



Grit, academic resilience, and mindset of nursing students: A cross-sectional study

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ABSTRACT

Background: Nursing students engage with the complex health system for competence development. These students are exposed to nerve-wrecking experience in addition to their everyday personal and social challenges. Non-cognitive attributes, namely grit, resilience and mindset can influence students' ability to overcome complexities as they become nurses resulting in academic success and well-being. Insights into the state of non-cognitive attributes among undergraduate nursing students are essential in developing tailor-made educational programmes to enhance their grit, resilience, and mindset.

Objectives: To describe the undergraduate nursing students' grit, academic resilience, and mindset at a university in South Africa

Design: A quantitative descriptive cross-sectional design.

Setting: A School of Nursing at a public multi-campus university in South Africa.

Participants: All students (N = 315) registered for the undergraduate nursing programme were invited to participate, and 70 % (N = 221) chose to participate.

Methods: Data were collected using self-administered questionnaires that included a 7-item demographic survey, the 30-item Academic Resilience Scale (ARS-30) that measures affective, cognitive, and behavioural responses in an educational context, the 16-item Dweck Mindset Scale (DMI) that measures a personal belief about whether intelligence and talent are fixed or amenable to change, and the 8-item Grit-S scale measuring passion for long term goals and perseverance. The collected quantitative data were analysed statistically through the Statistical Analysis Software Version 9.4 computer programme.

Findings: The findings revealed that the participants have normal grit and a growth mindset, but low academic resilience.

Conclusions: Tailor-made educational programmes that target non-cognitive attributes must integrate interventions that are focused on enhancing academic resilience for undergraduate nursing students.

1. Introduction

Nursing students spend hours training in the healthcare system to achieve competence. Furthermore, these students are regularly exposed to distressed and sick people who may be dying or highly infectious, posing a high risk to students' lives (Al-Dweik et al., 2021;

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Dehkordi and Tavakol, 2011; Liu et al., 2022; Zhou et al., 2022). The protracted shortage of nurses creates a context where nursing students work with limited supervision and support (ICN, 2023). In addition to understanding their role in the complexities of the healthcare environment, nursing students are also expected to navigate everyday personal, relationship, and financial stressors as they transition into adulthood (Calo et al., 2022). These kinds of stressors may compromise students' well-being and their ability to cope and thrive within a nursing programme.

Non-cognitive attributes such as grit, mindset, and resilience can influence nursing students in overcoming challenges while in the clinical learning environment. While cognitive attributes refer to skills requiring intellectual effort, such as thinking, reasoning, problem-solving, and remembering (Mýtina-Kureková et al., 2016), non-cognitive attributes are skills associated with an individual's interpersonal interaction, integrity, and enthusiasm (Stoffel and Cain, 2018).

2. Background

Non-cognitive attributes are critical to students' academic performance and persistence (Farruggia et al., 2018) and are essential in predicting health sciences students' clinical practice performance (De Visser et al., 2018; Patterson et al., 2019; Sobowale et al., 2018). Grit and academic resilience have been proven to contribute to health sciences students' well-being and academic success (Calo et al., 2019).

Grit is a distinct, non-cognitive trait related to one's intrinsic motivation to endure adversities in the quest to reach a goal. Grit is associated with positive outcomes in education and occupation (Thomas et al., 2021; Vazsonyi et al., 2019). Stoffel and Cain (2018) describe grit as having a dual dimension: consistency or non-fluctuation of interest, and determination or perseverance. Consistent interest reflects the ability to maintain the same level of interest for a long time, while perseverance and effort are related to the ability to endure and overcome setbacks (Stoffel and Cain, 2018). Health professionals designate grit as substantially crucial in academic life and occupational success (Stoffel and Cain, 2018); it is significantly associated with self-regulation and predicts academic and clinical performance (Terry and Peck, 2020), and lessens academic procrastination (Attia and Abdelwahid, 2020).

Academic resilience is the ability to recuperate from adversities that threaten intellectual development (Chisholm-Burns et al., 2019; Howell et al., 2018; Hwang and Shin, 2018). Academically resilient students have both protective and personal factors, especially in challenging educational environments (Sulong et al., 2019). Protective factors include a support system comprising family, friends, neighbours, and educators who can be consulted when students experience stressful and challenging situations (Hwang and Shin, 2018; Sulong et al., 2019). Personal factors are external protective constructs such as caring relationships and the encouragement to engage in meaningful activities through which one's developmental needs are fulfilled. These needs include a sense of love, safety, and belonging, as well as challenge, power, and respect (Sulong et al., 2019). Academic resilience is essential for nursing students because skills such as creativity, critical thinking, and problem-solving are vital in nursing education (Hwang and Shin, 2018).

Mindset refers to an individual's perceptions of their learning abilities (Mrázek et al., 2018). Conceptually, mindset is a bipolar construct situated on a continuum from 'fixed', on the one end, to 'growth' on the other (Clark and Sousa, 2018; Liu et al., 2018). Fixed and growth mindsets are induced by situations and are associated with personal attributes, motivation, and response patterns triggered by challenging situations (Mrázek et al., 2018). Individuals with a fixed mindset view intelligence, skill, talent, and ability as inherent traits pre-determined at birth (Clark and Sousa, 2018). The growth-inclined mindset enables the development of certain abilities through assistance, effort and application of correct learning strategies (Fuesting et al., 2019). Fraser (2018) concurs that a growth mindset is focused on the mastery of goals that promote the acquisition of new knowledge and skills, thereby improving academic achievements. Students with a growth mindset are not averse to fear of failure; instead, they persevere through setbacks and learn from their mistakes and the concomitant feedback (Mills and Mills, 2018; Yousefi and Khalkhali, 2018). Furthermore, the advanced academic motivation and performance of students with a growth mindset enables them to acknowledge that improvement is possible, but also not always easily attainable (Liu et al., 2018). The properties of a growth mindset are associated with better education, gaining new skills, and expanding knowledge.

This article reports on the non-cognitive attributes of undergraduate nursing students at a university in South Africa. We argue that insight into the non-cognitive attributes of students provides useful information towards tailor-making student support strategies.

3. Methods

A quantitative, descriptive, cross-sectional research design was used to describe the grit, academic resilience and mindset of nursing students enrolled in the undergraduate nursing programme at a university in South Africa.

All undergraduate nursing students (N = 315) enrolled in a four-year South African university nursing degree programme were invited to participate in the study, and 70 % (N = 221) chose to participate. The university is classified as a traditional, residential university with approximately 40 000 registered students, with over 50 years of experience presenting an undergraduate nursing programme. The students in this programme require a high school leaving certificate and they come from various socio-economic backgrounds.

Three measurement tools were used in this study: the Short Grit Scale (Grit-S), the Academic Resilience Scale (ARS-30) and the Dweck Mindset Instrument (DMI). These instruments were all standardised and written in English. The Grit-S is an 8-item instrument using five 5-point Likert scale to calibrate an individual's grit which is emblematic of a passion for long term goals and perseverance. The score is derived by averaging the rating of each item, and ranges from a minimum of 1 to a maximum of 5 (Arslan et al., 2013; Calo et al., 2019; Chisholm-Burns et al., 2019). Additionally, the Grit-S has a Cronbach alpha of 0.71 — 0.93.

The ARS-30 is a 30-item instrument that uses 5-point Likert scale to measure academic resilience and has a Cronbach alpha of 0.90

on a global scale (Cassidy, 2016). The tool measures affective, cognitive, and behavioural responses in an educational context. The total is the average of all 30 scores, and the theoretical range is 30 to 150, with higher scores indicating higher academic resilience (Calo et al., 2019; Chisholm-Burns et al., 2019).

The DMI is a 16-item Likert scale with 6 points used to measure a personal belief about whether intelligence and talent are fixed or amenable to change (Dweck, 2006). Scores for intelligence are reversed such that higher scores indicate growth mindset, and lower scores indicated fixed mindset (Moser et al., 2011). This tool has a Cronbach alpha of 0,97 (Lee et al., 2012). In addition to these tools, the participants were required to provide their socio-demographic data, including their level of study, age, information on current and previous studies, and previous and current employment.

Ethics approval was granted from the Health Sciences Research Ethics Committee of the University of the Free State (HSD2020/1110/2909). Data were collected after ethics and gatekeeper approval were granted. A call for participation in the study was shared with all potential participants through the university's learning management system. The call to participate comprised an information leaflet and an electronic consent form. Subsequent reminders were sent to students two and four weeks after the initial call. On agreeing to be part of the study, the participants accessed the data collection tools via an electronic link. Hard copy tools were distributed to students who struggled with online access or preferred the latter option. The hard copy data were collected, cleaned, checked for completeness and captured on Microsoft Excel sheets. Incomplete tools were also included in this study.

Data exported from the web portal was self-coded, while data collected via hard copy tools were coded using Microsoft Excel sheets. The datasets from the 2 collection approaches were merged and stored in Microsoft Excel. In instances of duplicate participation, the researcher de-duplicated the data by retaining only the initial participation based on the date of completion. Data from respondents who did not consent or withdrew their participation at a later stage were excluded from the analysis.

Data were analysed through the Statistical Analysis Software (SAS) Version 9.4. The Chi-square and Fisher's exact tests were considered suitable for describing the proportional differences between four different academic levels of undergraduate nursing students.

4. Findings

The sample consisted of 221 students, representing 70.2 % of the total participants, with ages ranging from 19 to 39 years. Of the respondents who reported their gender, 90.3 % (n = 169) were female. Some of these students had been enrolled in other educational programmes before joining nursing, and only a minority were employed during the time of this study. Table 1 depicts the participants' socio-demographic information.

Table 2 outlines the categories of the non-cognitive attributes which the measurement tools of this study sought to investigate, namely grit, academic resilience, and mindset.

Table 3 shows the mean grit score for all the year groups ranging from 3.4 to 3.5.

Table 4 presents the mean global score of the ARS-30 for the first-, second-, third-, and fourth-year students ranging from 67.0 to 76.5. Fourth-year students had the highest academic resilience of 76.5 and the first-year students had the lowest score of 67.0.

The mean global DMI scores, as shown in Table 5, between first-, second-, third-, and fourth-year students were noted and ranged from 6.4 to 6.8. Third-year students had the highest mean global DMI score of 6.8 and the second-year students had a score of 6.4, which was the lowest. The mean scores that were over the maximum score ranges could be due to outliers – those extreme values that differ from other data points in a data set, possibly skewing the results (Lemonaki, 2021).

5. Discussion

The unpredictability of nursing education programmes and the complexity of the healthcare environment, including changes within society, may act to increase the distress of nursing students, which in turn, complicates their ability to perform optimally. Nursing education institutions must devise strategies to support at-risk students to achieve both academic and personal success. Grit,

Table 1
Socio-demographic information.

Characteristics	Level of study								
	1 st years (n = 59)		2 nd years (n = 53)		3 rd years (n = 57)		4 th years (n = 52)		
	n	%	n	%	n	%	n	%	
Age (years)	≤19	38	74.5%	6	13.3%	1	1.8%	1	2.6%
	20–29	12	23.5%	38	84.4%	55	98.2%	38	97.4%
	30–39	1	2%	1	2.2%	None	None	None	None
Gender	Male	8	16%	5	11.6%	3	5.4%	2	5.3%
	Female	42	84%	38	88.4%	53	94.6%	36	94.7%
Previous studies	Yes	4	8.5%	16	53.3%	15	31.9%	8	38.1%
	No	43	91.5%	14	46.7%	32	68.1%	13	61.9%
Previous employment	Yes	3	6.4%	4	13.3%	10	20.8%	5	23.8%
	No	44	93.6%	26	86.7%	38	79.2%	16	76.2%
Current employment	Yes	None	None	2	6.7%	None	None	1	4.8%
	No	47	100%	28	93.3%	48	100%	20	95.2%

Table 2

Categories of Academic Resilience, Grit and Mindset (Calo et al. 2022; Cassidy, 2016; Whittington et al. 2017).

Measurement tool	Scoring	Category	Interpretation
ARS-30	■ Total = average of all 30 scores.	<100.83	Low
	■ Mean global range from 30 to 150.	100.83 – 130.39	Moderate
		>130.39	High
Grit-S	■ Total = averages of all 8 scores	1 - 2.99	Low/not gritty
	■ Mean scores range from a minimum of 1 to a maximum of 5	3 – 4.3	Normal/gritty
		4.31 - 5	High/extremely gritty
DMI	■ Scores for intelligence are reversed	1 – 3	Fixed
	■ Mean scores range from 1 to 6	3.1 – 3.9	Undecided
		4 - 6	Growth/malleable

Table 3

Mean Grit-S by level of study.

Variable	Level of study			
Mean Grit-S score	First-year	Second-year	Third-year	Fourth-year
	(n = 59)	(n = 53)	(n = 57)	(n = 52)
	3.5	3.5	3.4	3.5

Table 4

Mean ARS-30 scores by level of study.

Variable	Level of study			
Mean global ARS-30 score	First-year	Second-year	Third-year	Fourth-year
	(n = 59)	(n = 53)	(n = 57)	(n = 52)
	67.0	75.0	76.0	76.5

Table 5

Mean DMI scores by level of study.

Variable	Level of study			
Mean global DMI score	First-year	Second-year	Third-year	Fourth-year
	(n = 59)	(n = 53)	(n = 57)	(n = 52)
	6.4	6.4	6.4	6.5

academic resilience, and a growth mindset are crucial non-cognitive attributes that students can develop to enhance their academic performance and success. This study is the first-of-its-kind in sub-Saharan Africa as it explored nursing students' grit, academic resilience, and mindset to inform the development of contextually relevant student support strategies. In this study, students reported normal grit, low academic resilience, and a growth mindset. Grit and mindset remained consistent across the cohorts. Although the students exhibited a persistently low level of academic resilience, their gradual improvement in resilience over time is commendable.

The mean grit scores of undergraduate nursing students in this study were within the normal ranges of 3.4 to 3.5, indicating that the students are gritty. Gritty students can maintain intrinsic motivation to endure adversity in the quest to meet a goal (Calo et al., 2022). These findings are consistent with the outcomes of studies conducted on physiotherapy students in Australia (Calo et al., 2019) and occupational therapy students in the United States (Carson, 2017), but contrary to a study on nursing students in Egypt (Attia and Abdelwahid, 2020). In general, students in health sciences have been reported as being gritty. In the case of the current study, the results may be influenced by the faculty's rigorous selection processes that only accept students who have high secondary schooling scores. Furthermore, the students had already successfully navigated a range of adjustments within higher education, which aligned with the adoption of different teaching and assessment practices during the COVID-19 pandemic.

The maintenance and development of students' grit levels are pivotal. Nursing educators should thus demonstrate grit and seek to instil it in undergraduate nursing students. McCabe (2016) encouraged nursing educators to be cognisant of their own grit to support its development in students. Additionally, the RESET-P-GOALS programme (Mirza et al., 2021) could be integrated into the undergraduate nursing curriculum to maintain and strengthen the grit levels of undergraduate nursing students. The RESET-P-GOALS programme is a learning strategy that develops skills such as cognition, mastery of learning, metacognition, time management, reflection, and self-regulation. Indeed, Mirza et al. (2021) reported that they implemented this programme in a medical programme and found that it increased medical students' grit levels.

In our study, the mean global ARS-30 scores ranged from 67.0 to 76.5, meaning that the students' academic resilience was low. Interestingly, the scores increased with the years of study. This incremental increase in students' academic resilience scores over the years is expected; increased life experience as a nursing student results in exposure to exciting encounters, which in turn makes them

more resilient (Ramalisa et al., 2018). The current study's findings resonate with those of Calo et al. (2019, 2022), who found low academic resilience levels in a proportion of Australian physiotherapy students who were mostly twenty-four years old or younger. Calo et al. (2019, 2022) suggest that these low resilience levels could compromise student engagement and possibly hinder academic success.

Meanwhile, Mozammel et al. (2018) proffer that developed academic resilience improves student engagement and facilitates students' responsive engagement with adverse events. The ability of students to be in control, be creative, make decisions, think critically, and solve problems is essential in the field of nursing, yet could be at risk of being inadequately developed (Hwang and Shin, 2018; Kuldass et al., 2015).

The low academic resilience may be driven by the high number of clinical hours expected of South African students compared to other health professions. Nursing students are expected to spend between 2000 and 4000 clinical hours during a four-year programme before graduation. Extended time in the clinical facilities separates students from support structures such as family and friends. Rogers (2017) agrees with Radhamani and Kalaiivani (2021) in valuing the connection, guidance, and support that students often receive from their families in fostering academic resilience.

An emotional education intervention may thus improve and sustain academic resilience among nursing students in undergraduate nursing curricula. For example, Smith (2012) implemented a social-emotional learning programme in an educational setting, which enhanced academic resilience. Additionally, an interprofessional education programme should be strengthened in the undergraduate nursing curriculum. As suggested by Conrado-Hijon (2017), an educational programme that includes interprofessional education enhances the development of academic resilience.

The current study's mean global DMI score ranged from 6.4 to 6.8, indicating a growth mindset. These findings resonate with a study conducted on physiotherapy students in Australia (Calo et al., 2019) and another study that included veterinary sciences students in the United Kingdom (Bostock et al., 2018). These findings suggest that the students are mastering their goals, appreciate feedback, learn from their mistakes, are self-efficient and motivated, and use appropriate learning strategies. All these strategies could enhance their chances of academic success. A growth mindset is one that includes a cautious and persevering attitude (Mills and Mills, 2018; Yousefi and Khalkhali, 2018), identification and application of effective learning strategies (Yan et al., 2014), the mastery of goals (Aditomo, 2015; Fraser, 2018; Moser et al., 2011), motivation (Liu et al., 2018), and self-efficacy (Davis et al., 2011). The growth mindset of nursing students could be associated with the time they are exposed to various areas in clinical settings during their studies. As prospective health professionals, these students will be expected to be at the forefront of the healthcare system and through their professional knowledge, cope with the complexities inherent in the healthcare system. As such, it would be expected that they be able to assess and identify their knowledge gaps and formulate strategies that address these gaps to enhance their performance. These abilities should enable them to complete their professional tasks.

The complexities of healthcare systems drive the need for self-directed health professionals (Nottidge and Louw, 2017). Implementing a sustained growth mindset intervention into undergraduate nursing programmes, such as identifying the types of educational interventions that maintain a long-lasting growth mindset, could provide the basis for an essential ameliorative approach. Mentorship, a practice of incentivising a mentee to acknowledge their challenges and learn from their mentor, is identified as one practice that can assist students in maintaining a growth mindset if applied consistently.

6. Limitations

The limitations of this study include the fact that data were collected from one university in South Africa. Although not representative of other nursing institutions, it nevertheless makes a contribution to the field of nursing education since it is the first study of its kind in the sub-Saharan region. Self-reported measures of grit, resilience, and mindset may be subject to social desirability and the desire of students to provide socially appropriate answers. Further research could focus on the correlations of these attributes to students' academic outcomes to enrich the description of this work.

7. Conclusion

Grit, academic resilience, and mindset are crucial non-cognitive attributes that influence the ability of students to cope with complex nursing education programmes. This study investigated the presence of these non-cognitive attributes in undergraduate nursing students at a university in South Africa. The findings demonstrate that the students have normal grit and a growth mindset, but low academic resilience. Potential interventions to improve the academic resilience of nursing students and students in other health professions are not well established and require further research. From this study, the following recommendations are made:

- Further research should examine the correlations between non-cognitive attributes and student academic performance.
- Multi-site research should be done, which integrates the role of limited resources in nursing education and student outcomes.
- Systems should be developed that flag at-risk students and assist in developing individualised learning plans.
- A supportive learning environment should be developed, which enables at-risk nursing students to engage with individual modifiable factors.

Grit, academic resilience, and a growth mindset are noted by Calo (2022) as being complex. Yet these non-cognitive attributes develop with life experiences. Strategies to support students should not focus on eliminating or overcoming challenges but on students' ability to adapt to changes in the complex healthcare environment and in their personal lives.

The words of Alain Dehaze come to mind:

“As the world we live in so unpredictable, the ability to learn and adapt to change is imperative, alongside creativity, problem solving, and communication skills”.

Data statement

The data from this work may be shared based on reasonable requests.

Author statement

We consent that all the authors meet the authors meet the criteria for authorship.

What is already known

- The clinical learning environment requires nursing students to be resilient
- Non-cognitive attributes of nursing students can be modified
- The non-cognitive attributes of South African nursing students are unknown

What this paper adds

- Non-cognitive attributes influence nursing students' engagement with challenges in the healthcare system
- Academic resilience of nursing students is low which can be developed
- Educational programmes must be tailored to include interventions that enhance academic resilience

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CRediT authorship contribution statement

Boitumelo Setlogelo: Writing – original draft, Project administration, Methodology, Investigation, Conceptualization. **Champion N Nyoni:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Data curation, Conceptualization.

Declaration of competing interest

None.

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Supplementary materials

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