how people will feel, think and act (Bandura, 1997). In terms of feeling, it is seen that depression, anxiety, and helplessness are associated with low sense of self-efficacy. Persons with low self-efficacy will also have low self-esteem, and due to this they harbor pessimistic thoughts about their achievements and personal development. A strong self efficacy facilitates cognitive processes and performance in a variety of settings including quality of decision making and achievement (Bandura, 1997).

Self-efficacy has a great influence on preparing action because self-related cognition's are a major element in the motivation process. Self-efficacy levels can enhance or hinder motivation. More challenging tasks are preferred and performed by people with high self efficacy (Bandura, 1997). They also set themselves higher goals and try to stick to them. People also anticipate either optimistic or pessimistic scenarios in line with their level of self-efficacy. Once an action has been taken, highly self-efficacious people expend more effort and persist much longer than those with low self-efficacy. Even at the time of setbacks people with high self efficacy tend

to recover more quickly and they also maintain commitment to their goal. Self efficacy thus represents a belief in one's competence in dealing with all kinds of demands.

The Social Cognitive Theory incorporates the idea of self efficacy which is also based on the work of Bandura. This theory emphasizes on the significance of social context. The theory also talks about the importance of maintenance behaviour along with initiating behaviour.

Since most of the studies conducted on the population in consideration is mostly about stress, anxiety and depression that exists within them, there is also a need to reflect on variables like self-efficacy and grit. But also there are exceptionally less number of studies that have examined the influence of self-efficacy on grit. Hence there arises a need for it to be attended to. The influence of self efficacy, year of study and biological sex on grit has not been considered in any of the previous studies.

Need and significance of the study

The psychological health of medical students and professionals has always been an important matter of study. There is a profession which serves people at large and therefore keeping themselves mentally and physically healthy is important before they address the health of their patients. Previous studies in this population have mainly concentrated on studying the anxiety levels, stress, burnouts, depression etc. These studies also throw light to the fact that the curriculum of medicine and the profession itself gives them stress and related problems. The students and professional are often not able to achieve their success in a healthy condition and are sometimes not able to keep up their passion throughout the course time and while working due to the various problems the curriculum and profession bring up. The so far done studies in this area, as suggested, had studied more about problems this population face. In this study, the investigator tries a different view by trying to investigate positive variables in the population and how identifying these variables and designing strategies to develop them can bring about positive changes in medical students and professionals. This study may also help in addressing the importance of developing positive variables and initiate training strategies which can help this population to reduce stress, anxiety etc. by focusing on developing grit and self-efficacy.

Objective

1. To find out the independent and interaction effect of self-efficacy, year of study and sex on grit.

Hypothesis

1. The main and interaction effect of self-efficacy, year of study and sex on grit among medical students will be significant

Method

Participants

The participants of the study consisted of 449 medical students from various medical colleges in India. The participants included both male and female medical students from 1st year MBBS to Post Graduation. The participants were all users of social media and having at least one smart phone/tab. The participants were of Indian Nationality. There were 172 (38.31%) males and 277 (61.69%) were females. Among 172 males 69 (40.12%) were belong to Hindu religious affiliation, 56 (32.56%) Islam community, 43 (25%) Christian, and 4 (2.33%) were not reported their religious affiliation. Among 277 females 135 (48.74%) were Hindu's, 83 (29.96%) Islam, 57

(20.58%) Christian and 2 (0.72%) participants were not revealed their religious affiliation. The participants year of study was also collected; there were 262 (58.35%) were in 1-4th year, 127 (28.28%) were doing House surgeoncy, and remaining 60 (13.36%) were doing PG programme.

Instruments

A survey E-form was developed by the investigators to collect the relevant data. The survey was created using Google Forms. It is an online platform that enables users to create online forms which can be sent via the internet through emails, social networking sites or hyperlinks. After reviewing theory and existing techniques the researcher planned a survey form, with Likert type anchors. The survey included questions of different types. Accordingly, the form was divided into three sections: section A: General self-efficacy Scale, section B: Short grit scale (Grit-S), and section C collected demographic details such as sex, religion, year of study and type of institution studying.

1. General self-efficacy scale (GSE): The GSE is a 10-item scale developed by Jerusalem and Schwarzer (1981) to assess the optimistic self-beliefs used to cope with a variety of demands in life. Authors reported an internal reliability with Cronbach Alpha ranging between .76 and .90. The General self-efficacy scale is correlated to work satisfaction, emotion and optimism. Negative coefficients were found for burnout, anxiety, depression and stress and thus confirm the validity of the scale.
2. Short grit scale (Grit-S): The grit scale is a set of measures designed to measure a trait level perseverance and passion for long-term goals and developed by Duckworth and Quinn (2009). This scale consists of eight statements, each including five potential responses ranging from 'Very much like me' to 'Not like me at all'. Duckworth and Quinn (2009) reported evidence for predictive validity and reported reliability coefficient Cronbach's Alpha which ranges from .73 to .83.
3. Personal Details: Personal details such as sex, religion, year of study and type of institution studying were collected using the personal data.

Procedure

The data collection was conducted through an online format. Potential participants were approached to participate in the study. The initial pool of potential participants comprised of medical students who were studying in different medical colleges in India that the researcher had social media contact with. These initial participants were asked to participate in the survey and also forward it to other people in the contact list. Since no technological mechanisms to track those who receive and those among them who respond to the survey, response rate could not be measured. All the potential participants were told that it was a study in medical students to know about their passion and perseverance in their field. After ensuring that confidentiality would be maintained and that data would only be used for the purpose of the study, consent was obtained and the link for survey E-form was sent either through social media messaging or email, whichever the participant felt comfortable with. The responses generated by the participant were automatically recorded into Google Drive. At the end of data collection, the information was extracted in a work sheet and data cleaning was done. Then coded and consolidated using appropriate statistical techniques.

Results and discussion

Grit indicates a person's level of passion and perseverance which also makes it an important variable of study among medical students. Cracking the admission tests

and getting into a medical school needs academic brilliance but surviving through the long years of the entire medical course needs not only academic brilliance but also survival excellence. The students need to be continuously passionate, show perseverance and should be able to sustain to reach the long term goal. Grit may be or may not be influenced by other psychological variables.

Understanding this is one of the objectives investigator tried to study the influence of Self-Efficacy, the academic training or year of study and participants biological sex on grit. Here the variable self-efficacy was measured using an interval scale, the variable was categorized into three groups as Low self-Efficacy, Average Self-efficacy, and High Self-Efficacy based on the principle $\text{Mean} \pm \frac{1}{2}\text{SD}$, and it resulted 142 (31. 63%) participants belongs to low self-efficacy group, 182 (40. 53%) with average self-efficacy and 125 (27. 84%) participants in high self-efficacy group.

In this study, the investigator tries to understand how self-efficacy, year of study and sex influence grit of medical students. In order to understand the same, 3 way ANOVA was computed. The results are presented in table 1.

Table 1

Summary of ANOVA of Grit by Sex, Self-Efficacy and Year of Study (2x3x3)

Source of variance	Sum of Squares	df	Mean Square	F
Sex	0. 347	1	0. 347	0. 924
Self –efficacy	12. 924	2	6. 462	17. 21**
Year of study	1. 187	2	0. 593	1. 580
Sex * self-efficacy	2. 671	2	1. 335	3. 556*
Sex * Year of study	1. 000	2	0. 500	1. 331
Self-efficacy * Year of study	3. 141	4	0. 785	2. 091
Sex * self -efficacy* Year	2. 634	4	0. 659	1. 754
Error	161. 852	431	0. 376	
Total	4453. 062	449		

* $p < .05$. ** $p < .01$.

Table 1 shows the results of three-way ANOVA to find out the independent and interaction effects of self-efficacy, year of study and sex on grit. The calculated F values revealed that independent effect of self-efficacy on grit is significant ($F_{(2,431)}=17.21$, $p<.01$), which implies that the 3 groups of self-efficacy (low, average and high) shows significant difference in grit. Interaction effect of sex and self-efficacy on grit also shows significant difference at 0. 05 level. It implies that grit varies among the three self-efficacy group based on the sex.

The variable self-efficacy was grouped into 3 level or groups as low, average and high. From the ANOVA table, it was seen that in grit there was significant difference among these 3 groups of self-efficacy. To know the difference in grit among the groups, post hoc (Duncan) test was done. The results are presented in table 2.

Table 2

Comparison of mean scores of grit by self efficacy (Duncan's procedure)

Self-Efficacy	N	Subset for alpha = 0. 05		
		Low	Average	High
Low	142	2. 7852		
Average	182		3. 0941	
High	125			3. 3870

While going through the means scores of self-efficacy, it is understood from the result that, the group with high self-efficacy shows more grit. From the table it can be seen that, group with high self-efficacy shows more grit with a mean score 3.38 compared to the other two groups. The results explain that in this study, participants who show more self-efficacy shows increased grit. Study conducted by Riddle (2018) also validated this result. Al-Aboosi, Whictomb, Wickes & Shahabuddin (2017) from their study found that a better predictor of grit is a combination of subjective happiness, academic self-efficacy, gratitude, and appreciation.

The possible reason might be that when one has more confidence and belief about their abilities, it helps them to become more passionate and show more perseverance and get more motivated to work tirelessly to attain the long term goals.

Two-way interaction was found between sex and self-efficacy on grit. To know more about the nature of distribution of mean scores two-way cell means were calculated and presented in table 3.

Table 3

Interaction effect of sex and self-efficacy on grit

Sex	Self-Efficacy	Mean	N	SD
Male	Low	2.8720	42	0.56275
	Average	2.9771	71	0.58298
	High	3.2458	59	0.67393
	Total	3.0436	172	0.62632
Female	Low	2.7487	100	0.56477
	Average	3.1689	111	0.61645
	High	3.5133	66	0.72759
	Total	3.0993	277	0.69137
Total	Low	2.7852	142	0.56500
	Average	3.0941	182	0.60925
	High	3.3870	125	0.71268
	Total	3.0780	449	0.66704

From table 3, it is understood that, grit is minimum for females (Mean = 2.74) with low self-efficacy. It means that in the case of females when their belief about their abilities is least then their chances of being gritty also is the least. It can also be seen that the grit scores are maximum for the females (Mean=3.51) who have high level of self-efficacy. This shows that when the beliefs about one's abilities are high then in this study the grit of the female students are also seen high.

Analyzing the independent and interaction effect of self-efficacy, sex and year of study on grit shows that self-efficacy has independent effect on the grit. The results indicate that high self-efficacy group shows high grit. There is also interaction effect shown by sex and self-efficacy on grit. The results show that females who have high self-efficacy show high grit while females with low self-efficacy show low grit. It is also clear from the results that the year of study have no independent or interaction effect on grit.

Conclusion

The present study was conducted to understand the influence of self-efficacy, year of study and biological sex among medical students. Results revealed that self-efficacy have significant effect on the grit among medical students. Higher the self-efficacy, the levels of grit shown by an individual is also high. Females with high self-efficacy are grittier compared to the ones with low self-efficacy.

Implication

Medical profession is one of the most important ones as it deals with serving people at large. Ensuring the mental health of medical students and professionals become important as only when they are mentally and physically healthy, they can provide proper health care to the society. The course period of medical curriculum is a stressful, intellectually and emotionally demanding period as much as its practice is. Understanding what can be developed in them can provide better opportunity to make this period less stressful and can help them cope with situations in a better way. They need not only cognitive abilities but also non cognitive abilities in order to achieve success amidst the challenges this course put forward. The results of the study can help to develop training methods to helping this population develop or enhance these qualities in them.

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