

REVIEW

Review of Grit and Resilience Literature within Health Professions Education

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Objective. To review literature pertaining to grit and resilience in health professions education.

Findings. There is significant interest in grit and resilience throughout the health professions, but little has been published with regard to pharmacy. Although there are methodological issues with defining and measuring grit and resilience, several studies have shown relationships between the constructs and personal and academic well-being. Educational interventions aimed at increasing grit and resilience have produced mixed results. Developing protective factors appears to be the most common approach in helping students become more resilient.

Summary. Literature pertaining to grit and resilience reveals that the terms are nuanced, complex, and difficult to measure and understand. Regardless, the general characteristics associated with grit and resilience are of interest to educators and warrant further study.

Keywords: grit, resilience, mental health

INTRODUCTION

Non-cognitive traits, defined as those skills associated with motivation, attitude, and temperament rather than intellect, are increasingly recognized as important skills to identify and develop in medical professionals, including pharmacy students. The 2015 AACP White Paper on Pharmacy Admissions recognized non-cognitive traits, similar to grit and resilience, as imperative for consideration when seeking to admit well-rounded students.¹

The concepts of grit and resilience, terms generally used to describe the ability to persevere through hardships to meet goals, are rapidly emerging topics in both popular press and peer-reviewed literature. Resilience has been cited as a predictor of well-being² and grit has been found to be associated with academic and professional success independent of IQ.³ Long considered important traits for military service⁴⁻⁷ and athletic success,⁸⁻¹⁰ these terms are increasingly being used within academic settings, particularly regarding perceived student ability (or lack thereof) to handle challenging situations and disappointment.¹¹⁻¹⁴ Increasing evidence of stress and anxiety among college students may be adding

to the emerging popularity of these constructs. A 2014 study by the American College Health Association found that 54% of college students surveyed reported feeling “overwhelming anxiety” within the past 12 months.¹⁵

There are multiple theories as to why some students struggle with difficult aspects of school and life. One theory is the fear of failure as a result of being under increasingly more pressure to perform in order to secure post-graduate training or a desired job.¹⁶ Today’s college graduates face a tough job market as indicated by higher rates of unemployment and underemployment compared to the general public.¹⁷ Some psychologists and education philosophers posit, however, that America’s youth may simply possess less grit and resilience than previous generations because of differences in upbringing. With greater frequency, faculty members are discussing their concern regarding students’ emotional fragility in response to grades and the increasing tendency to blame the teacher for poor performance.¹¹ A past president of the Association for University and College Counseling Center Directors (AUCCCD) said, “[Students] haven’t developed skills in how to soothe themselves, because their parents have solved all their problems and removed the obstacles.”¹¹

Regardless of the causes, the growing perception that many students are ill-equipped to handle the challenges of college is forcing schools to change their approach of how to successfully advance students through the curriculum

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and prepare them for the “real world.” Consequentially, many educators may struggle to find an appropriate balance between being supportive while also challenging students to take responsibility for their education and minimizing handholding.

Grit and resilience are often mentioned as key factors in coping with mental health pressures and are important concepts to study to better understand and improve at-risk students’ chances of educational success and personal well-being.¹⁸ In this paper, the authors delineate the similar constructs of grit and resilience. The authors review the health professions education literature regarding these topics with a focus on their roles in academic performance and wellness, and whether these traits can be taught. The paper concludes with a discussion of the numerous complexities involved with these constructs.

Grit and resilience are two related terms often used interchangeably, but in actuality are completely different constructs. Grit is defined as perseverance and passion toward long-term goals and describes sustained commitment toward completing a specific endeavor despite episodes of failure, setbacks, and adversity.³

Various definitions for resilience exist,¹⁹ but the term generally refers to one’s ability to maintain or regain mental health after experiencing adversity.²⁰ In more simple terms, resilient individuals exhibit the ability to “bounce back” from stressful and negative emotional experiences.²¹ By definition, resilience is an inherent attribute of grit. Academic resilience, a type of resilience specific to education, is described in many different ways, but is roughly defined as an increased probability of academic success despite stressful events and conditions.¹⁹

METHODS

Like other psychological constructs, measurement of resilience and grit is complex and not an exact science. Nineteen different general resilience scales have been reported in the literature. The number of scales indicates the popularity of the construct, but also leads to inconsistencies in how to define and study these constructs.²² One review of resilience literature indicated that studies reporting the proportions of populations to be resilient ranged from 25% to 84%. The wide range draws into question whether resilience or some other psychological construct is actually being measured.²³ Based on a combination of psychometric ratings, the Connor-Davidson Resilience Scale,²⁴ the Resilience Scale for Adults,²⁵ and the Brief Resilience Scale²⁶ are considered the most valid and reliable.²² The only known instrument for measuring academic resilience is the Academic Resilience Scale (ARS-30),¹⁹ which has not undergone significant testing for predictive power. There are also few measurement

scales for the newer construct of grit. Duckworth’s 12-item grit scale (Grit-O)³ and the psychometrically stronger 8-item Short Grit Scale (Grit-S) are the only known tools for directly measuring grit.²⁷

Grit and resilience are terms rarely found within pharmacy education literature, but have been discussed briefly in medical and nursing education. This section summarizes peer-reviewed literature regarding grit and resilience within health professions education. PubMed mesh search terms: psychological resilience, academic resilience, and grit were all used in combination with each of the following terms: pharmacy education, medical education, nursing education, dental education, and health professions education. No limitations were placed on publication year. To be included in this review, an article must focus on the psychological constructs of grit or resilience, pertain directly to health professions education, and pertain to academic success and personal well-being. Fifty-eight articles published from 2008-2016 were retrieved through PubMed search. Articles were screened by the two authors to determine relevance. Twenty-seven articles pertaining to resilience met inclusion criteria and an additional article was identified through reference citations (Figure 1). No articles were found in the literature search for grit. However, two articles were discovered from references of other articles and one additional article was found through journal table of contents. Finally, one abstract for an article-in-progress (at the time this manuscript was written) pertaining to grit was identified at the American Association of Colleges of Pharmacy (AACP) Annual Meeting in 2016.⁵⁵ Thirty-one peer-reviewed articles are included in this review (Tables 1 and 2).

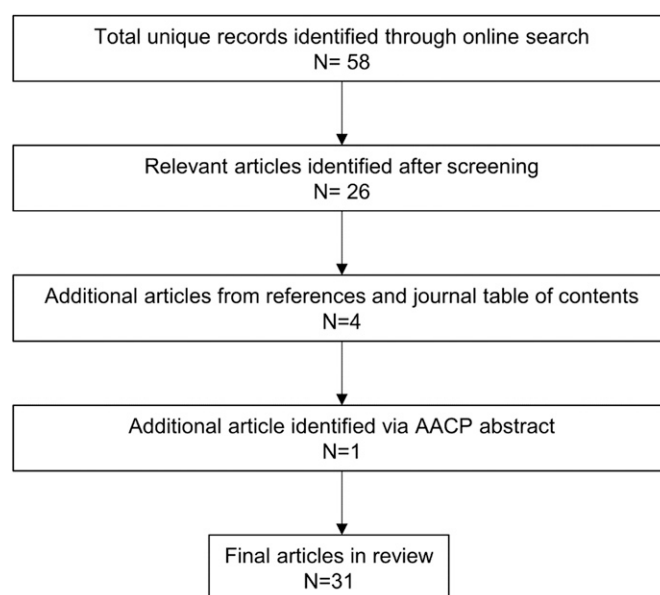


Figure 1. Literature Search Results.

Table 1. Resilience Literature in Health Professions Education

Author	Year	Profession	Article Type	Major Findings
Milne	2016	Nursing	Qualitative integrative review	Cultural, financial, and academic support necessary for resilience in indigenous students (Australia).
Cumberworth & Cumberworth	2015	Medical	Letters to the Editor	Response to Eley & Stallman (2014) - A financial commitment to medical education may enhance commitment rather than inhibit resilience.
Oliver	2015	Medical	Commentary	Resilience cannot be taught with training or examination.
Reyes	2015	Nursing	Qualitative integrative review	Three themes regarding resiliency: it is important, conceptualized as both trait and process, associated with protective factors.
Shi	2015	Medical (N=2925 students)	Research	Stress and resilience play a role in life satisfaction.
Tempski	2015	Medical (N=1350 students)	Research	Resiliency associated with higher overall and medical school-related quality of life and educational environment perception.
Beauvais	2014	Nursing (N=124 students)	Research	Academic success and resilience is weakly correlated.
Eley & Stallman	2014	Medical	Commentary	A consumer model of education has promoted a sense of "entitlement," which may hinder the development of resilience, responsibility, and resolve.
Mott	2014	Nursing (N=6 students)	Qualitative interview research	Resilience and persistence are key to overcoming school bullying.
Pines	2014	Nursing (N=60 students)	Research	Intervention in form of simulation, role-play, and conflict management offered little improvement except for a significant increase in "necessitating" sub-scale of resiliency.
Pitt	2014	Nursing (N=132 students)	Research	Resilience correlated with first- year GPA and third-year clinical scores.
Sandars	2014	Medical	Guideline	Reactive and proactive methods can be used to enhance resilience in students.
Stephens	2013	Nursing	Review	Definition of resilience requires clarification to plan interventions in nursing education.
Dyrbye & Shanafelt	2012	Medical	Commentary	Resiliency should be nurtured in medical students through student- and school-level initiatives rather than used as a tool to weed out candidates.
Howe	2012	Medical	Review	Resilience appears to be useful in educational practice, though more research is needed to develop formal training.
Longenecker	2012	Medical (N=50 students)	Research	Themes associated with resilience include hardship, teamwork, adaptability, and lifelong learning.
Taylor	2012	Nursing (N=136 students)	Research	Matched pairs of pretest-posttest across semester. No statistical difference overall, but slight increase in persistence and existential oneness sub-scale.
Tempski	2012	Medical	Commentary	Transformative education should improve emotional competences, including resiliency.
Chen	2011	Nursing	Review/Commentary	Problem-based learning may aid in developing resilience because it causes students to face problems, reflect, etc.

(Continued)

Table 1. (Continued)

Author	Year	Profession	Article Type	Major Findings
Dyrbye & Shanafelt	2011	Medical	Commentary	Medical schools are responsible for promoting student wellness through development of self-care skills and establishing an environment that promotes health.
Mehzabin	2011	Medical (N=58 students)	Research	Mean intrinsic resilience scores are high among entry-level medical students.
Pines	2012	Nursing (N=166 students)	Research	Stress resiliency and empowerment are positively correlated.
Elizondo-Omana	2010	Medical (N=182 students)	Research	Resilience scores did not correlate with academic performance in gross anatomy class.
Haglund	2009	Medical (N=125 students)	Research	Exposure to trauma was associated with personal growth.
McAllister & McKinnon	2009	Medical	Review	Resilience theory should be included in educational content of health professionals.
Dunn	2008	Medical	Special Article	Developing coping reservoirs can promote well-being and resilience among students.
McGowan	N/A	Nursing	Review	Weak evidence that hardiness is associated with slightly improved academic performance and decreased burnout.

Most of the health professions literature regarding resilience is commentary-based rather than research. Several health professions educators have posited that resilience is an important trait for medical and nursing students, and the questions revolve around whether those traits can be taught and if so, how to best teach them.²⁸⁻³²

RESULTS

Many of the studies regarding resilience in health professions education pertain to correlation with academic performance. An observational study of 182 first-year medical students in a gross anatomy course found no correlation ($r=0.11$) between resilience score and the

final course grade.³³ Additionally, there was no difference in resilience scores between students who passed the course on the first try and those who had to remediate. In a study of nursing students ($N=136$), researchers did not find a significant difference in resilience ($t(131)=-.024$, $p=.981$) across the course of a semester, nor was there a significant difference ($F(4,124)=1.488$, $p=.210$) in resilience scores between students of different levels in nursing school.³⁴

Other studies, however, have identified weak evidence that resilience is associated with academic performance along with decreased burnout in nursing students.³⁵ In a study of 132 nursing students, researchers found

Table 2. Grit Literature in Health Professions Education

Author	Year	Profession	Article Type	Major Findings
Pate	2017	Pharmacy (N=702 students)	Research	Grit is associated with high academic performance in pharmacy students.
Hammond	2016	Pharmacy	Commentary	Grit should be studied in pharmacy students and residents as it has been associated with success.
McCabe	2016	Nursing	Commentary	Grit should be nurtured through mentorship with experienced practitioners and self-reflection.
Robinson	2015	Nursing (N=97 students)	Research	Grit is associated with greater course engagement in nursing students.

resilience weakly correlated with academic performance, including first-year GPA ($r=0.21$, $p=.01$) and third-year clinical scores ($r=0.25$, $p=.05$).³⁶ Likewise, in a study of 124 nursing students, academic success was found to be weakly correlated with resilience ($r(121)=0.24$; $p=.007$).³⁷

Another focus of resilience research is from a quality of life perspective. In a study of over 1,300 Brazilian medical students, researchers found that higher levels of resilience were associated with a higher quality of life (QoL), as measured by the World Health Organization Quality of Life Questionnaire, and better perception of their educational environment.³⁰ More specifically, they found that medical students with very high resilience had statistically higher overall QoL than those with very low to moderately high ($p<.001$) or even high ($p=.013$) resilience levels. Evaluators also used the validated Dundee Ready Educational Environment Measure (DREEM) questionnaire to assess five domains (learning, teachers, academic self-perception, atmosphere, and social perception) of the students' educational environment. Students with very high resilience demonstrated significantly higher levels of each domain ($p<.001$ for all domains) compared to students with very low to moderately high resilience. Students with very high resilience also demonstrated lower anxiety and depression scores, which were assessed using the State Trait Anxiety Inventory (STAI) and Beck Depression Inventory (BDI), respectively. No differences were found between sex or student year in the medical program.³⁰

Shi and colleagues conducted a multi-center study of nearly 3,000 Chinese medical students to evaluate the mediating role of resilience between stress and life satisfaction. Age was found to be negatively correlated with resilience ($r=0.08$, $p<.01$). The authors proposed that as medical students aged, they were more likely to face stress from more sources, especially when searching for a job. Results also showed that stress was negatively associated with life satisfaction ($\beta=-0.34$, $p<.001$), whereas resilience was positively associated with life satisfaction ($\beta=0.46$, $p<.001$). The authors concluded that resilience plays a mediating role between stress and life satisfaction.³⁸ Results from a study of 166 nursing students confirmed previous studies that stress resilience and empowerment are positively correlated, suggesting that those who feel more competent and in control of their situations have a stronger line of defense against setbacks.³⁹ Finally, in a qualitative study of six nursing students, Mott concluded that resilience and persistence are key factors in overcoming bullying by instructors.⁴⁰

Educators have also identified the transition from classroom education to clerkships and direct patient care

as a potential emotional stressor. Haglund and colleagues acknowledge that many medical students have had no exposure to death or severe illness prior to their clerkships. They assert that medical educators do not know the impact of witnessing death on a student's psychological well-being. In their prospective study of third-year medical students, they found that exposure to more traumatic events during the clerkship year was associated with more personal growth ($b=0.11$, $SE=0.04$, $p<.02$) by the year's end.⁴¹

Several authors have offered commentary regarding potential methods for teaching resilience. Chen posits that problem-based learning may help build nursing student resilience because it gives students a sense of responsibility, involves critical feedback, and forces reflection.⁴² Dyrbye and Shanafelt argue that self-care activities are necessary to promote resilience, but first an appropriate culture and learning environment needs to be established because many students fail to seek help due to fear of repercussion or confidentiality. They propose that rather than focusing solely on improving students' self-care, college interventions should address competitiveness, poorly structured clerkships, and inadequate preparation to human suffering and ethical challenges.²⁸ Sandars and colleagues emphasize using both proactive and reactive methods to develop resilience. The reactive approach is most commonly used and involves addressing individual factors that may be maladaptive to a student's coping process. The proactive approach, however, uses workshops to teach adaptive responses, or coping skills, prior to a potentially stressful experience.⁴³ Likewise, based on their literature review, Howe and colleagues propose a number of education conditions that may develop resilience. These include admitting students with interpersonal strengths that can be further developed in training, requiring reflection, creating a safe environment for failure, providing mentorship, and encouraging stress release.³¹ Oliver, however, argues that resilience, like many other skills, must be developed on the job and that no amount of training in schools will increase it.⁴⁴

Some authors have discussed the role that schools can play in developing protective factors. Dunn and colleagues propose a conceptual model known as the "Coping Reservoir." This reservoir represents balance between negative inputs (eg, stress, time demands, etc.) and positive inputs (eg, psychosocial support, social activities, etc.), which determines if the outcome is positive or negative. They argue that by developing positive inputs during school, students will be more resilient and equipped to handle negative experiences.⁴⁵ McAllister & McKinnon echo this concept and posit that for students to manage future workplace stress, they should discuss resilience

during their education and ask for mentorship from experienced practitioners.²⁹ Likewise, in a selective review of resilience literature, Stephens proposed a model of resilience in which protective factors were necessary to balance against student stressors.⁴⁶ Longenecker and colleagues discuss resilience themes that they believe are necessary curricular components in medical school including: hardship is an opportunity for growth, team work strengthens resilience, adaptability is more important than hardiness, and lifelong learning must be applied.⁴⁷ Through an integrated qualitative review, Milne and colleagues found that cultural, financial, and academic support were necessary components for resilience in indigenous nursing students.⁴⁸ In another integrated review, Reyes and colleagues identified protective factors as being associated with resilience and the ability to buffer or mitigate risk factors. Reyes and colleagues assert that strategies should be explored and implemented to enhance protective factors.⁴⁹

Only one study conducted with regard to increasing resilience through educational interventions was identified in the peer-reviewed literature. Pines used an intervention of conflict management simulations and role-playing with 60 nursing students. The Stress Resiliency Profile (SRP), an assessment designed to identify mental habits that may increase stress, was used to evaluate the impact of the intervention. Overall, there was no significant improvement in SRP scores after training. A stress resilience subscale score, however, pertaining to mindset of commitment (“necessitating” score) improved ($p=.014$) from pre- (mean (SD) 31.1 (5.0)) to post- (29.8 (5.0)) simulation, with higher scores indicating a perception that tasks are inflexible demands.⁵⁰ These results suggest that intervention could improve student perception of tasks as being a commitment with room for discretion and intervention.

Finally, with regard to the educational environment’s influence on resilience, Eley and Stallman claim that a consumer model of education has promoted a sense of “entitlement” and that faculty accommodation based on student expectations (including curricular rules and expectations, attendance requirement, etc.) hinders the development of resilience in medical students.⁵¹ Cumberworth and Cumberworth counter this commentary arguing that by the time students reach medical school they have already experienced disappointments and failures in their academic endeavors.⁵² The idea that medical students in and of themselves display a level of resilience is supported by a study of intrinsic resilience levels in 58 first-year medical students in the United Arab Emirates. Researchers found that students scored uniformly high [Mean (SD) 48.9 (5.0)] for intrinsic

resilience with “high resilience” being defined as any score above 48 on a scale of 16 to 80. Additionally, median intrinsic resilience scores did not significantly vary with regard to age, gender, religion, nationality, or family structure ($p>.05$ for all).⁵³

While there is scarce research regarding resilience within health professions education, there is even less research pertaining to grit. Hammond introduces grit into pharmacy literature through a commentary urging for exploration of the topic within pharmacy education.⁵⁴ Research pertaining to grit in pharmacy students is limited to one article.⁵⁵ Evaluators used the Short Grit Scale (Grit-S) to assess grittiness among pharmacy students at three pharmacy schools (University of Mississippi, University of Louisiana-Monroe, and University of Arkansas for Medical Sciences) and compared it with academic performance. Among 1314 students, 724 (55%) completed the Grit-S. The total grit score was a significant and independent predictor for students with grade point average (GPA) ≥ 3.5 (RR=1.8, 95% CI of 1.5-2.3. Participants with a lower GPA (< 3.0) had lower scores in the persistence subdomain (RR=0.7, 95% CI of 0.6-0.8) than those with a higher GPA.⁵⁵

The remainder of grit literature from health professions education is from nursing. In one commentary, McCabe discusses clinical experiences and role modeling for developing grit within nursing students. She proposes that grit is nurtured over time through conversations with experienced nurses or reflecting on their own experiences.⁵⁶ There is, however, only one published study in nursing literature that evaluates grit in students. Robinson studied the relationship between grit using the Grit-S and nursing student course engagement. Engagement subtypes included skills, emotion, participation/interaction, and performance as measured by the Student Course Experience Questionnaire (SCEQ). The mean grit score was 3.7 (range 2.63-5) with a possible range of 1 (lowest grit) to 5 (highest grit). Higher grit scores were associated with greater overall course engagement ($r=0.47$, $p<.001$). More specifically, higher grit scores had the strongest association with student skills ($r=0.56$, $p<.001$) and emotion ($r=0.29$, $p<.01$). The author concluded that student engagement is a multidimensional concept, but evidence supports the relationship between grit and engagement.⁵⁷

DISCUSSION

Although limited in literature, grit and resilience have been credited throughout the health professions and popular press with predicting success, as well as contributing to personal well-being and the ability to withstand the rigors of school and life.^{30,36-38} Literature from

the health professions indicate that grit and resilience are of considerable interest with regard to academic, career, and life success.^{28,30,31,41,54} An underlying theme refers to the role of faculty and schools in helping students deal with stress and setbacks.

Perhaps one of the drivers of the growing interest in grit and resilience as reflected in the literature is that today's education environment presents a philosophical dilemma regarding the amount and type of support that should be provided to students struggling with the rigors of balancing school and life. For various evaluative and financial reasons, it is in a school's best interest to prevent failure and ensure a high graduation rate. Also with rising tuition costs and the burden of student debt, there is somewhat of a moral imperative to help professional students graduate, which is likely the only way to recoup their significant financial investment. Providing counseling, accommodations, and other types of support services are becoming an increasingly important means of ensuring student success, helping some students bridge difficult periods of life, and preventing dropout. The principles behind this support are laudable because they place student well-being and success as driving values.

However, although numerous valid reasons for attending to student psychological and mental health needs exist, there is a conflicting side to the issue. Many fear that excessive support (ie, hand-holding) puts students at a disadvantage when they enter life after school, which is often filled with struggle, criticism, setbacks, and disappointments. The concern is that graduates, who for whatever reason do not possess characteristics of resilience or grit, may ultimately be unable to mentally handle hardships in their career when the stakes are higher. Within the medical professions in particular, there is another concern that providing excessive support and/or allowing concessions will leave students unprepared to provide the highest level of patient care. In contrast to the previously mentioned student-support philosophy, an approach that allows students to struggle, fail, recover, and potentially develop resilience and an attitude of accountability may be considered a valuable and necessary role of professional education. Although vastly different, both philosophical approaches have students' best interest in mind. There may be ways in which both approaches can co-exist leading to greater student success, but no reports of this currently exist in the literature.

Despite the popularity and desirability of grit and resilience, educators should be aware of the intricacies in defining, measuring, discussing, teaching, and addressing their existence (or lack thereof) in the student population. Additionally, extrapolating results across cultures may be problematic because of differences in educational

structures and philosophies. The further one delves into the research literature, the more complex these topics become and the more questions that need to be asked, including the following: What non-cognitive traits do we believe are most important for students to possess? Are we mostly interested in grit, resilience, academic buoyancy, or in some other similar construct(s)? Should we attempt to identify students low in grit and/or resilience either for admissions purposes or to pro-actively help students who may struggle? Can, should, and how do we teach students to be gritty and/or resilient? These questions for health professions educators are discussed alongside studies from the wider body of grit and resilience literature.

Determining exactly which non-cognitive traits are critical for health professions students may be the most important question to answer first. Grit and resilience appear to be the most pertinent constructs with regard to ability to handle setbacks, negative feedback, and other obstacles in health professions education and careers. However, the wider body of literature indicates there is a list of other measurable constructs that overlap, such as perseverance, mindset, self-control, mindfulness, self-efficacy, conscientiousness, etc.⁵⁸ It could be that other constructs may be better suited for what we really want to know. From a research standpoint, analysis of grit and resilience is complex because the terms themselves are conceptually weak, overlap with other constructs and terms, and are often misapplied in the literature.⁵⁸ Grit is an exceedingly difficult trait to identify because it refers to a combination of sustained effort and interest over time, meaning that grit may not manifest itself in individuals for many years. In a recent meta-analysis of grit studies representing 66,807 individuals, the authors concluded that the construct validity of grit is questionable. It is very strongly correlated with conscientiousness and is much more a measurement of perseverance than interest.⁵⁸ A major limitation of measuring grit (and even resilience) is that the scales are based on self-reports and subject to social desirability bias.³ Even the leading researcher of grit, Angela Duckworth, believes that enthusiasm for the construct is ahead of the science and that attempts to measure and make policy decisions pertaining to non-cognitive traits may be misguided because of methodological limitations.^{59,60}

Resilience is even more challenging to study. Traditional resilience definitions and research have applied specifically to severe psychological trauma; however, in more recent years, society has used the term in much broader contexts to describe less extreme forms of psychological distress (eg, academic resilience). Individuals who fit the traditional sense of the word resilient are rare

because most people do not experience extreme adversity in their lives. There is even debate as to whether resilience is a global construct, meaning an individual always displays resilience, as opposed to one that is context specific, in which the level of resilience is directly related to the event.¹⁹ Like grit, the validity of measurement instruments has been questioned.⁶¹ Furthermore, while academic buoyancy as a term has not been discussed in the health professions literature, Martin and Marsh make a compelling argument that academic buoyancy, not resilience, is actually what many educators are concerned with in regard to ability to handle negative school experiences.⁶² Whereas resilience refers to excelling despite severe and sustained psychological trauma, academic buoyancy addresses more common acute daily setbacks in academic settings such as low grades or negative classroom experiences.

Despite the difficulties in identification and measurement, many are of the opinion that non-cognitive traits are important for academic and career success. In addition to AACP's recognition of importance of non-cognitive traits, the American Association of Medical Colleges (AAMC) Committee on Admissions endorsed resilience as one of nine core personal competencies for entering medical students.^{1,63}

Although the body of evidence within health professions is relatively weak and with conflicting results, both grit and resilience have been shown to correlate with academic success.^{36,37,55} It is relatively easy for educators to envision how perseverance and determination are valuable characteristics for students and graduates, especially with regard to overcoming adversity in school and careers. Screening for these traits during the admissions process is compelling and could potentially help schools admit students who are more likely to succeed. Dyrbye and Shanafelt, however, caution against using resilience as a weed-out tool for fear that other characteristics such as dedication and empathy may be overlooked.²⁸

In addition to the aforementioned measurement challenges, another difficulty with attempting to identify grit and resilience within academic contexts is that they may not be readily apparent or recognized until someone has been truly challenged. Many individuals may matriculate to professional school with few major school or life impediments. For some, pharmacy school may be the first time they experience considerable academic difficulty. While no reports in the health professions literature document this, anecdotal conversations with faculty members and school counselors indicate an alarming percentage of pharmacy students who express devastation at their first "bad grade" or low GPA. Although it may be difficult, being able to identify these individuals

and pro-actively addressing the issues appear to be desirable for both students and faculty.

Of related importance, educators should not overlook student wellness and mental health during health professions training. As resilience has been associated with higher quality of life and life satisfaction, efforts to identify and develop this trait in students may be worthwhile.^{30,38} Pharmacy students must not only manage school-related and personal (eg, illness, financial, etc.) stress, but also those specific to the health professions including exposure to suffering and death.^{29,41,45,51,64,65} Additionally, the Accreditation Council for Pharmacy Education Standards 2016 requires that pharmacy schools should promote student well-being.⁶⁶

How to teach or instill grit and resilience through educational interventions is of particular interest in the training of health care professionals.^{2,30,38,45,51,65,67} Sound research in this area is sparse, partially because of conceptual and measurement issues.²² Methodological concerns aside, there are also mixed results as to what effect interventions within education settings can have in the development of these constructs. Willingham posits that "elements" of grit can probably be taught, but the research has just begun.⁶⁸ In general, there is evidence that grit interventions may have some positive effect, but also opposing evidence in which interventions were unsuccessful.^{58,69} There is value in attempting to instill grit in students, but currently a lack of solid evidence for what this type of education should look like. Likewise, educational interventions regarding resilience have also been associated with mixed outcomes.⁴⁹ The differing results suggest that instructional strategy selection is very important and the question is not whether these constructs can be taught, but what is the best way to do so.

While there is insufficient evidence for any single type of intervention that will be highly effective, much of the literature, including health professions education literature, refers to "protective factors" as a major influence in resilience. Protective factors are influences that modify or ameliorate responses to events predisposing one to a maladaptive outcome.⁷⁰ Some suggest that protective factors are crucial to resilience and that schools can aid in the development of those factors.²⁹ While there may be other methods to develop resilience, helping students understand and develop protective factors may be an effective short-term intervention. Protective factors come in many forms, including coping mechanisms, peer and family support, social connectedness, positive role modeling and mentorship, and intellectual stimulation.^{29,45,46,71,72} Based on the concept of protective or "replenishing" factors, Jackson and colleagues recommended five self-development strategies to build

resilience: building positive nurturing professional relationships and networks, maintaining positivity, developing emotional insight, achieving life balance and spirituality, and becoming more reflective.⁶⁴ It is in these areas of developing protective and replenishing factors in which school counselors may play a crucial role.

Even if we universally accept that helping students develop protective factors is important, there are confounding variables to consider with regard to understanding how individuals respond to adversity. Research outside of health professions education literature indicates that it is not only the presence of academic challenges, but also the individual's perception of those adversities that determines the outcome.⁷³ Of particular interest are the two implicit theories of intelligence – entity and incremental theory, more commonly referred to as “mindset.” Students with an entity (fixed) mindset view intelligence as unchangeable (ie, you are either intelligent or not). Failures and setbacks are viewed as permanent and cannot be rectified by effort. In contrast, students with an incremental theory of intelligence (growth mindset) see abilities as something that can be developed over time and are more optimistic about overcoming challenges. Whether a student has a fixed or growth mindset shapes one's goals, beliefs about effort, and how one interprets setbacks. Interventional studies outside of health professions have shown that a growth mindset not only promotes resilience, but that teaching it in an academic setting can change student behavior.⁷⁴⁻⁷⁶

While there is some evidence that grit and resilience may aid in the development of health care professionals, the further one delves into the wider body of research, the more complex the constructs become. It is clear that the topics are appealing to educators and that some students possess traits outside of general intelligence that are conducive to success, but it is less clear how to interpret the existing literature and address those constructs within educational practice.

There are still many important questions that need to be pursued in future research. First, research is needed to determine the actual percentage of pharmacy students who may be considered “at-risk” for poor academic performance or increased stress and anxiety because of low levels of grit or resilience. It would be valuable for faculty and school counselors to identify these students for early intervention. Second, research is needed to determine specific, implementable strategies that schools can use to increase resilience. Potential interventions could be implemented institution-wide or on an individual basis. Third, grit warrants further study with regard to predicting academic and career success. Finally, and perhaps most importantly, we need to determine the traits (grit,

resilience, mindset, conscientiousness, persistence, etc.) that most accurately represent the non-cognitive skills we want to see in our students with the intent of improving academic performance and student well-being.

CONCLUSION

This review reflects a summary of major points and issues of grit and resilience within the health professions education literature and discusses their importance to academic success and personal well-being within the context of pharmacy education. Educators are always searching for characteristics and traits that predict success. Despite criticism within scientific literature of their overlap with other traits and difficulty to measure accurately, grit and resilience have been offered as possible explanations for students who succeed in the face of pressure. Many educators currently struggle with how to help students succeed without hindering their ability to overcome school and life difficulties.

Whether grit, resilience, academic buoyancy, mindset, self-efficacy or something else is the best factor to study is unclear, but that should not prevent us from trying to find the answers in order to equip our graduates with skills and attitudes that will promote well-being and career success.

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