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Longitudinal Effect of Grit on Medical Student's Well-Being

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Abstract

Background: This study investigated the effect of medical students' self-reported grit, empathy, and self-directed learning on their well-being.

Methods: Measures of grit, empathy, and self-directed learning on their well-being were administered as part of a larger battery of measures at multiple timepoints during medical school. The study participants were M4s and M3s at a School of Medicine in the Northeast United States.

Results: Grit was found to predict significantly lower levels of reporting mental distress for students at follow-up, while self-directed learning and empathy were not significantly related to later well-being.

Conclusion: This result adds to a growing body of literature that grit is an important trait to measure and track in medical education, as it may serve to protect against development of burnout and mental distress in medical school.

Keywords: grit, medical student well-being, empathy, self-directed learning readiness

1. Introduction

The well-being of medical students is an important outcome in medical education. Medical educators have a desire that their students are happy and thriving mentally during their time in medical school, and any characteristics or interventions that can improve the chances that students are doing well mentally have obvious value. In addition to the intrinsic value of students reporting being mentally well during their time in medical school, there are numerous reasons to specifically monitor well-being and the possibility of burnout or mental distress based on previous studies of the effects of poor mental health on students.

Students' burnout and depression has been shown to be related to an increased likelihood of dropping out of school (DeLuca, 2004). Students who are experiencing mental distress such as burn out are more likely to develop depression (Pagnin et al., 2013) as well as develop suicidal ideation (Dyrbye et al., 2008). So monitoring, and ideally intervening, students who are showing signs of mental distress are important to avoid students falling down this path. More specific to medical training, those in the medical field, and medical students in particular, have particular problems with mental distress. Relative to their peers, medical students are more likely to show signs of burnout (Brazeau et al., 2014). This has important consequences as those who are mentally distressed, as measured by burnout or similar indicators, are more likely to make medical mistakes. Student burnout is also connected with a lack of empathy towards their patients.

Given the prevalence and importance of mental distress, such as depression and burnout, in the medical education field, researchers have investigated reasons that students might be dealing with these issues. It has been suggested that medical students and workers deal with high rates of mental distress because of the workload, as well as dealing with death and trauma (Santen et al., 2010). However, what can protect medical students from experiencing these symptoms is less clear. A few studies have investigated particular personality traits that may make students likely to be burned out or depressed, and have particularly identified grit, defined as passion and perseverance for long-term goals (Duckworth et al., 2007) as a trait that may be protective. One cross-sectional study in the U.K. showed a negative correlation between grit and burn out (Halliday et al., 2017). A further study in Singaporean medical school showed that students with higher grit scores at the beginning of medical school were less likely to be burnt out across follow-ups in Year 1 of Medical school (Jumat et al., 2020).

Based on the results of these previous studies, the current study looked at grit as a protector against overall well-being, in medical students in the United States. Self-directed learning and empathy served as control variables. Empathy has been shown to be negatively related with burnout in medical students (Brazeau et al., 2010), but it is unclear whether empathy is protective against burnout or if burnout decreases empathy. Students with higher levels of self-directed learning may be better prepared for succeeding in medical school, and therefore report lower levels of mental distress. Therefore, the purpose of this study is to examine the impact of learners' perceptions of grit, self-directed learning, and empathy at the beginning of medical school on well-being later during medical school.

2. Method

Participants

Data for this study was collected from M4s (Year 4 students) and M3s (Year 3 students). Study participants completed the Student Attribute Survey (SAS) longitudinally. Specifically, first, during their orientation, followed by at the end of their first year, the end of Phase I, and the end of Phase II core clerkships. The SAS measures various constructs, such as Medical Student Well Being Index (MSWBI), Interpersonal Reactivity Index (IRI), Grit, Self-Directed Learning Readiness (SDLR), Professionalism, and Cultural Competency.

It is natural for the response rates to go down in subsequent administrations of the surveys in most longitudinal studies. In this study, 83 respondents from the M4 who had consented to use their data for research completed the survey at time point one, whereas 37 completed at time point two. Similarly, 112 participants from M3 completed the survey at time point one, whereas 49 completed during time point 2. However, retaining valid data of the study participants from both the time points resulted in a sample size of 62.

Measures

The Medical Student Well Being Index (MSWBI) is a tool developed by the Mayo Clinic to screen medical students' psychological well-being (Dyrbye et al., 2010). It is a seven-question assessment that evaluates fatigue, depression, burnout, anxiety/stress, and mental/physical quality of life. Each question has only two options – 'Yes' or 'No'. After completing the assessment, respondents receive an overall Medical Student Well-Being score of 0 – 7 (one point for every 'Yes' answer). Students with scores greater than or equal to four on the MSWI are placed into a 'Psychological Distress' category. Research shows that students who fall into this range experience negative results associated with distress including serious thoughts of dropping out of medical school.

The Interpersonal Reactivity Index (IRI) was developed as a measurement tool used to assess empathy (Davis, n.d.). The Index is a 28-item questionnaire that is divided into 4 subscales (7 items per subscale). All 28 questions are on a 5-point Likert scale ranging from 'Describes me very well' to 'Does not describe me well'. The four subscales are: Empathic Concern – feelings of sympathy and concern for unfortunate others; Fantasy – identifying with the feelings and actions of fictitious characters; Personal Distress – feelings of personal anxiety and unease in tense settings; Perspective Taking – adopting the psychological point of view of others. The SAS included the fourteen questions that made up the empathic concern and perspective taking subscale.

The Short Grit Scale (SGS) measures trait-level perseverance and passion for long-term goals, called grit (Duckworth & Quinn, 2009). It is an eight-question assessment that follows a five-point Likert scale (*Very much like me=5 - Not at all like me=1*). Participants are asked to respond to each question based on how well the phrase describes them. Four of the eight questions have positive phrasing while the other four have negative phrasing. The five-point Likert scale is inverted in the negatively phrased questions. After respondents answer all eight questions on the SGS, their points are added up to get their overall grit scores. The maximum overall grit score of 40 means the respondent is extremely gritty while the minimum score of 5 shows no grit whatsoever.

The self-directed learning readiness scale (SDLRS) assesses a respondent's current level of readiness to manage their own learning (Guglielmino, 1978). The Scale is originally a 58-item survey, but the SAS used a modified 42-item survey. All 42 questions followed a 5-point Likert scale of Strong Agree = 5 - Strongly Disagree = 1. The points from every question on the SDLRS are added up and the respondent gets an overall SDLR score. The authors suggested dividing the scores into three levels of SLDR: Below Average (scores ranging from 42 – 145), Average (scores ranging from 146 – 163), and Above Average (164 – 210). However, in this study we did not classify study participants into three categories and instead used it as a continuous predictor.

Data Analysis

We used R statistical software v. 4.1.3 to compute descriptive statistics and perform regression analyses. Linear regression was used to assess the effect of grit, SLDR, empathic concern, and perspective taking at time point one on medical school well-being at follow-up.

Ethical Considerations

The Institutional Review Board (IRB) at Hackensack Meridian School of Medicine approved this study (Study # Pro2021-0520).

3. Results

Descriptives of the scores at the initial survey and at follow-up are presented in Table 1.

Table 1. Descriptive statistics for measures

	Time 1				Follow-Up			
	Mean	SD	Min	Max	Mean	SD	Min	Mx
Grit	31.42	4.36	17	39	29.87	5.15	19	39
MSWBI	1.19	1.28	0	5	2.93	2.12	0	7
Empathic Concern	29.27	4.1	11	35	28.76	4.24	8	35
Perspective Taking	28.36	3.63	17	35	27.93	3.85	16	35
Self-directed learning	177.82	14.03	149	207	176.29	21.1	87	210

Note. For each scale, scores were calculated by summing all items after reverse coding.

At time point one, study participants' scores on the MSWBI ranged from 0 to 5. At follow-up, the range expanded to 0-7, resulting in a higher number of students being classified as psychologically distressed.

At time point one, scores for empathic concern range from 11 to 35, and scores for perspective taking range from 17 to 35. While the maximum score of 35 remained constant at follow-up, the minimum scores decreased to 8 for empathic concern and 16 for perspective taking. Both subscales of the IRI, empathic concern and perspective taking, were entered as separate variables in the regression model, as these have been suggested to be distinct constructs.

Initially, observed SLDR scores ranged from 149 to 207. At follow-up, however, these scores showed significant variation, with the minimum dropping to 87 and the maximum increasing to 210. This suggests a wide range of individual differences in the perceived growth of students' self-directed learning skills.

The overall regression model was significant, $F(4, 57) = 2.65$, $p < 0.05$ and the four independent variables explained 16% of the variance in MSWBI. As indicated in Table 2, however, the only predictor that had a significant impact on well-being was grit ($p = .02$). A 1-point increase in the sum of the grit score (between 1-40) led to a predicted .17 decrease on the MSWBI (out of 1-8, with higher scores meaning more mental distress) at the follow-up.

Table 2. Regression model coefficients

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	7.843	3.698	2.121	0.0383 *
Grit	-0.174	0.073	-2.364	0.0215 *
Self-directed learning	-0.004	0.023	-0.174	0.863
Empathic Concern	0.083	0.066	1.256	0.214
Perspective Taking	-0.038	0.092	-0.413	0.682

*Note. * = p <.05*

4. Discussion

This study demonstrated that medical students' characteristics at time one had an overall effect on well-being later on (i.e., the overall regression model was statistically significant and explained 16% of the variance in well-being at follow-up). Specifically, grit at the start of medical school significantly predicted medical student-well being after the first year of medical school. Grit being predictive of overall well-being in medical students is a novel finding to our knowledge. Grit was still predictive even when factoring additional variables such as SLDR and empathy. Grit had previously been shown to be protective against burnout in first-year medical students, and therefore, the findings of this study is consistent with the existing literature (Jumat et al., 2020). Given these results, an important future direction is whether grit can be increased by interventions in medical school. Although grit has mainly been described as a relatively consistent trait, in our data, the correlation between short-grit scores at time point one and follow-up was $r = .60$, suggesting that while scores are relatively stable, the correlation was well below 1.0 and there may be changes to grit over time.

An additional finding of this study was that well-being was not related to empathy. Previous studies had suggested that

burnout may lead to decreases in empathy, but there was no indication that more empathic students, either in terms of empathic concern or perspective taking, were more likely to become less burned-out.

Limitations and Future Research

Grit is a construct that has been criticized for being poorly defined, namely because it is highly correlated with conscientiousness, and made up of two lower-order traits: passion and perseverance, with lack of clarity that these two make up a meaningfully higher construct (Credé, 2018; Credé et al., 2017). Nonetheless, this is the third study (Halliday et al., 2017; Jumat et al., 2020) to indicate significant relation of the construct of grit (as measured by the SGS or similar measures) to aspects of mental health in medical students. Further research on the topic will help to elucidate whether it is actually conscientiousness, or specifically the passion or perseverance sub-traits that help protect medical students from burnout and mental distress. Regardless, it is clear that some combination of these traits plays a role in maintaining well-being during medical school, a crucial outcome in medical students.

This study made significant contributions to the literature on the relationships between well-being and Grit especially after controlling for empathy and SDLR. However, further research to test the regression model examined in this study would be beneficial. Some of the limitations of this study included a small sample size and large rates of dropout between time point one and follow-up. Furthermore, it would be beneficial to replicate this study using different samples from other colleges and universities. Finally, adding covariates to the analysis, such as gender, race, and MCAT scores to predict well-being would further enrich the literature by understanding if the relationship of well-being and grit is consistent across different groups of people.

5. Conclusion

This study added to a growing body of literature that grit is an important trait to measure and track in medical education, as it may serve to protect against development of mental distress in medical school. Future research can help further understand exactly what grit as a construct is measuring and how it protects against well-being, allowing medical educators to best intervene to improve grit or support students who score lower on grit.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

References

Brazeau, C. M. L. R., Schroeder, R., Rovi, S., & Boyd, L. (2010). Relationships Between Medical Student Burnout, Empathy, and Professionalism Climate: *Academic Medicine*, *85*, S33-S36. https://doi.org/10.1097/ACM.0b013e3181ed4c47

Brazeau, C. M. L. R., Shanafelt, T., Durning, S. J., Massie, F. S., Eacker, A., Moutier, C., … & Dyrbye, L. N. (2014). Distress Among Matriculating Medical Students Relative to the General Population: *Academic Medicine*, *89*(11), 1520-1525. https://doi.org/10.1097/ACM.0000000000000482

Credé, M. (2018). What Shall We Do About Grit? A Critical Review of What We Know and What We Don't Know. *Educational Researcher*, *47*(9), 606-611. https://doi.org/10.3102/0013189X18801322

Credé, M., Tynan, M. C., & Harms, P. D. (2017). Much ado about grit: A meta-analytic synthesis of the grit literature. *Journal of Personality and Social Psychology*, *113*(3), 492-511. https://doi.org/10.1037/pspp0000102

Davis, M. (n.d.). *A Multidimensional Approach to Individual Differences in Empathy*. ResearchGate. Retrieved August 6, 2025, from https://www.researchgate.net/publication/34891073_A_Multidimensional_Approach_to_Individual_Differences_in_Empathy

Duckworth, A. L., & Quinn, P. D. (2009). Development and Validation of the Short Grit Scale (Grit–S). *Journal of Personality Assessment*, *91*(2), 166-174. https://doi.org/10.1080/00223890802634290

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, *92*(6), 1087-1101. https://doi.org/10.1037/0022-3514.92.6.1087

Dyrbye, L. N., Szydlo, D. W., Downing, S. M., Sloan, J. A., & Shanafelt, T. D. (2010). Development and preliminary psychometric properties of a well-being index for medical students. *BMC Medical Education*, *10*(1), 8. https://doi.org/10.1186/1472-6920-10-8

Dyrbye, L. N., Thomas, M. R., Massie, F. S., Power, D. V., Eacker, A., Harper, W., … & Shanafelt, T. D. (2008). Burnout and Suicidal Ideation among U.S. Medical Students. *Annals of Internal Medicine*, *149*(5), 334-341. https://doi.org/10.7326/0003-4819-149-5-200809020-00008

Guglielmino, L. M. (1978). *Development of the Self-Directed Learning Readiness Scale* (Vol. 38, Issues 11-A, p. 6467). ProQuest Information & Learning.

Halliday, L., Walker, A., Vig, S., Hines, J., & Brecknell, J. (2017). Grit and burnout in UK doctors: A cross-sectional study across specialties and stages of training. *Postgraduate Medical Journal*, *93*(1101), 389-394. https://doi.org/10.1136/postgradmedj-2015-133919

Jumat, M. R., Chow, P. K. H., Allen, J. C., Lai, S. H., Hwang, N. C., Iqbal, J., … & Compton, S. (2020). Grit protects medical students from burnout: A longitudinal study. *BMC Medical Education*, *20*(1), 266. https://doi.org/10.1186/s12909-020-02187-1

Pagnin, D., De Queiroz, V., Oliveira Filho, M. A. D., Gonzalez, N. V. A., Salgado, A. E. T., Oliveira, B. C. E., ... & Melo, R. M. D. S. (2013). Burnout and career choice motivation in medical students. *Medical Teacher*, *35*(5), 388-394. https://doi.org/10.3109/0142159X.2013.769673

Santen, S. A., Holt, D. B., Kemp, J. D., & Hemphill, R. R. (2010). Burnout in Medical Students: Examining the Prevalence and Associated Factors: *Southern Medical Journal*, *103*(8), 758-763. https://doi.org/10.1097/SMJ.0b013e3181e6d6d4